Narrikup export abattoir

Benale Pty Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 808
February 1996

PJA

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 8 March 1996

Environmental Impact Assessment (EIA)

Process Timelines in weeks

Date	Timeline commences from receipt of full details of proposal by proponent	Time (weeks)
30/10/95	Proponent Document Released for Public Comment	
27/11/95	Public Comment Period Closed	4
12/12/95	Issues Raised During Public Comment Period Summarised by DEP and Forwarded to the Proponent	4
22/12/95	Proponent response to the issues raised received	2
23/2/96	EPA reported to the Minister for the Environment	9

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Summary and recommendations

The proponent, Benale Pty Ltd, proposes to establish an export abattoir at Narrikup 20km north of Albany (Figure 1). This proposal has been assessed by the Environmental Protection Authority (EPA) at the level of Consultative Environmental Review (CER).

The EPA concluded that for this proposal the key environmental issues with respect to biophysical impacts, pollution management and social surroundings were as follows:

Biophysical impacts

- Protection of flora and fauna.

Pollution management

- Potential for drawdown of water table.
- Management of nutrients.
- Management of salinity.
- Management of solid wastes.
- Management of noise.
- Management of odours.

Social surroundings

- Traffic impacts.

The EPA, during its assessment has utilised the information given in the proponent's CER document, received the advice of government agencies, and has taken into account additional information supplied by other government agencies, the public and the proponent.

With respect to the key environmental issues and environmental objectives, the EPA has concluded that the proponent will need to undertake further investigations to remove the uncertainty with regard to the sustainability of groundwater supplies of adequate quality, prior to the commencement of operation of the abattoir.

In relation to the management of nutrients and salinity, the EPA has concluded that the proponent should ensure that no net export of nutrients or salt occurs at the property boundary. To achieve this, the proponent would need to prepare and implement a detailed Environmental Management Programme (EMP) to monitor whether these are being contained on-site. The EMP should include a competent contingency plan which will be implemented in the event of unforeseen and unacceptable release of nutrients or salinity from the property. Implementation of the EMP should ensure that the abattoir will be managed to meet the environmental objectives for this proposal.

The EPA also concludes that the proponent's draft EMP should be released for a four week public comment period, prior to finalisation, so that all relevant government agencies and local government authorities as well as interested members of the local community can have input into the EMP.

The overall conclusion of the EPA is that the proposal can be made environmentally acceptable subject to the implementation of the proponent's commitments and the EPA's recommendations in this assessment report.

Recommendation Number	Summary of recommendations
1	The EPA recommends that the proposal as described in the proponent's CER be approved to proceed subject to implementation of the proponent's commitments and the EPA's recommendations in this report.
2	The EPA recommends that the proponent prepare an Environmental Management Programme (EMP) to the satisfaction of the EPA, on advice from the Department of Environmental Protection and Water and Rivers Commission (for components i, ii and iii), which includes, but is not restricted to, the following: **i Protection of groundwater** • results of investigations undertaken to demonstrate that sufficient groundwater of adequate quality is available so that salinity and groundwater drawdown management objectives can be met; • a monitoring and audit programme to detect any impacts on the water table and the quality of groundwater due to the abstraction of groundwater; and • a contingency plan in the event of there being unacceptable impacts on the water table and its water quality due to the abstraction of groundwater. **ii. Wastewater disposal** • an irrigation management plan which when implemented, - allows nutrient uptake in plants and phosphorus retention in amended soil, but not salt build up in the soil; and - balances the requirements for leaching to prevent salt build-up in the soil but not to transfer nutrients to groundwater; • a monitoring and audit programme to detect any impacts on irrigated pastures and woodlots, soil conditions, and the quality of groundwater, treated wastewater, and water in Mill Brook due to nutrient input from irrigated wastewaters; • a monitoring and audit programme to detect any impacts on irrigated pastures and woodlots, soil conditions and water in Mill Brook due to the salinity of irrigated wastewaters; • a contingency plan in the event of there being unacceptable impacts on the water quality of Mill Brook due to nutrient input; and

2 Cont'd	• a contingency plan in the event of there being unacceptable impacts on pastures and woodlots, soil conditions, Mill Brook and the groundwater aquifer due to the salinity of irrigated waste waters. **iii. Nutrient uptake** • a monitoring and audit programme to regularly determine the ongoing phosphorus retention capacity of the amended soils, which is reviewed at five yearly intervals; and • a contingency plan to ensure adequate retention of phosphorus. **iv. Noise** • noise management measures at the abattoir; • a monitoring and audit programme for noise emissions as a means of gauging the effectiveness of noise control measures and compliance with allowable noise levels; and • a contingency plan in the event of there being unacceptable impacts on nearby premises due to noise above accepted standards. **v. Odours** • process design, and management measures for odour control with particular attention to the rendering plant and wastewater treatment plant; • a monitoring and audit programme for odorous emissions generated from abattoir operations; and • a contingency plan in the event of there being unacceptable impacts on nearby odour sensitive premises. **vi Solid waste management on site** • an inventory of the nature and quantities of solid wastes generated; • identification of solid wastes which are recycled or converted to other materials; • waste disposal approvals obtained from local government authorities and relevant government agencies; • the locations and technical designs of waste disposal sites; and • a contingency plan in the event that solid wastes cannot be rendered on site.
3	The EPA recommends that the draft Environmental Management Programme should be released for a four week public comment period prior to finalisation. The draft document should be made available to all relevant government agencies, and local authorities, as well as to interested members of the local community so that the EPA can receive comments which will be taken into account by the proponent during its preparation of the EMP.
4	The EPA recommends that prior to undertaking any widening of proposed roads for abattoir transport, the proponent shall carry out a vegetation survey of the road reserve to determine the potential impacts on rare and endangered species in these areas which are protected by the Wildlife Conservation Act, 1950-1979, and manage the impacts on these species in a manner that is consistent with the findings of the survey. The proponent should provide information on the survey to the EPA, the Shire of Plantagenet, Department of Conservation and Land Management and the National Parks and Nature Conservation Authority.

5	The EPA recommends that during the operation of the abattoir, the proponent shall ensure that no net export of nutrients via surface or groundwater occurs at the property boundary and that there is adequate monitoring and control to meet this objective.
6	The EPA recommends that during the operation of the abattoir, the proponent shall ensure that no net export of salts via surface waters occurs at the property boundary and that there is adequate monitoring and control to meet this objective.

1. Introduction

1.1 The purpose of this report

This report and recommendations provide the EPA's advice to the Minister for the Environment on the environmental acceptability of a proposed export abattoir located on a property on Settlement Road, Narrikup in Western Australia.

1.2 Background

Since the closure of the Metro Meats abattoir at Albany, there has been a sustained effort by State Government agencies and the local authorities of the Town of Albany, Shire of Albany, and Shire of Plantagenet, to establish a new abattoir in the Albany region.

In January 1995, the proponent, Benale Pty Ltd, referred a proposal to establish an export abattoir at Narrikup 20km north of Albany, to the EPA for assessment (Figures 1 and 2). The EPA set the level of assessment at CER. During the environmental assessment of this proposal the EPA utilised information supplied by other government agencies, the public and the proponent.

The CER was prepared in accordance with guidelines issued by the EPA. Public consultation during the preparation of the document helped ensure that interested individuals and groups were aware of the proposal and in a position to provide informed comment. The CER document was released for public review for a 4 week period ending on Monday 27 November 1995. A summary of issues raised in public submissions was prepared and forwarded to the proponent, and the proponent's responses were taken into account during this assessment.

This EPA Bulletin is provided as advice to the Minister for the Environment and published. After a 14 day appeal period, the Minister sets Environmental Conditions relating to the proposal.

1.3 Structure of report

This document has been divided into seven Sections.

Section 1 describes the historical background to the proposal and its assessment and explains the structure of this report. Section 2 briefly describes the proposal (more detail is provided in the proponent's CER). Section 3 explains the method of assessment and provides an analysis of public submissions with the ultimate aim of identifying the key environmental issues to be evaluated in Section 4.

Section 4 sets out the evaluation of the key environmental issues associated with the proposal. In each sub-section, the environmental objectives are defined, the likely effect of the proposal, key issues raised in the advice to the EPA from submissions and the proponent's response to submissions. Then the adequacy of the response by the proponent is considered in terms of project modifications and environmental management commitments in achieving an acceptable outcome. The EPA's analysis and recommendations with respect to the identified issues are contained in this section. Where inadequacies are identified, recommendations are made to achieve the environmental assessment objective.

Section 5 summarises the conclusions and recommendations. Section 6 describes the recommended environmental conditions. References cited in this report are provided in Section 7.

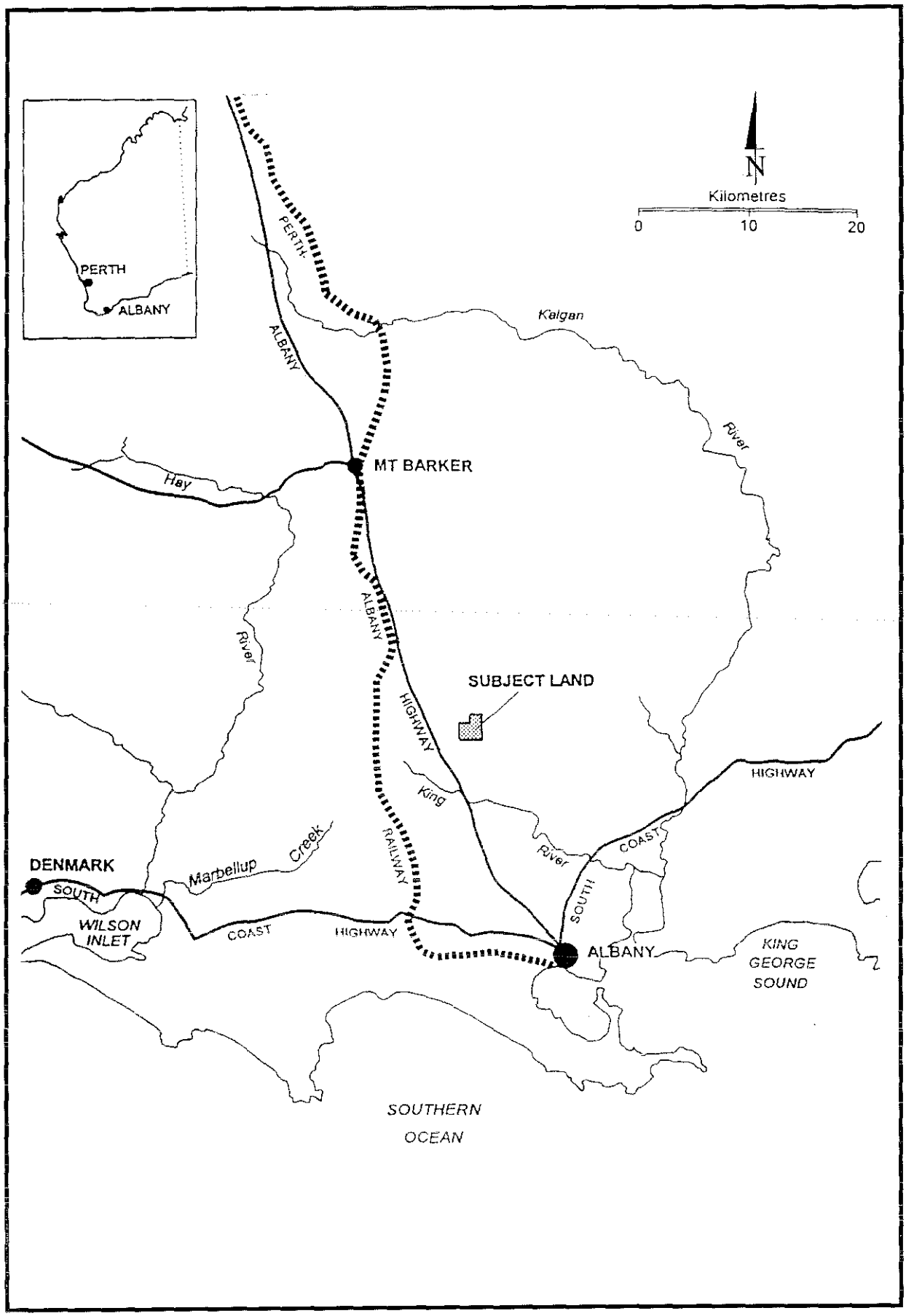


Figure 1. Regional loacation map. (Source: Figure 1 of the CER)

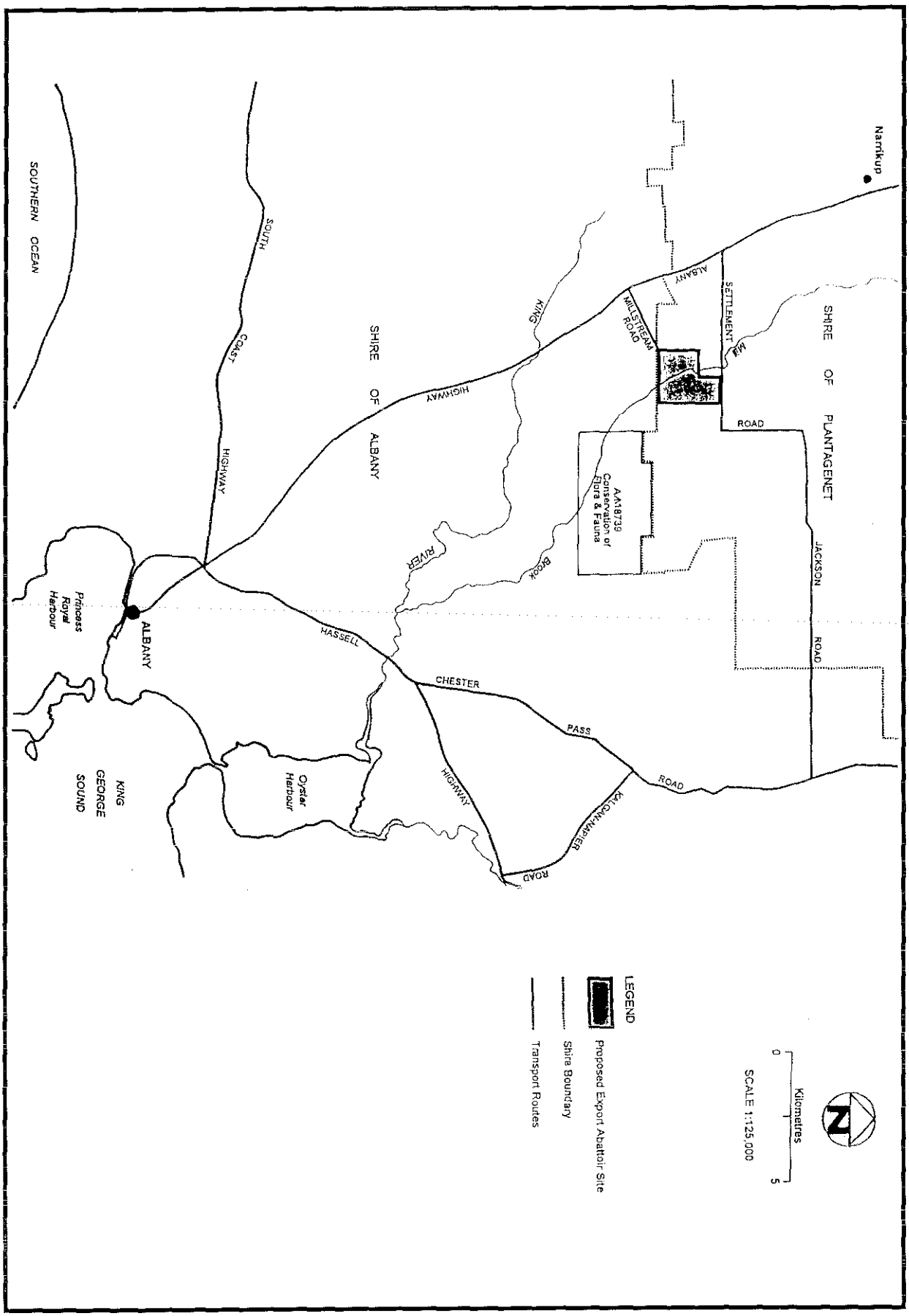


Figure 2. Location map. (Source: Figure 11 of the CER)

2. The proposal

The site chosen for the abattoir comprises two adjacent lots with a total area of about 425ha, located 28km south of Mt Barker and 20km north of Albany (see Figures 1 and 2). The site was originally zoned Rural and an application for rezoning to a Special Site (abattoir and associated uses) within the Rural zone was approved by the Hon. Minister for Planning on 15 October 1995. Most of the land has been cleared for agricultural purposes, but there are stands of remnant vegetation on hillocks and along Mill Brook.

The proposed Narrikup export abattoir (CER, 1996) would have the capacity to process 1,000,000 sheep and 50,000 cattle each year. It would include stockholding areas, lairage yards, the abattoir itself, a rendering plant for processing animal wastes, a fellmongery for the removal of wool from sheepskins, and a pickling plant for defleeced skins (Figure 3).

The abattoir process water requirements are proposed to be sourced from the underlying aquifer through the abstraction of approximately 1000m^3 per day (210,000m^3 per year) of groundwater.

The wastewater treatment system proposed for the abattoir is illustrated in Figure 4 and comprises primary treatment using screens and a dissolved air flotation unit, and secondary treatment using two anaerobic ponds in parallel, two aerobic ponds in series, and a single aerobic maturation pond.

Wastewater from the aerobic maturation pond would be used to irrigate forage pasture and wood lots. Nutrients in the wastewater from the maturation pond would have estimated concentrations of 85mg/L for total nitrogen and 30mg/L for total phosphorus. At an annual flow rate of 210,000m^3/yr, the total nutrient load from the abattoir after primary and secondary treatment would be 18 tonnes total nitrogen and 6.3 tonnes total phosphorus per year.

The predicted nutrient input and uptake rates for the site are detailed in Table 1 below:

Table 1. Predicted Nutrient Input and Uptake Rates

	Irrigated pasture	Dry pasture	Woodlots	Total uptake	Annual nutrient input/load	Balance
Nitrogen (tonnes per year)	9.6	3.5	9.0	22.1	18	-4.1
Phosphorus (tonnes per year)	1.1	0.4	0.2	1.7	6.3	+4.6

The use of red mud gypsum (RMG) is proposed to increase the phosphorus retention ability of the soil in order to allow for the adsorption of the balance of the phosphorus load not taken up.

Solid wastes at the abattoir generated from the processing of stock and from the wastewater treatment system will be recovered and processed through the rendering plant. Wastes in the form of faeces collected below lairage yards will either be taken away to a landfill site, or sold as fertiliser.

The abattoir will operate from 7.00am to 4.00pm from Monday to Friday each week, for 210 days each year (ten months). The abattoir will not operate for two months during winter. The transport of stock to the abattoir and of produce to either the Port of Albany or the Port of Fremantle for export, will involve approximately 30 truck movements each day along Settlement Road from the west, and 26 truck movements each day along Settlement Road from the east. This represents about three truck movements to the west of the site and three truck movements to the east of the site each hour between 7.00am and 4.00pm. In addition, there are likely to be between 200 and 400 cars arriving at the plant between 6.30am and 7.00am and leaving between 4.00pm and 4.30pm.

The proposal is described in detail in the proponent's CER (1996) document. Table 2 is a summary of the project characteristics.

Table 2. Summary of project characteristics

Inputs	
Processing of stock	
Sheep	1,000,000 per year
Cattle	50,000 per year
Groundwater for process water	210,000m^3 per year
Electrical power	2,500kV
Outputs	
Commercial meat resulting from processing of stock	33,600 tonnes per year
Solid waste output	200 tonnes per year
Volume of wastewater	827 kL/day
Nitrogen load in treated wastewater	18 tonnes per year
Potential nitrogen uptake by irrigation areas	22.1 tonnes per year
Phosphorus load in treated wastewater	6.3 tonnes per year
Potential phosphorus uptake by irrigation areas	1.7 tonnes per year *
* *The residual 4.6 tonnes of phosphorus to be adsorbed by red mud amended soils*	
Area for irrigation	
Kikuyu grass/white clover	40ha
Eucalypts	100ha
Transport	
Truck movements	
From the west	30 trucks per day
From the east	26 trucks per day
Light vehicle movements	200 to 400 per day
General	
Area of proposed site	425ha
abattoir operation times	7am to 4pm; Monday to Friday
	210 days per year (or 10 months per year)
Project lifespan	Indefinite
Nearest residence	1000m from abattoir rendering plant

Figure 3. Plant layout. (Source: Figure 10 of the CER)

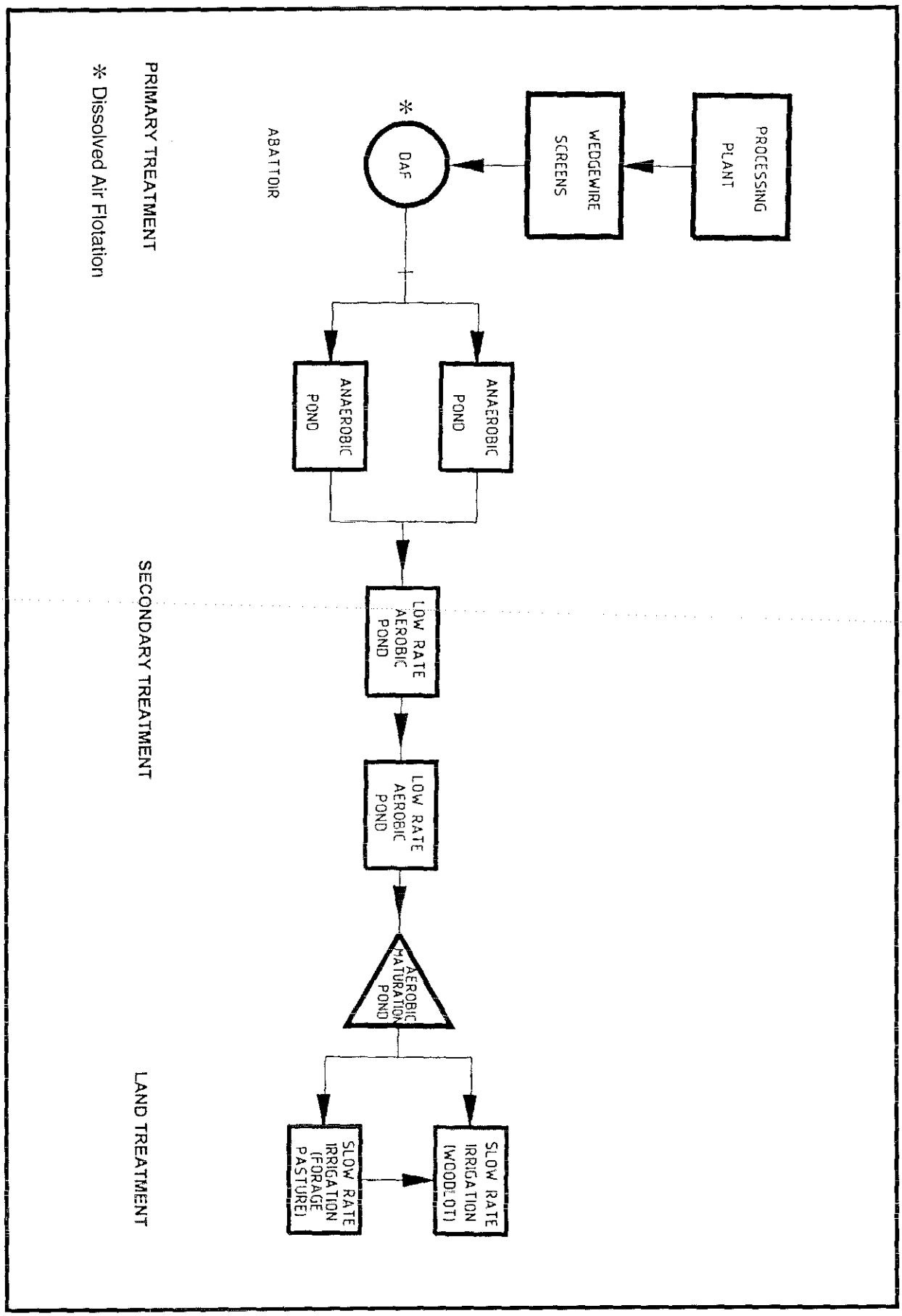


Figure 4. Abattoir wastewater treatment syste. (Source: Figure 13 of the CER)

3. Identification of issues

3.1 Method of assessment

The purpose of the environmental impact assessment is to determine whether a proposal is environmentally acceptable or under what conditions it could be environmentally acceptable.

A set of administrative procedures has been defined (refer to flow chart in Appendix 1) in order to implement this method of assessment.

The first step in the method is to identify the environmental issues to be considered. A list of topics (or possible issues) is identified by the EPA through the preparation of guidelines which are referred to relevant agencies for comment prior to being finalised.

In the next main step these topics are considered by the proponent in the CER both in terms of identifying potential impacts as well as making project modifications or devising environmental management strategies.

The CER is checked to ensure that each topic has been discussed in sufficient detail by the proponent prior to release for government agency and public comment. The submissions received are summarised and this process can add environmental issues which need to be evaluated in terms of the acceptability of potential environmental impact.

Proponents were invited to respond to the issues raised in submissions. Appendix 2 contains a summary of the issues raised in submissions and the proponent's response to those issues. A list of submitters appears as Appendix 3. A total of 36 submissions were received from the public (22), community groups (3) and various local and state government agencies (11).

The proponent's revised commitments following their response appears in Appendix 4.

The above information, namely the guidelines, the proponent's CER, the submissions and the proponent's response to these submissions, is then subjected to analysis for environmental acceptability. For each environmental issue, an objective is defined and, where appropriate, an evaluation framework identified.

The expected impact of the proposal, with due consideration to the proponent's commitments to environmental management, is then evaluated against the assessment objective. The EPA then determines the acceptability of the impact. Where the proposal as defined by the proponent has unacceptable environmental impacts, the EPA can either advise the Minister for the Environment against the proposal proceeding or make recommendations to ensure the environmental acceptability of the proposal.

Limitation

This evaluation has been undertaken using information currently available. The information has been provided by the proponent through preparation of the CER document (in response to guidelines issued by the EPA), by DEP officers utilising their own expertise and reference material, by utilising expertise and information from other State government agencies, information provided by members of the public, and by contributions from EPA members.

The EPA recognises that further studies and research may affect the conclusions. Accordingly, the EPA considers that 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 EPA.

3.2 Public and agency submissions

During the assessment the EPA sought expert advice from the DEP, Water Authority of Western Australia, Western Australian Department of Agriculture, Geological Survey of Western Australia, Main Roads Department of Western Australia, Albany Waterways

Management Authority, Great Southern Development Authority, Shire of Albany, Town of Albany, Ministry for Planning, Health Department of WA, Government Officers Technical Advisory Group and the Water and Rivers Commission.

Comments were also sought on the proposal from the public and community groups. 36 submissions were received by the EPA during the submission period of 30 October 1995 to 27 November 1995, . A summary of the submissions was forwarded to the proponent's consultants, Alan Tingay and Associates, for response on behalf of the proponent. The consultants received copies of the full submissions from each State Government agency.

Submissions received by the EPA were from the following sources:

- Twenty-two from individual members of the public.
- Three from groups and organisations.
- Eleven from State and other government agencies.

The EPA has considered the submissions received and the proponent's response as part of the assessment of this proposal.

3.3 Review of topics

A number of topics were identified during the environmental impact assessment process, including those topics identified in the EPA guidelines, subsequent consultations with the proponent and relevant government agencies and in public and government agency submissions. The principal topics of concern are as follows:

Biophysical impacts

- Impacts on flora and fauna (in particular, rare and endangered species) on-site at the abattoir, along proposed traffic routes and along Mill Brook.

Pollution management

- Impacts on the water table due to extraction of groundwater.
- Management of nutrients (including potential impacts on groundwater and Mill Brook and Oyster Harbour).
- Management of salinity (including potential impacts on soils and on Mill Brook).
- Management of solid wastes.
- Management of noise.
- Management of odours.
- Contingency plans.
- Treatment of wastewater.

Social surroundings

- Traffic impacts.
- Socio-economic impacts (including devaluation of property values, security, etc.)

The topics and concerns raised during the public review period have been reviewed and from them, specific environmental issues have been identified which require evaluation. These include:-

Biophysical impacts

- Impacts on flora and fauna (in particular, rare and endangered species).

Pollution management

- Impacts on the water table due to extraction of groundwater.
- Management of nutrients.
- Management of salinity.
- Management of solid wastes.
- Management of noise.
- Management of odours.

Social surroundings

- traffic impacts.

The EPA is of the view that the balance of the topics are addressed adequately in Table 3. Specifically, the EPA considers that the treatment of wastewater via the wastewater treatment system proposed in the CER, can be addressed via the DEP's Works Approval process. This process will ensure that the wastewater treatment facilities will be designed and constructed in accordance with the requirements of the DEP and any other relevant government agency.

Similarly, the topic of contingency plans to address nutrient and salinity impacts as well as impacts on the water table is discussed in the sections of the report on impacts on the water table (Section 4.2), management of nutrients (Section 4.3), and management of salinity (Section 4.4) respectively.

The EPA considered that some issues were principally an expression of socio-economic concerns or issues not relevant to this proposal eg property values and security of locals. Such issues are considered to be more adequately dealt with in other processes rather than the EPA assessment process, and have therefore not been considered in this report.

4. Evaluation of key issues of concern

The EPA has considered the issues raised during the environmental impact assessment process including matters identified in public submissions. The EPA has evaluated the key environmental issues identified in Table 3 (Section 3.2) of this report, based on existing information and advice from other Government agencies and public comments.

Biophysical impacts

4.1 Protection of flora and fauna

4.1.1 Objective

The EPA's objective is to protect flora and fauna (particularly endangered or protected flora and fauna) on-site at the abattoir, along proposed traffic routes and along Mill Brook, from detrimental impacts associated with the development and operation of the proposed abattoir, including nutrients, salinity and a lowered groundwater table.

Table 3. Identification of issues requiring Environmental Protection Authority evaluation.

BIOPHYSICAL IMPACTS

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	PUBLIC COMMENTS	IDENTIFICATION OF ISSUES
Impacts on flora and fauna	The project will involve site clearances for the abattoir facilities, water extraction, wastewater irrigation of pastures and woodlots, and widening of access roads.	**Town of Albany**-nutrient effects on rare and endangered species at site and on Mill Brook **Shire of Albany**-vegetation stress due to a decrease in freshwater supply as a result of groundwater extraction.	Concern over potential impacts remnant vegetation at site and on flora and fauna along Mill Brook. Concern over potential impacts on remnant vegetation along roads proposed for upgrading and widening. Concern over downstream impacts of nutrient loading on Mill Brook Nature Reserve. No detailed study of existing flora or fauna undertaken, so how can impacts from abattoir operations on flora and fauna be determined.	The potential impacts on flora and fauna at the site, access roads and areas where hydraulic regime has changed, need to be evaluated by the EPA.

Table 3.Identification of issues requiring Environmental Protection Authority evaluation. (cont'd)

POLLUTION MANAGEMENT

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	PUBLIC COMMENTS	IDENTIFICATION OF ISSUES
Impacts on the water table due to extraction of groundwater	The abattoir will extract 1ML/day of groundwater for process water.	**Geol Survey**-hydrological studies were inadequate in proving availability of groundwater, potential impacts on water table and hence, quality of groundwater aquifer. **Shire of Albany**-Drilling program and pump testing only carried out over small section of site. Validity of assumptions used is questioned. **Ag Dept**-More bores need to be measured to determine drawdown from extraction and verify modelling.	Concern that pumping tests were carried out over a small area for 1 day at 1/3 of the rate proposed, yet results were predicted for the whole site for 210 days at 3 times the rate tested.	The potential impacts on the water table need further evaluation by the EPA

Table 3.Identification of issues requiring Environmental Protection Authority evaluation. (cont'd)

POLLUTION MANAGEMENT

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	PUBLIC COMMENTS	IDENTIFICATION OF ISSUES
Management of nutrients	Wastewater from the abattoir will be irrigated over woodlots and irrigated and dry pastures at the site. Red mud gypsum will be used to increase phosphorus absorption capacity in soils.	**WAWA**-export of nutrients from irrigation pastures through surface runoff. Removal of total phosphorus through woodlots and irrigated and dry pastures and soil adsorption using red mud. **Albany Waterways**-Require further details on nutrient uptake from woodlots and pastures and impacts of livestock on nutrient uptake and soil stability. **Town of Albany**-Concern for runoff from stockholding areas reaching Mill Brook and eventually Oyster Harbour and King George Sound. Concern over high stocking rates resulting in denudation of crop pastures and thereby reducing nutrient uptake by crops. Input of nutrients from stock not taken into account.	Concern over effectiveness of red mud gypsum in retaining phosphorus in soil profile. Concern over nutrient enrichment of groundwater. Concern over the fact that nutrient absorption predictions used average of 8m of soil, but actual soil depths at the site can be as low as 3.6m Concern over nutrient enrichment of Mill Brook from runoff from storm events, soil compacted stockholding areas, overflow from ponds. Concern over nutrient uptake rates of kikuyu grass. Concern over saturation of soils due to high moisture content resulting in reduced nutrient uptake and runoff. Need for baseline monitoring of Mill Brook and continuous monitoring thereafter by an independent operator.	The issue of management of nutrients needs further evaluation by the EPA

Table 3.Identification of issues requiring Environmental Protection Authority evaluation. (cont'd)

POLLUTION MANAGEMENT

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	PUBLIC COMMENTS	IDENTIFICATION OF ISSUES
Management of nutrients (cont'd)		**Ag Dept**-Need continuous monitoring of flow rates and quality of Mill Brook. Need periodic measurement of PRI to determine speed at which soil is becoming saturated with phosphorus. **DEP**-Concern over efficacy of red mud in retaining nutrients and potential for nutrients subsequently leaching into groundwater. Runoff from lairage areas needs to be addressed. **GOTAG**-More detail on runoff control required so that risk of contamination of waterbodies on eastern side and south of site can be addressed. **Shire of Albany**-Need for strategic drainage or contour banks to control surface runoff. **Geol Survey**-Preferential flow paths due to heterogeneous soils, which may result in nutrient contamination of aquifer. Low soil permeability will result in generation of runoff.		The issue of management of nutrients needs further evaluation by the EPA

Table 3.Identification of issues requiring Environmental Protection Authority evaluation. (cont'd)

POLLUTION MANAGEMENT

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	PUBLIC COMMENTS	IDENTIFICATION OF ISSUES
Management of salinity	Irrigation wastewaters will be saline due to salt content in groundwater used for processing.	**WAWA**-concern over potential for increase in salinity levels in soil due to wastewater irrigation. **GOTAG**-Concern over white clover (pasture crop) tolerance of saline wastewater. **Shire of Albany**-concern over increase in salinity of groundwater through extraction of fresh water layer resulting in salinisation of Mill Brook. **DEP**-Concern over salinisation of Mill Brook from irrigation of saline wastewater.	Concern over use of salt intolerant, nitrogen fixing legume (white clover) in pasture mix. Concern over increase in salinity of wastewater from pickling process. Concern over increase in salinity of groundwater and resultant impacts on bore water. Concern over salinity impacts on vegetation along Mill Brook and on rare and endangered plant species.	The issue of management of salinity needs further evaluation by the EPA
Contingency plans	Disposal of wastewaters may result in unacceptable impacts on surface and groundwater.	**WAWA**-Identification of potential impacts and management strategies sought. **Town of Albany**-Concern for runoff from stockholding areas reaching Mill Brook and eventually Oyster Harbour and King George Sound. Corrective action needs to be identified. In the event of unacceptable salinity impacts on groundwater, Mill Brook or other waterways, the proponent needs to implement immediate corrective action. **DEP**-Proponent needs to monitor nutrient export from amended soil layer and commit to undertake remedial action if red mud isn't working.	Need clarification of what contingencies are in place to address salinity impacts on Mill Brook and nutrient impacts on Mill Brook and Oyster Harbour. Need for contingency plans to address leakage of treatment and holding ponds.	The issue of contingency plans to address nutrient and salinity impacts and impacts on the water table is addressed in sections on management of nutrients, management of salinity and impacts on the water table, respectively.

Table 3.Identification of issues requiring Environmental Protection Authority evaluation. (cont'd)

POLLUTION MANAGEMENT

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	PUBLIC COMMENTS	IDENTIFICATION OF ISSUES
Management of solid waste	Solid waste will be generated at the abattoir and disposed of in a landfill.	**DEP**-proponent must ensure that an appropriate landfill is secured with the local Authority to accept solid waste. In the event the rendering plant fails, an alternative rendering plant needs to be identified to accept the material. Proponent should consider pelletising the faecal solid waste.	Proponent needs to ensure that an appropriate location is secured for disposal of construction waste, solid waste from wastewater treatment and general rubbish.	The issue of management of solid wastes generated from the abattoir needs further evaluation by the EPA
Management of odours	Odours will mainly be generated from the rendering plant and wastewater treatment ponds.	**Shire of Albany**-Proponent failed to consider localised temperature inversions when predicting odour impacts **DEP**-need to detail wastewater/odour issues related to the fellmongery, pickling operation and skin drying.	Odour controls should be in place prior to commissioning of plant. Concern over relevance of meteorological data (from Albany Airport) used in predicting odour impacts.	The issue of management of odours generated from the abattoir needs further evaluation by the EPA
Management of noise	Noise will be generated by plant operations.	**DEP**-Proponent needs to commit to complying with regulations.	Need traffic noise study for when ship is in port due to campaign hauling.	The issue of management of noise generated from the abattoir needs to be evaluated further by the EPA.
Wastewater treatment	Wastewater from the plant will be treated prior to irrigation.	**DEP**-Need detailed designs for aerobic/anaerobic treatment ponds and holding ponds, lining, storage, the plant itself and pollution control devices. **Shire of Albany**-Need for greater amount of freeboard to prevent overflow/overtopping of ponds.		Detailed designs and specifications will need to be addressed via Works Approval process. No further evaluation by EPA process

Table 3.Identification of issues requiring Environmental Protection Authority evaluation. (cont'd)

SOCIAL SURROUNDINGS

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	PUBLIC COMMENTS	IDENTIFICATION OF ISSUES
Traffic impacts	An average of 30 trucks and 200 to 400 private vehicles are proposed to result from the project each day with occasional campaign hauling (additional 120 truck movements) when a ship is in Albany Port.	MRD-Upgrades will be necessary for major road routes (Settlement Road and major intersections). Proponent needs to clarify how often campaign hauling will occur.	Concern over safety of children crossing Settlement Road after school, during peak traffic. Concern over impacts of increased traffic on Settlement Road on local residents during cattle and machinery crossings of Settlement Road. Concern over traffic noise and related dust impacts Proponent should use Millstream Road as major access route due to low residential density and minimal disruptions. Project should not go ahead until road upgrades complete. Need for company bus service to reduce number of small vehicles on road.	The issue of traffic impacts will need further evaluation by the EPA
Socio-economic impacts (eg property values and security)	Establishment of the abattoir in Narrikup may have socio-economic impacts, eg affect values of local properties, and impact on security of local residents.		Concern over the potential for property devaluation due to establishment of the abattoir at Narrikup. Concern that the increase in number of employees may result in security of local residents being threatened.	These issues are outside the scope of this assessment and should be addressed through other processes rather than the EPA assessment process. The issues require no further evaluation by the EPA.

4.1.2 Evaluation framework

Existing policy framework

To meet the requirements of the Wildlife Conservation Act, (1950-1979) and maintain biodiversity in the State.

Technical information

The CER identifies the dominant vegetation type in the vicinity of the abattoir site as a low to medium density Marri (*Eucalyptus calophylla*) Woodland. A large proportion of the site has been cleared of original vegetation for farming purposes, and stands of remnant native vegetation are now confined to the tops of hillocks and ridges and to the banks of Mill Brook. The Mill Brook channel is also lined by bunch grasses and reeds. Stands of Tasmanian Blue Gum (*Eucalyptus globulus*) planted in rectangular-shaped plots for erosion and stock protection purposes are also scattered throughout the property.

The remnant vegetation includes areas that contain species listed as rare and endangered (*Banksia brownii, Banksia goodii and Eucalyptus goniantha goniantha*) under the provisions of the Wildlife Conservation Act, 1950-1979. These areas are situated along the southern boundary of the property and within the vegetation lining Mill Brook. The proponent has indicated in its CER that the site plan for the abattoir has been designed so that none of the remnant vegetation will be disturbed as this vegetation provides the most diverse fauna habitats.

Stands of the above-mentioned rare and endangered species are also present in certain regions along proposed transport routes. The CER states that the project would necessitate widening of certain stretches of road, including parts of Settlement Road. Accordingly, clearing of roadside vegetation which would be necessary in these areas could affect these rare and endangered species.

Vertebrate fauna on the proposed abattoir site presently inhabit areas of remnant vegetation, Mill Brook, and pasture land. It is considered that the remnant vegetation and Mill Brook are likely to support the most species while the pasture will provide a niche for a limited number of bird species.

The CER states that a survey of vertebrate fauna on the site has not been made because the abattoir has been designed so that the remnant vegetation and Mill Brook will not be affected. Therefore, it is proposed that the important habitats and the fauna they support will be retained. Areas of pasture will also remain but some existing pasture will be converted to tree plantations. The CER states that these will provide a new additional habitat for some bird species.

Comments from key government agencies

The Shire of Albany expressed concerns about the need for preservation of rare and endangered plant species protected by the Wildlife Conservation Act, 1950-1979, within vegetation lining Mill Brook, for example the use of fencing to exclude stock which may graze outside irrigated pasture areas. The Shire also expressed concerns over the potential for vegetation stress along Mill Brook due to a reduction in freshwater supply.

The Town of Albany expressed similar concerns in relation to the potential impacts on rare and endangered species located on-site and along Mill Brook, due to the introduction of nutrients and salinity from irrigated wastewaters.

4.1.3 Public submissions

Public concerns expressed related to the lack of information in the CER in relation to vegetation and fauna and the impact that the abattoir will have on existing communities at the site, along and downstream of Mill Brook and along traffic routes proposed for widening. Submissions expressed that an assessment of flora and fauna communities in these areas was essential in order to determine whether or not these communities were being impacted upon by abattoir related operations.

Submissions also indicated that more detail was required on the potential impacts on the conservation reserve downstream of Mill Brook.

4.1.4 Proponent's response

In response to the issues detailed in the public submissions, the proponent provided the following comments:

"The layout of the abattoir as described in the CER has been designed to avoid the remnant vegetation, and the remaining areas of vegetation will also be fenced to provide further protection. These areas will also be fenced to exclude stock and to minimise the potential for accidental damage. These measures mean that the existing flora and fauna will be able to continue to exist on the site. It is considered most unlikely that indirect effects from noise etc., will have any impact on the wildlife."

The proponent has indicated that the site will be operated such that there is no off-site export of nutrients. As a result, it is considered that monitoring programs aimed at determining any impacts on flora or fauna communities off the site are not warranted.

The proponent states further that:

"It is recognised that the plant layout and remnant vegetation figure in the CER suggests that certain areas of vegetation may need to be removed. However, it is expected that it will be possible to protect these areas of vegetation during the preparation of the detailed design for the abattoir. Should any clearing of vegetation be considered unavoidable, the proponent will make a specific assessment of that vegetation and will seek approval from the DEP for its removal."

"The proponent does not consider that vegetation along Mill Brook will be stressed by the abstraction of water from the aquifer for the purposes of the abattoir. Information gathered to date indicates that the water table across the site is rising and that the abstraction will have a stabilising effect on this rise, and as a result vegetation stress is most unlikely. Figure 7 of the CER shows groundwater contours developed from a model for water abstraction and indicates that there will be very little alteration to the groundwater contours in the vicinity of Mill Brook and the surrounding vegetation."

Commitments made by the proponent

With respect to flora and fauna, the proponent has made the following environmental commitments (refer to Appendix 4 for full list of commitments):

17. Benale Pty Ltd will ensure that remnant vegetation at the site is protected. If any vegetation needs to be removed, approval from the DEP and/or other relevant government agencies will be sought. (Timing - throughout the life of the project.)

4.1.5 Evaluation

Following advice from the Shire of Albany, the Town of Albany and the comments in public submissions, (Appendix 5) and the proponent's response to questions raised (Appendix 2), the EPA considers that the protection of on-site flora and fauna is manageable. The EPA notes the commitments made by the proponent to ensure that if any vegetation requires removal, approval from the EPA and/or other relevant government agencies will be sought. The EPA supports the proposed use of fencing to exclude stock which may graze outside irrigated pasture areas and potentially damage remnant vegetation on-site and along Mill Brook.

With regard to the potential for loss of vegetation along Mill Brook, the EPA considers that the proponent should ensure that export of nutrients and salt from the site must be controlled to prevent unacceptable impacts on these plant communities. The EPA's assessment of nutrient and salinity issues is contained in sections 4.3 and 4.4, respectively.

Notwithstanding the above, the EPA concludes that prior to undertaking any widening of proposed roads for abattoir transport, the proponent shall carry out a vegetation survey of the road reserve to determine the potential impacts on rare and endangered species in these areas which are protected by the Wildlife Conservation Act, 1950-1979, and manage the impacts on these species in a manner that is consistent with the findings of the survey. The proponent should provide information on the survey to the EPA, the Shire of Plantagenet, Department of Conservation and Land Management and the National Parks and Nature Conservation Authority. **(Recommendation 4)**

Pollution management

4.2 Potential for drawdown of water table

4.2.1 Objective

The EPA's objective is to ensure that the proposed extraction of 210ML per annum of groundwater does not result in drawdown of the water table, such that indigenous vegetation is threatened and riparian rights jeopardised.

4.2.2 Evaluation framework

Existing policy framework

Groundwater should meet the requirements of the Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters (EPA Bulletin 711, October 1993). Notwithstanding this, the proponent should ensure that no detrimental impacts on water quality or availability occur as a consequence of the project.

Technical information

In its CER, the proponent has assumed (for planning purposes) that the abattoir will require a maximum of 1ML of water each day. These amounts are based on knowledge of requirements at the Dubbo Abattoir operated by the proponent and also on figures from abattoirs in Western Australia.

A specific study was commissioned by the proponent to determine the availability of groundwater on the site for supply to the abattoir. The results of this study are provided in Appendix 2 of the proponent's CER. In summary, groundwater was pumped from the production bore for a trial period of 24 hours during which the groundwater levels were monitored. The CER states that the pumping rate of $300m^3$/day did not produce any significant drawdown in nearby monitoring wells. Computer modelling of the effects of abstracting 1ML/day to supply the abattoir also indicated that there would be minimum impact on groundwater levels beyond the property boundaries. The study therefore concluded that supply of 1ML of groundwater per day to the abattoir from on-site groundwater resources was readily achievable.

The proponent has proposed that water level in the groundwater production bores, in a series of monitoring bores installed close to the production borefield, in selected irrigated pasture and wood lot areas, and in two monitoring bores which will be installed near the eastern boundary of the site, will be measured once a month during the life of the project. This monitoring program will provide information on groundwater levels and any drawdown effects on the water table.

Comments from key government agencies

The Geological Survey of WA expressed major concerns over the adequacy of the pumping test conducted by the proponent, in providing useful information on the availability of groundwater

at the site. It was suggested that the techniques applied may have resulted in an over-estimation of the amount of groundwater present in the area.

The Shire of Albany expressed similar concerns over the proponent's groundwater investigation. In particular, concerns related to the validity of the assumptions made by the proponent in its modelling exercise, for example, the aquifer is assumed isotropic when it may be homogeneous. Also, the groundwater flow is assumed uniform and continuous in direction and velocity but Figure 2 in the hydrogeological study (Appendix 2, CER) suggests this may not be the case. Also, it was stated that the pump test was conducted at a third of the required abattoir capacity for twenty four hours and seeks to create a model for extracting this amount over a larger area, for at least 210 times as long. Concern was expressed that the pump test did not stress the aquifer, which is standard practice in determining the production capability of the aquifer.

The Department of Agriculture recommended that at least ten bores should be monitored at the site to determine the drawdown from the production bore and determine the accuracy of the modelling results in the CER.

4.2.3 Public submissions

Public submissions noted that there were inconsistencies within the proponent's hydrological report, and that the proponent had not conclusively shown that there were adequate water supplies in the area, and hence another study should be conducted.

The public was also concerned that the proposed groundwater abstraction programme could impact on the flow of Mill Brook, with a possible scenario being that Mill Brook could 'dry up' two kilometres south of the site for most of the year. Other concerns related to the potential impacts of extracting the upper fresher layer of the aquifer and the effects that this may have on the salinity of the aquifer over a period of time.

Concern was also expressed over the fact that piezometer readings of groundwater levels at a site adjacent to the proposed abattoir location, suggest that the water table level may be cyclic in nature as opposed to being stagnant or rising, as suggested in the CER.

4.2.4 Proponent's response

In response to the issues detailed in the public submissions, the proponent provided the following comments:

"There is no doubt that additional information is required to conclusively determine the water yielding capacity of the aquifers underlying the proposed development site. However it must be remembered that it was beyond the scope of the CER to conduct a detailed hydrogeological investigation. It was possible to collect only a limited amount of information and then extrapolate this information, using acceptable assumptions, to the long term requirements of the Abattoir. Obviously the quality of the modelling results are dependent on the quality of the data used in the model. Despite the limited nature of this investigation we concluded from the modelling results that there was cause for considerable optimism for the viability of groundwater abstraction for this development."

In relation to potential impacts on Mill Brook due to extraction of groundwater, the proponent responded,

"The model has indicated that there will be minimal changes in groundwater levels in the vicinity of Mill Brook, therefore the effect on groundwater springs in Mill Brook will also be minimal. It must be remembered that groundwater levels and stream flows appear to have been rising in recent years in response to agricultural practices. This factor, which is very positive in terms of the viability of abstracting 1ML per day from the aquifer, has not been included in the inherently conservative modelling exercise. All these issues can be addressed in greater detail during the design and testing of the well field."

In relation to the assumptions used in the modelling exercise (Appendix 2, CER), the proponent stated that these were standard assumptions normally applied in groundwater modelling.

With regard to the Shire of Albany's comment on the need to stress the aquifer during pump tests, the proponent responded as follows:

"The lack of response in all monitoring bores, particularly the Agriculture WA bores, gauged during the pumping test suggested that the aquifer was performing better than expected. In hindsight, the constant rate test could have been performed at a higher pumping rate or additional monitoring bores could have been installed closer to the pumped bore."

In relation to the concerns about the increase in salinity of the fresher layer of the aquifer, the proponent indicated that this was possible, but that it could be minimised by proper well field design and management.

"All of the irrigation calculations are based on water quality data collected from the lower section of the aquifer and therefore represent a worst case scenario. The calculations suggest that, even in this scenario, irrigation is viable"

With regard to the proposed cyclic nature of the water table below the site, the proponent responded:

"Investigations were carried out in early May when water table elevations are still recovering from the drier summer months. Therefore any calculations or assumptions based on these data would be inherently conservative. Data from the 15 piezometers show a rising trend in water table elevations in addition to seasonal cycles of approximately 300 to 400mm."

Commitments made by the proponent

With respect to the extraction of groundwater for process water, the proponent has made the following environmental commitments (refer to Appendix 4 for full list of commitments):

4. Benale Pty Ltd will undertake further groundwater studies to determine potential impacts on the water table and groundwater quality prior to construction. (Timing - prior to construction).

10. Benale Pty Ltd will undertake background monitoring prior to operation of the abattoir to determine baseline conditions for groundwater quantity and quality. (Timing - prior to operation).

4.2.5 Evaluation

Following advice from the Geological Survey of WA (now Water and Rivers Commission), the Shire of Albany and the Department of Agriculture, (Appendix 5), the comments contained in public submissions and the proponent's response to questions raised (Appendix 2), the EPA has concerns about the adequacy of information provided by the proponent in relation to availability of water of adequate quality and the impacts on the groundwater table of water sourcing.

The EPA notes the commitments made by the proponent to undertake background monitoring to determine baseline conditions for the availability of groundwater and undertake further groundwater studies to determine potential impacts on the water table and groundwater quality prior to construction.

The EPA concludes that the proponent should prepare and implement an Environmental Management Programme (EMP) to the satisfaction of the EPA, on advice from the DEP, which includes, but is not restricted to, the following:

- Results of investigations undertaken to demonstrate that sufficient groundwater of adequate quality is available so that salinity and groundwater drawdown management objectives can be met.
- A monitoring and audit programme to detect any impacts on the water table and the quality of groundwater due to the abstraction of groundwater.

- A contingency plan in the event of there being unacceptable impacts on the water table and its water quality due to the abstraction of groundwater. **(Recommendation 2)**

The EPA also concludes that the draft Environmental Management Programme should be released for a four week public comment period prior to finalisation. The draft document should be made available to all relevant government agencies, and local authorities, as well as to interested members of the local community so that the EPA can receive comments which will be taken into account by the proponent during its preparation of the EMP. **(Recommendation 3)**

4.3 Management of nutrients

4.3.1 Objective

The EPA's objective is to ensure that nutrients are managed on-site so that there is no net export of nutrients from the site.

4.3.2 Evaluation framework

Existing policy framework
Meet the requirements of the Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters (EPA Bulletin 711, October 1993).

Technical information
Following primary and secondary treatment, wastewater produced from the abattoir will be directed to a tertiary maturation pond. The proponent has proposed the use of a slow rate irrigation system to dispose of the wastewater from the maturation pond. The proposed land treatment and disposal system is shown in Figure 3 and incorporates the following elements:

- 40ha of spray irrigated kikuyu (holding yards). It is proposed that this area has been designed to achieve:
  - limited runoff in most years. The runoff is collected by the small holding dam and applied to wood lots as required, and
  - uptake of nitrogen and phosphorus from the wastewater applied.
- 100ha of wood lots of fast growing Eucalypts, slow rate irrigated by an automatic irrigation system. It is proposed that this area has been designed to achieve:
  - full uptake of nitrogen from the wastewater applied;
  - adsorption by soils of all of the phosphorus from the wastewater applied onto the soils;
  - no runoff from storing greater than 1 in 2 year average recurrence intervals.
- 35ha of rainfed trees, planted downslope from the irrigated pasture and wood lots. These trees will take up and transpire the volumes of water expected to percolate downwards and/or laterally from the pasture and wood lots. They will also impede and take up any excess surface runoff that may occur.

The application rate of wastewater to pasture and woodlots will be dependent on a number of factors (such as evapotranspiration and rainfall, and projected sustainable nutrient loadings) and will vary during the year. Precise rates will be determined by an agronomist during the detailed design stage of the wastewater disposal system and will be reassessed regularly on an ongoing basis during the operation of the abattoir.

The proponent has stated in its CER that in order to achieve the controlled removal of nutrients off-site, the kikuyu pasture will be harvested and sold off-site, or used for short term grazing. Long term grazing will not be allowed as grazing on effluent disposal areas does not achieve optimum nutrient utilisation. Short term grazing, however, will occur on occasions when

sheep received at the abattoir are 'hollow' and require grazing and water intake for between one and two days before slaughter. A portion of the nutrients contained in this feed will be returned to the soil through defecation. However, the remainder will be retained in the sheep and removed at the end of the grazing period as paunch, which will be processed in the rendering plant and ultimately mostly removed from site.

The CER indicates that areas used for short term sheep grazing will be carefully monitored to determine nutrient utilisation and to ensure the soil structure is not adversely affected. Irrigation will assist soil stability and ensure that the vegetation cover is maintained. Mechanical aeration of the soil, and other measures to maintain adequate infiltration capacity, will also be applied. Furthermore, the entire forage area will not be irrigated each year and nor will it be continually stocked thus allowing some areas to be fallow on an annual basis. Therefore, the applied nutrients will be used by dry land and irrigated crops in rotation.

It is proposed that the wood lots will be planted with a combination of *Eucalyptus globulus, Eucalyptus dunii and Eucalyptus grandis* at a density of about 1,500 trees/ha. After five to seven years of irrigation, the Eucalypts are removed from the site and thus all of the nutrients that have contributed to the biomass of the tree are removed permanently.

The CER states that irrigated forage crops will be located strategically so that any major runoff will migrate via natural drainage lines to a holding dam constructed near the central portion of the eastern boundary of the site (Figure 3). The dam and pastures are provided with a buffer of rainfed trees which will reduce the amount of surface and sub-surface water and/or nutrients migrating into the creek.

Nutrient balance

The CER states that nutrients in the wastewater from the maturation pond will have estimated concentrations of 85mg/L for total nitrogen and 30mg/L for total phosphorus. At an annual flow rate of 210ML/yr, the total nutrient load from the abattoir after primary and secondary treatment will be 18,000kg total nitrogen and 6,300kg total phosphorus.

The nitrogen uptake for dry land or non-irrigated pasture is 175kg/ha/yr and for irrigated eucalypts it is 90kg/ha/yr. The nitrogen uptake by irrigated pasture crops is 480kg/ha/yr. The total nitrogen uptake each year, given these rates and the crop areas, is 22,100kg.

The overall total uptake of phosphorus is 1,720kg which is substantially less than the annual load in the irrigation water of 6,300kg.

Therefore, 4,580kg/yr of phosphorus will accumulate in the soil, provided the Phosphorus Retention Index (PRI) of soils in the area are sufficiently high to absorb the phosphorus. It has been estimated by the proponent that the total soil storage for an average 8 metre soil depth at 100kg/ha/m depth of soil is 112,000kg. For the irrigated areas (including woodlots) it is proposed by the proponent to amend the soil to a depth of 400mm with 25% red mud gypsum (RMG). At the proponent's estimate of a storage of 0.0005kg of phosphorus per kg of RMG, an additional phosphorus storage of 105,000kg is made available. Thus, together with the natural soil storage capacity of the existing soil, this is expected to provide a theoretical life of 50 years before any increase in phosphorus is detectable in the groundwater.

Figure 5 illustrates the notional nutrient pathways for nitrogen and phosphorus in the irrigated waste streams. In the unlikely event that the performance of the RMG or the storage capacity of the soil prove to have been overestimated, the proponent may elect to replace some woodlots with forage crops, or may undertake chemical precipitation of nutrients in the maturation pond.

Samples of surface soils will be collected from depths of 10cm, 50cm and 100cm below representative irrigated pasture and wood lot areas during late summer (February-March) each year. These soil samples will be analysed for nutrient levels. This monitoring program will provide information on the effectiveness of nutrient uptake by pasture and tree crops.

Water samples will be collected from representative production and monitoring bores down slope from ponds and irrigation areas on a monthly basis, and will be analysed nutrient levels. This will provide early warning of any nutrients leaching from ponds or irrigation areas. Water samples will be collected from Mill Brook, upstream of the abattoir operations where Mill

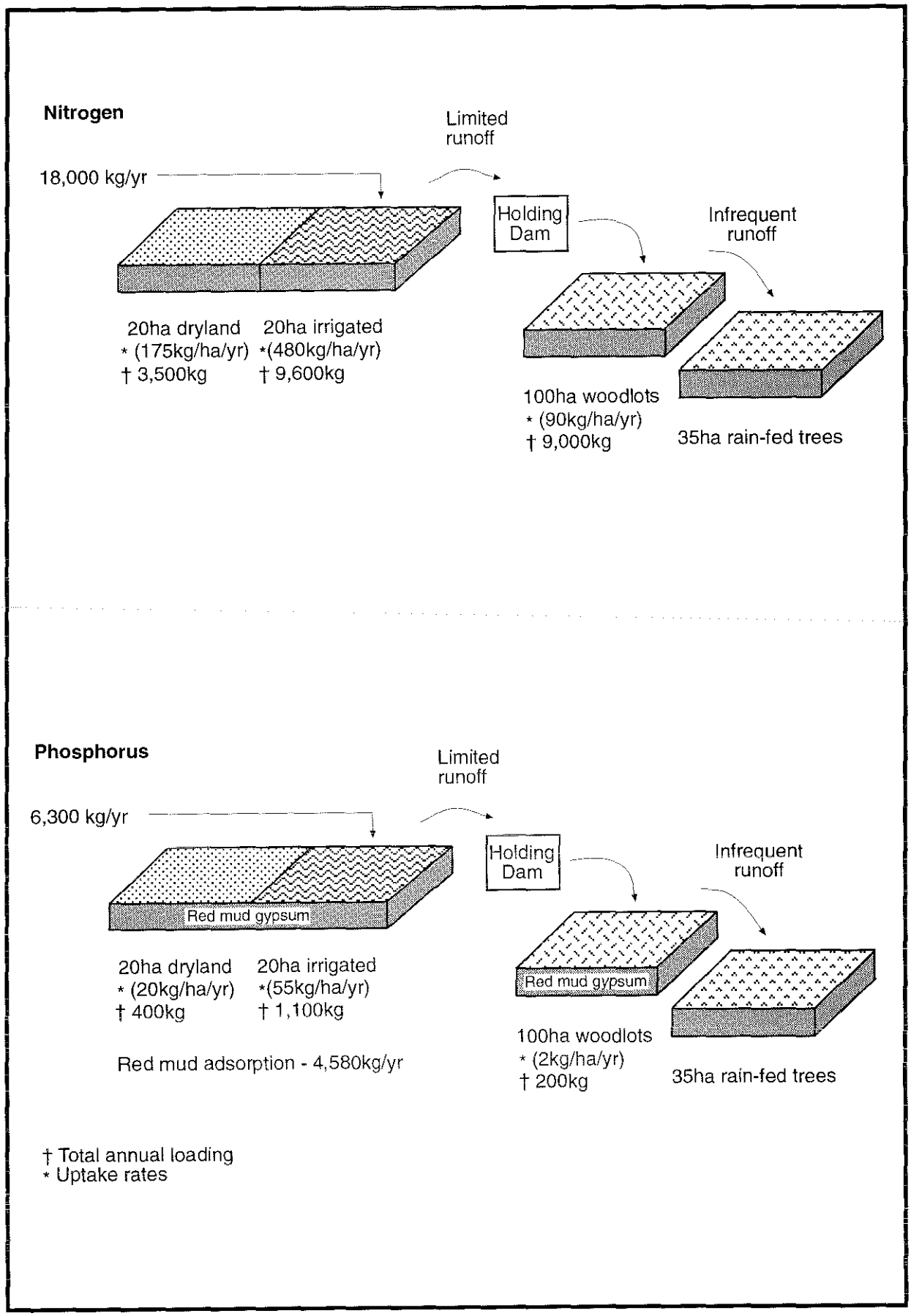


Figure 5. Illustration of notional nutrient pathways.

Brook enters the site, and close to the southern boundary. Samples will be collected monthly and analysed for nutrient levels. Flow rates will also be measured at the same time at each site.

This monitoring program will provide information on the quality of surface water in Mill Brook as it enters the abattoir site and as it leaves the site.

Comments from key government agencies

The Water Authority (WAWA) expressed concerns over the effectiveness of using red mud gypsum (RMG) to adsorb phosphorus not taken up by vegetation. The potential impacts of nutrient export from the site and the effect of this on Oyster Harbour was not adequately assessed from WAWA's perspective. WAWA expressed reservations about the proposed contingency, and stated that the proponent would need to clearly identify and discuss potential impacts and management strategies to ameliorate or minimise environmental impacts. WAWA noted that information on precipitation techniques to remove phosphorus from waste streams was minimal.

The Albany Waterways Management Authority (AWMA) noted that further detailed information and guidelines are needed to be prepared to address nutrient uptake from tree and pasture areas, and also on the impact livestock will have on this nutrient uptake and on soil stability.

The Town of Albany's main concern related to the export of nutrients from the site, and into Oyster Harbour. It noted that stocking rates could result in compaction of soils, denudation of vegetation and increase the likelihood of runoff into Mill Brook. The Town of Albany questioned the levels of monitoring proposed and stated that a contingency plan to address the potential impacts on Mill Brook and Oyster Harbour (and the remaining seagrasses) needs to be prepared.

The Government Officers Technical Advisory Group (GOTAG) stated that more detail on runoff control was required so that the risk of nutrient contamination of waterbodies on the eastern and southern side of the site can be addressed. It was also noted that the proposed stocking rates together with the high moisture content of the soils (due to irrigation) would increase the risk of nutrient rich water draining into adjacent creek lines.

The Department of Agriculture stated that adequate gauging stations would be required to continuously monitor and calculate the nutrient load coming into and leaving the property. Consideration should also be given to monitoring the phosphorus retention index (PRI) of the soils to determine the speed at which the soils are becoming saturated with phosphorus.

The Geological Survey of WA noted that due to the presence of heterogeneous soils in the area, it would be likely that preferential flowpaths would exist and that infiltrating rain water would significantly increase the amount of nutrients moving into the groundwater. However, as the permeability of the soil is low in some areas of the site, the Geological Survey considered that a substantial amount of runoff would occur.

The DEP also expressed concerns over the ability of red mud amended soils to retain excess phosphorus. The DEP considers that the proponent should develop a clear and committed contingency in the event that the soil amendment technique fails. One of these could be to carry out alum dosing to remove excess phosphorus from the waste stream.

4.3.3 Public submissions

Public concern related to the effectiveness of proposed red mud gypsum soil amendment techniques and potential impacts on groundwater and Mill Brook (and Oyster Harbour) should the RMG fail to restrict nutrient export from the site. Concern was also expressed over the potential for the generation of runoff as a result of soil compaction by stock, storm events or overflow from ponds.

Comment was made in relation to the need to undertake baseline monitoring of Mill Brook and of soil conditions, and that continuos monitoring should occur thereafter by an independent operator.

Other concerns related to the lack of detailed contingency plans and the need for the proponent to address remedial measures in the event that nutrients are leaching from the RMG layer or if elevated levels of nutrients are monitored in the groundwater or in Mill Brook (and Oyster Harbour).

4.3.4 Proponent's response

In response to the issues detailed in the public submissions, the proponent provided the following comments:

"The data collected during the CER suggest that the soil profile has a relatively high vertical permeability, particularly the superficial horizons. The water balance model predicts some runoff from the irrigated pasture areas which the proponent believes can be contained in fringing rain-fed woodlots or will soak into the soil in localised depressions. No direct runoff is expected from the pasture into Mill Brook as strategic recontouring and cutoff/swale drains will direct runoff into the holding dam"

The proponent indicated that the degree to which the PRI of the RMG is reducing will be monitored and once the phosphorus storage capacity of the RMG is depleted, it will be removed progressively around the site and replaced by a new layer of RMG and soil mixture.

Some compaction is expected during the holding of stock prior to slaughter. Consequently it is proposed that the soil will be routinely ripped to maintain current infiltration capacity. The proponent indicated that stockholding rates in holding areas will be controlled to ensure that denudation of pasture crops is avoided.

The proponent indicated that although it was likely that there will be some preferential flow paths in the unsaturated zone, given the proper management of irrigation at the site and the conservative nature of all calculations and assumptions used in determining the wastewater loading rates, the proponent is confident that there will be no deleterious effects on the aquifer underlying the site.

In relation to contingency measures, the proponent indicated that,

"The proponent is committed to establishing and immediately implementing management strategies and contingency plans to ensure immediate corrective action in the event of any problems relating to unacceptable nutrient discharge to groundwater and/or Mill Brook and any other environmental discharges from the abattoir complex."

"The proponent will ensure that there is a contingency plan in place in the event that the RMG amendment fails to prevent the release of nutrients into the groundwater. This could include the use of chemical dosing and/or the inclusion of additional forage pasture over woodlots."

Commitments made by the proponent

With respect to the management of nutrients on-site, the proponent has made the following environmental commitments (refer to Appendix 4 for full list of commitments):

8. Benale Pty Ltd will maintain the vegetation and soil structure of the irrigated pastures and woodlots to ensure optimum nutrient uptake. (Timing - during the life of the project).
9. Benale Pty Ltd will undertake to remove the red mud gypsum (RMG) amended soil layer and replace it with a new layer of RMG when monitoring of the RMS amended soils shows that the phosphorus storage capacity is depleted to 90%. (Timing - during the life of the project).
10. Benale Pty Ltd will undertake background monitoring prior to operation of the abattoir to determine baseline conditions for groundwater quantity and quality, Mill Brook and soil. (Timing - prior to operation).
11. Benale Pty Ltd will implement an environmental monitoring program as described in the CER in order to provide information relating to the quality of groundwater, treated wastewater, and water in Mill Brook. The monitoring program will be implemented in consultation with the Department of Agriculture and the Albany Waterways Management

Authority and the results will be provided to these authorities, the Shire of Plantagenet and to the DEP and will be made available to the public. (Timing - throughout the life of the project).

12. In the unlikely event that the environmental monitoring program indicates the Narrikup Export Abattoir may be contributing significant nutrients to groundwater or to Mill Brook, Benale Pty Ltd will undertake specific studies to determine the cause and will take whatever corrective action is necessary to remedy the situation. (Timing - throughout the life of the project).
13. Benale Pty Ltd will comply with all relevant codes and guidelines for stock holding rates in stock holding areas. (Timing - throughout the life of the project).
19. Benale Pty Ltd will prevent runoff from the site via cutoff/swale drains which will divert any runoff to the holding dam or the maturation pond. (Timing - throughout the life of the project).

4.3.5 Evaluation

The EPA received advice from the Water Authority and Geological Survey of WA (now part of the Water and Rivers Commission), the Albany Waterways Management Authority, the Town of Albany, the Government Officers Technical Advisory Group, the Department of Agriculture and the DEP (Appendix 5), public comments and the proponent's response to questions raised (Appendix 2). Based on this advice, the EPA considers that the containment of nutrients on-site such that no net export of nutrients to water resources (Mill Brook or groundwater aquifer) is essential in ensuring that impacts on the water quality of Mill Brook and Oyster Harbour are prevented. Notwithstanding this, the EPA is aware that off-site removal of pasture grass clippings, woodlots, and RMG and soil mixtures that have reached adsorption capacity, is necessary.

The EPA notes the commitments made by the proponent in relation to monitoring the export of nutrients from the site and ensuring that nutrient uptake rates by vegetation are maintained. The EPA also notes the proponent's commitments in relation to contingency measures and determining background nutrient levels presently existing on-site and in Mill Brook.

The EPA also notes that the proponent has not proposed any water quality criteria for the export of nutrients from the site, from the disposal of wastewaters. Accordingly, the EPA has sought advice from the Water and Rivers Commission on this issue. The Commission's advice is detailed in Appendix 6 and recommends the following concentrations for water quality parameters measured in monitoring bores.

Table 4. Recommended water quality criteria at the property boundary in groundwater or surface water

Water Quality Parameter	Recommended Criteria
Ammonia	0.05mg/L
Total nitrogen	1.0mg/L
Total phosphorus	0.1mg/L
pH	4.5-9.0

The EPA concludes that during the operation of the abattoir, the proponent shall ensure that no net export of nutrients via surface or groundwater occurs at the property boundary and that there is adequate monitoring and control to meet this objective **(Recommendation 5).** Should background monitoring (undertaken by the proponent prior to construction) reveal that existing nutrient levels are below recommended criteria, the proponent should ensure that nutrient levels at the property boundary do not remain inconsistent with the above criteria.

Also, the EPA concludes that the proponent should prepare and implement an Environmental Management Programme (EMP) to the satisfaction of the EPA, on advice from the DEP and the Water and Rivers Commission, which includes, but is not restricted to, the following:

- An irrigation management plan which when implemented;
  - allows nutrient uptake in plants and phosphorus retention in amended soil, but not salt build up in the soil; and
  - balances the requirements for leaching to prevent salt build-up in the soil but not to transfer nutrients to groundwater;
- A monitoring and audit programme to detect any impacts on irrigated pastures and woodlots, soil conditions, and the quality of groundwater, treated wastewater, and water in Mill Brook due to nutrient input from irrigated wastewaters.
- A monitoring and audit programme to regularly determine the ongoing phosphorus retention capacity of the amended soils, and reviewed at five yearly intervals.
- A contingency plan to ensure adequate retention of phosphorus.
- A contingency plan in the event of there being unacceptable impacts on the water quality of Mill Brook due to nutrient input **(Recommendation 2).**

The EPA also concludes that the draft Environmental Management Programme should be released for a four week public comment period prior to finalisation. The draft document should be made available to all relevant government agencies, and local authorities, as well as to interested members of the local community so that the EPA can receive comments which will be taken into account by the proponent during its preparation of the EMP. **(Recommendation 3)**

4.4 Management of salinity

4.4.1 Objective

The EPA's objective is to ensure that salinity in the irrigated wastewaters is managed on-site so that no net export of salinity via surface waters occurs at the property boundary.

4.4.2 Evaluation framework

Existing policy framework

Meet the requirements of the Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters (EPA Bulletin 711, October 1993) and the draft Guidelines for the use of Reclaimed Water, 1995 (ANZECC, NHMRC and Agriculture and Resource Management Council of Australia and New Zealand).

Technical information

Groundwater studies commissioned by the proponent (Appendix 2 of the CER) determined that sodium chloride is the principal component of the TDS content of groundwater at the site. Salinity levels in the groundwater ranged from 1690mg/L to 2720mg/L TDS, and the level of salinity increased with the depth from which groundwater was abstracted. The groundwater study concluded therefore that a series of bores should be inserted into the upper, fresher

section of the groundwater aquifer to supply water to the abattoir. The CER referenced McFarlane et al. (1995), which reported groundwater salinity in this upper part of the aquifer to be between the maximum desirable value for human consumption (500mg/L or 90mS/m) and the maximum permissible value (1,500mg/L or 270mS/m). The proponent stated that a similar range of salinity values was recorded in the upper part of the aquifer on the neighbouring property to the west.

The water supply, after it has been used for process requirements and has passed through the wastewater treatment system, will be used for irrigation of pasture crops and tree plantations (wood lots). The CER states that salinity in the water will not be affected significantly by process use or wastewater treatment. The pickling plant wastewater (which has a high TDS content) will be diluted when it joins the abattoir wastewater stream and the proponent has assumed that the level of salt in the groundwater is the level of salt which will be applied to the irrigation areas. The EPA considers that the TDS levels in the wastewater stream will be marginally higher than in the upper groundwater layers.

The proponent's investigation on whether there is any significant potential for salt accumulation in the soil profile over time concludes that with appropriate application rates of treated wastewater to irrigated pasture, and a combination of treated wastewater and groundwater irrigation for the wood lots, the residual nitrogen in the wastewater will be adequately taken up by the crops, while at the same time there will be adequate leaching of water through the soil profile to prevent accumulation of salt.

The proponent's study also concludes that the superficial soils which have been selected for crop irrigation on the site have low potential for salt accumulation as it is considered that these soils:

- have low existing salt levels;
- are well drained; and
- have low clay content, which means that the salinity of the irrigation water will not reduce permeability through chemical interaction with the soil.

To ensure that enough irrigation water is leached through the superficial soil layer to prevent build-up of salt and to ensure the survival of the crops, the proponent's study has estimated that leaching rates of 38% and 25% respectively will be required for pasture and wood lots. At the same time, the application rates must not be too high, or the crops will not be able to take up sufficient nitrogen from the treated wastewater, and excess nitrogen may be leached through the soil profile. In order to prevent this, it is estimated that the irrigation or loading rates should be 0.43m per year for pasture, and 0.17m per year for wood lots (Appendix 2 of CER). More water can be applied to the pasture because these crops have higher nitrogen uptake capacity than the wood lots, but lower evapotranspiration rates. The pasture therefore takes up the nitrogen and allows excess water to leach through the soil profile to attain the necessary leaching rate.

In contrast, wood lots have relatively low capacity for nitrogen uptake, but high evapotranspiration rates. This means that if treated wastewater was applied at a rate which ensured nitrogen uptake, the water would be used by the trees but the necessary leaching rate may not be achieved. In order to ensure that this does not happen, it is proposed that groundwater may need to be applied to the wood lots in combination with treated wastewater so that there is excess water and adequate leaching.

It should be noted that the above estimates of loading rates for woodlots are based on mature trees. In the initial stages the nitrogen uptake of younger trees will be less and the loading rates will need to be lower. Therefore, it is proposed to irrigate existing woodlots and/or additional pasture areas until the new plantings are established.

Samples of surface soils will be collected from depths of 10cm, 50cm and 100cm below representative irrigated pasture and wood lot areas during late summer (February-March) each year. These soil samples will be analysed for TDS levels. This monitoring program will provide information on any salt accumulation in the soil profile.

Water samples will be collected from representative production and monitoring bores down slope from ponds and irrigation areas on a monthly basis, and will be analysed for TDS amongst other parameters. Water samples will also be collected from Mill Brook, upstream of the abattoir operations where Mill Brook enters the site, and close to the southern boundary. Samples will be collected monthly and analysed for TDS. Flow rates will also be measured at the same time at each site. This monitoring program will provide information on the quality of surface water in Mill Brook as it enters the abattoir site and as it leaves the site.

Comments from key government agencies

WAWA expressed concern over the potential threat of increased salinity levels in soil (due to poor flushing rates through the soil profile as a result of low volume application rates), whilst at the same time attempting to achieve satisfactory nutrient uptake rates by woodlots and crop pastures.

In its submission, GOTAG noted that the white clover pasture crops may not be able to tolerate the salinity levels in the irrigated waters and accordingly, this could affect nutrient uptake rates of the irrigated areas.

The Town of Albany stated that in the event of unacceptable salinity impacts on groundwater, Mill Brook or other waterways, the proponent needs to implement immediate corrective action. Accordingly, an appropriate contingency plan would need to be prepared by the proponent to address this issue.

The Shire of Albany expressed concern over the potential for increases in salinity of groundwater as a result of the proposed extraction of the upper, fresher layer of the aquifer. The Shire stated that this could result in the salinisation of Mill Brook over a period of time. The Shire also questioned whether the pickling solution would greatly add to the salt content of wastewaters.

4.4.3 Public submissions

One of the issues raised in public submissions was that it is inappropriate to include white clover in the pasture mix as this crop would not tolerate the salinity levels contained in the irrigated wastewaters. Concern was also expressed over the fact that the pickling process would add to the amounts of salt in the wastewaters, and that this was not taken into account in the proponent's calculations for Total Dissolved Solids (TDS) in the wastewater.

Some concern was also expressed over the potential for the salinity of groundwater to rise as a result of continued extraction of the fresh water layer and the reduction in volume of water recycled back into the aquifer (from evaporation and transpiration), but with no reduction in the salt content thereof. Accordingly, this could increase the salinity levels in local bores used to produce stockwater. Several submissions raised the issue of the salinisation of Mill Brook and the consequential impacts that this would have on vegetation along and downstream of the brook.

It was stated in several public submissions that a detailed contingency plan would need to be prepared and implemented, in the event that monitoring of Mill Brook indicated that salinity levels were above acceptable levels.

4.4.4 Proponent's response

In response to the issues on salinity impacts detailed in the public submissions, the proponent provided the following comments:

"There will be a slight increase in salinity of the process water due to evaporation from the ponds and through transpiration after irrigation. This would be reflected in an increase in salt storage in the soil below the irrigated lots and higher salinity of water that drains past the root zone. These undesirable side effects will be avoided due to rainfall which exceeds the irrigation depth in the woodlots by 380% and by 180% in the irrigated pasture lots."

With regard to concerns about the increase in salinity of the aquifer due to the extraction of the fresher upper layer, the proponent indicated that based on information gathered to date, the water table across the site is rising and that the abstraction will have a stabilising effect on this rise, and as a result impacts on the salinity of the aquifer are unlikely. Figure 7 of the CER shows groundwater contours developed from a model for water abstraction and indicates that there will be very little alteration to the groundwater contours in the vicinity of Mill Brook and the surrounding vegetation. The proponent states further that increases in aquifer salinity can be minimised by proper well field design and management.

"All of the irrigation calculations are based on water quality data collected from the lower section of the aquifer and therefore represent a worst case scenario. The calculations suggest that, even in this scenario, irrigation is viable."

In response to concerns about monitoring for salinity impacts, the proponent stated that:-

"Samples of surface soils will be collected from depths of 10cm, 50cm, and 100cm below representative irrigated pasture and woodlot areas during late summer (February to March) each year. These soil samples will be analysed for TDS and nutrient levels. This monitoring program will provide information on the effectiveness of nutrient uptake by pasture and tree crops, and on any salt accumulation in the soil profile."

"Water samples will also be collected from Mill Brook, upstream of the abattoir operations where Mill Brook enters the site, and close to the southern boundary. Samples will be collected monthly and analysed for TDS and nutrient levels. Flow rates will also be measured at the same time at each site. This monitoring program will provide information on the quality of surface water at Mill Brook as it enters the abattoir site and as it leaves the site."

In relation to the increase in wastewater salinity due to the pickling process, the proponent indicated that as a consequence of brine recycling, the pickling wastewater will not add significantly to salinity levels in the general wastewater stream because the brine will be recycled.

The proponent acknowledges the limitations of white clover with respect to salt tolerance. All pasture nutrient balance calculations undertaken in the CER are based on kikuyu only. The proponent indicated that advice on the pasture mix will be sought from an agronomist during detailed design." This was also stated in the proponent's CER.

Commitments made by the proponent

4. Benale Pty Ltd will undertake further groundwater studies to determine potential impacts on the water table and groundwater quality prior to construction. (Timing - prior to construction).

10. Benale Pty Ltd will undertake background monitoring prior to operation of the abattoir to determine baseline conditions for groundwater quality, Mill Brook, and soil. (Timing - prior to operation).

11. Benale Pty Ltd will implement an environmental monitoring program as described in the CER in order to provide information relating to soil conditions, and the quality of groundwater, treated wastewater, and water in Mill Brook. The monitoring program will be implemented in consultation with the Department of Agriculture and the Albany Waterways Management Authority and the results will be provided to these authorities, the Shire of Plantagenet and to the DEP and will be made available to the public. (Timing - throughout the life of the project).

19. Benale Pty Ltd will prevent runoff from the site via cutoff/swale drains which will divert any runoff to the holding dam or the maturation pond. (Timing - throughout the life of the project).

4.4.5 Evaluation

Following receipt of advice from the Water Authority (now part of the Water and Rivers Commission), the Town of Albany, the Shire of Albany and the Government Officer's

Technical Advisory Group (Appendix 5), public comments and the proponent's response to questions raised (Appendix 2), the EPA considers that the disposal of wastewaters needs to be managed in order to ensure that the export of saline waters from the site does not result in the salinisation of Mill Brook which, consequently, may affect the flora and fauna within, along and downstream of the brook. Also, the EPA considers that the extraction of groundwater needs to be conducted so that the quality of the groundwater is not adversely affected.

The EPA notes the commitments made by the proponent to monitor impacts of salinity on Mill Brook, groundwater and the soil, as well as to undertake measures to ensure runoff from the site is prevented via cut off/swale drains.

The EPA also notes that the proponent has not proposed any water quality criteria for the discharge levels of salt from the site from disposal of wastewaters, once the project is operational. Accordingly, the EPA has sought advice from the Water and Rivers Commission on this issue. The Commission's advice is detailed in Appendix 6 and recommends that the concentration for total dissolved solids (TDS) measured in monitoring bores should be 1,000mg/L. This value falls within the range of salinity measured in the upper layers of the aquifer (McFarlane et al., 1995). Notwithstanding this, the Commission also stated that this criteria may be reviewed depending on the results of further drilling and background monitoring prior to operation of the abattoir, and the salinity tolerance of the pasture crops proposed.

The EPA concludes that during the operation of the abattoir, the proponent shall ensure that no net export of salts via surface waters occurs at the property boundary and that there is adequate monitoring and control to meet this objective.**(Recommendation 6).**

The EPA considers that the issue of encouraging leaching to stop salinity build up at the soil surface but not leaching nutrients beyond the root zone has not been adequately addressed.

Accordingly, the EPA concludes that the proponent should prepare and implement an Environmental Management Programme (EMP) to the satisfaction of the EPA, on advice from the DEP, which includes,

- an irrigation management plan which when implemented,
  - allows nutrient uptake in plants and phosphorus retention in amended soil, but not salt build up in the soil; and
  - balances the requirements for leaching to prevent salt build-up in the soil but not to transfer nutrients to groundwater;
- a monitoring and audit programme to detect any impacts on the quality of groundwater due to any increase in salinity via disposal of wastewater;
- a monitoring and audit programme to detect any impacts on irrigated pastures and woodlots, soil conditions and water in Mill Brook due to the salinity of irrigated waste waters;
- a contingency plan in the event of there being unacceptable impacts on pastures and woodlots, soil conditions, Mill Brook and the groundwater aquifer due to the salinity of irrigated waste waters. **(Recommendation 2)**

The EPA also concludes that the draft Environmental Management Programme should be released for a four week public comment period prior to finalisation. The draft document should be made available to all relevant government agencies, and local authorities, as well as to interested members of the local community so that the EPA can receive comments which will be taken into account by the proponent during its preparation of the EMP. **(Recommendation 3)**

4.5 Management of solid wastes

4.5.1 Objective

The EPA's objective is to encourage waste minimisation and recycling of solid wastes and to ensure that solid wastes from the abattoir are managed in an environmentally acceptable manner.

4.5.2 Evaluation framework

Existing policy framework

Solids wastes should be managed according to the requirements of the DEP , Health Department of WA, and relevant local government authorities. Disposal of solid wastes to an approved landfill would require relevant approvals from local government authorities and relevant government agencies.

Technical information

Solid wastes generated at the abattoir will include bones, flesh, fat, paunch material, faeces, de-woolled skins, and head pieces. Most of this waste will be processed through the rendering plant after being directed there from the point of generation, either automatically or by dedicated trailers.

Solid wastes trapped by screens and scrapers in the wastewater treatment system will be recovered and also processed through the rendering plant. Rendering plant products will be transported off-site.

The only substantial solid waste requiring disposal will be faeces that is collected below the lairage yards. Based on production at other facilities, it is estimated that 200 tonnes of sheep and cattle faeces will accumulate annually.

Options proposed for disposal of faeces collected from the lairage yards include:

- removal to an approved landfill;
- sale or giving away as a fertiliser; and
- treatment on site to produce a pelletised fertiliser for sale.

It is considered that any of the above methods will effectively remove nutrients from the site, and if removed on a regular basis, will help to prevent odour generation.

Currently, it is envisaged that the proponent will construct an organic fertiliser production plant within the abattoir complex. This plant will include a hammer milling operation and a pelletising machine. The pellets will be elevated up a cooling tower by conveyor and dropped to a bagging machine. The pelletised organic fertiliser would then be sold off-site.

In the event that the rendering plant or fertiliser production plant suffered an unscheduled shut down, solid waste would accumulate and require alternative disposal. It is estimated that 25t to 30t of solid waste could be generated annually from such events. This waste would have to be removed to an approved landfill as it was generated.

There will also be an occasional requirement to remove accumulated residues from the treatment ponds. These wastes also will be removed from the site and disposed of in an approved landfill in accordance with the measures identified in the proponent's Environmental Management Programme.

Comments from key government agency

The DEP considers that the proponent should ensure that an appropriate landfill is secured with the relevant local Authority to accept the solid waste prior to the commissioning of the abattoir. In the event the rendering plant fails, an alternative rendering plant needs to be identified to accept the material. The proponent should attempt to reduce and/or recycle solid wastes

generated wherever possible. Pelletising faecal solid waste and selling this material as fertiliser is one method that should be considered to reduce the amount of solid waste requiring disposal.

4.5.3 Public Submissions

Public comment on this issue related to the need for the proponent to ensure that an appropriate location is secured for the disposal of construction waste, solid waste from wastewater treatment processes and for general rubbish.

4.5.4 Proponent's response

In response to the issues relating to solid waste management detailed in the public submissions, the proponent provided the following comments:

"The proponent considers that determination of a suitable landfill for disposal of solid wastes from the abattoir and indeed a discussion of the mechanisms of transporting these wastes is premature at this stage. These matters will be considered during the detailed design phase for the project, if the proposal receives environmental approval. However, discussions with the Shire of Plantagenet and the Waste Management Division of the DEP indicate that solid wastes (including carcasses and faeces) could be disposed of in suitably designed trenches at the Mt Barker tip."

The proponent indicated that solid wastes produced during construction will be disposed of in accordance with the requirements of the Shire of Plantagenet, as will general refuse generated on site and solid wastes such as salt from the pickling process. These wastes may be ultimately placed at the Mt Barker tip site.

In response to contingency measures to deal with material requiring rendering, the proponent stated that,

"In the event of a breakdown in the rendering plant, the proponent will ensure that the material unable to be rendered will be removed from site either to an approved landfill or to another rendering plant."

Commitments made by the proponent

20. Benale Pty Ltd will ensure that all solid waste from the Narrikup Export Abattoir is either converted to a useful product such as fertiliser or that it is disposed of in an approved manner. (Timing - throughout the life of the project).

4.5.5 Evaluation

Following advice from the DEP , (Appendix 5) public comments and the proponent's response to questions raised (Appendix 2), the EPA considers that the proponent should attempt to reduce and recycle solid wastes generated wherever possible. The EPA endorses any proposal to pelletise faecal waste.

The EPA notes the commitments made by the proponent to ensuring that all solid waste from the abattoir is either converted to a useful product such as fertiliser or that it is disposed of in an approved manner.

The EPA also considers that the proponent should ensure that an appropriate landfill site is located to accept solid wastes from the abattoir, prior to construction of the abattoir.

Accordingly, the EPA concludes that the proponent should prepare and implement an Environmental Management Programme (EMP) to the satisfaction of the EPA, on advice from the DEP, which includes, but is not restricted to, the following:

- An inventory of the nature and quantities of solid wastes generated.
- Identification of solid wastes which are recycled or converted to other materials.

- Waste disposal approvals obtained from local government authorities and relevant government agencies
- The locations and technical designs of waste disposal sites.
- a contingency plan in the event that solid wastes cannot be rendered on site. **(Recommendation 2)**

4.6 Management of noise

4.6.1 Objective

The EPA's objective is to ensure that noise emanating from the abattoir does not affect the amenity of nearby residences. To meet this objective, relevant noise standards would have to be complied with.

4.6.2 Evaluation framework

Existing policy framework

There are currently no statutory regulations that govern road traffic noise. However, the Department of Main Roads has a policy that traffic noise at residential locations should be restricted to an L_{10} 18 hour of 63dB(A) wherever practicable. The DEP considers that this level should be 58dB(A) wherever practicable. The DEP also considers that instantaneous (maximum) levels should not exceed 80dB(A) but preferably should be closer to 65dB(A).

The proposed abattoir would need to comply with the Noise Abatement (Neighbourhood Annoyance) Regulations (1979).

Technical information

Traffic noise

The proponent conducted an assessment of the implications of traffic associated with the abattoir in terms of noise levels. Details of this study are contained in Appendix 3 of the proponent's CER. The traffic scenarios considered in the study were as follows:

1. From the west - 30 truck movements per day between 0700 hours and 1600 hours.
2. From the east - 26 truck movements per day between 0700 hours and 1600 hours.
3. From the west - 300 light vehicles between 0630 hours and 0700 hours and between 1600 hours and 1630 hours.
4. From the west (occasional campaign hauling) - 120 truck movements per day between 0700 hours and 1900 hours.

Table 5. Predicted noise levels At 50m from road traffic

	SOUND LEVEL dB(A)	
SCENARIO	L_{10} 1 Hour	L_{10} 18 Hour
1	51	38
2	49	35
3	61	51
4	56	44

(Source: Table 3, CER)

The predicted traffic noise levels associated with all of the above scenarios are less than the criteria suggested by the DEP of an L_{10} 18 hour of 58dB(A).

All trucks licensed for road use must comply with noise levels between 81 to 87dB(A) at a distance of 7.5m when in motion and stationary levels of 93 to 103dB(A) at 1m. This is equivalent to noise levels ranging from 65 to 71dB(A) at a distance of 50m. These levels appear to be within the instantaneous (maximum) level of 80dB(A) suggested by the DEP.

Noise from the Abattoir

The abattoir site is zoned Rural but special uses such as an abattoir are allowable provided that they are approved by the local authority. Areas where commercial operations are allowable fall within Category B2 of the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979 which stipulates a worst-case noise level (night time) of 45dB(A) is acceptable for Category B2. However, given that the area surrounding the proposed abattoir is at present entirely rural with no other industries nearby, it is proposed that the abattoir will be designed to ensure that the noise levels fall within the more stringent Category A2 of the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979. The maximum noise levels for Category A2 are as follows:

- Monday to Friday 0700-1900 hours 45dB(A)
- Monday to Friday 1900-2200 hours 40dB(A)
- Weekends and Public Holidays 0700-2200 hours 40dB(A)
- Always 2200-0700 hours 35dB(A)

As it is proposed that the abattoir will operate only on a daytime shift from Monday to Friday, the relevant maximum noise level is 45dB(A).

Predicted noise emissions from the abattoir are based on actual measured levels of an existing abattoir in Western Australia. A summary of the methodology for determining the predicted noise levels from the Narrikup abattoir is contained in the proponent's CER. The maximum predicted noise level at the nearest house (approximately 1000m away) is 41dB(A).

Therefore, the proponent's noise appraisal concludes that the proposed abattoir can comply with the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979. A further, more detailed assessment of noise will be made at the design stage of the abattoir to ensure that the total noise emission does not exceed a total sound power level of 110dB(A) and that no tonal characteristics exist. In order to achieve this, most plant refrigeration units and compressors will be located inside enclosures, and cooling towers and condensing units may require discharge silencers.

It is proposed that measurement of environmental noise levels will be made prior to the commencement of site works for the abattoir, following start-up of abattoir operations, and one year after start-up. The operational monitoring will cover peak activity periods. Noise levels will be measured on the boundary of the abattoir site, close to nearby houses in order to provide information on potential received levels of noises at these residences.

If the monitoring indicates that regulations are being exceeded, then further noise assessments will be made to determine the main sources of noise, and corrective action will be taken. Further noise monitoring will occur to confirm that the corrective action has been effective.

Comments from key government agency

The DEP notes the proponent's noise assessment and considers that the proponent should comply with the relevant noise regulations, which at this point are the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979.

4.6.3 Public submissions

One public submission stated that the proponent should be required to undertake further noise studies to determine the impacts of noise in the event of campaign hauling when a ship is in port.

4.6.4 Proponent's response

In response to the issues detailed in the public submissions, the proponent provided the following comments:

"The proponent will ensure that noise levels emanating from the plant comply with the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979."

"It is considered that wind conditions for Albany Airport are sufficiently similar to those experienced at the proposed abattoir site to allow for valid noise impact predictions to be undertaken, as presented in the CER. Nevertheless, the proponent has committed to prepare a noise assessment as part of the detailed design of the Narrikup Export Abattoir..."

In relation to the issue of a traffic noise study when campaign hauling is proposed, the proponent indicated that the need for a detailed traffic impact study will be determined during the detailed design phase of the project, and will be considered in conjunction with MRD

Commitments made by the proponent

11. Benale Pty Ltd will implement an environmental monitoring program as described in the CER in order to provide information relating to noise levels. (Timing - throughout the life of the project).

15. Benale Pty Ltd will prepare a noise assessment as part of the detailed design of the Narrikup Export Abattoir in order to confirm that the total noise emission does not exceed a total sound power level of 110dB(A) and that no tonal characteristics exist. The results of this noise assessment will be provided to the DEP for their approval. (Timing - prior to construction).

4.6.5 Evaluation

The EPA notes the commitments made by the proponent to implement a noise monitoring programme, prior to construction and during operation of the abattoir.

Following advice from the DEP (Appendix 5), public submissions and the proponent's response to questions raised (Appendix 2), the EPA concludes that noise from the abattoir should be manageable subject to the proponent preparing and implementing an Environmental Management Programme (EMP) to the satisfaction of the EPA, on advice from the DEP, which includes, but is not restricted to, the following:-

- Noise management measures at the abattoir.
- A monitoring and audit programme for noise emissions as a means of gauging the effectiveness of noise control measures and compliance with allowable noise levels.
- A contingency plan in the event of there being unacceptable impacts on nearby premises due to noise above accepted standards. **(Recommendation 2)**

4.7 Management of odours

4.7.1 Objective

The EPA's objective is to ensure that odours emanating from the abattoir do not affect the amenity of nearby residences.

4.7.2 Evaluation framework

Existing policy framework

It is proposed that the abattoir rendering plant will be designed and operated in accordance with the Environmental Code of Practice for Rendering Plants developed by the EPA, Meat and

Allied Trades Federation, and the CSIRO Meat Research Laboratory. The general principles of odour management in the Code of Practice may be summarised as follows:

- A minimum separation distance downwind to the nearest residence of 1000m should be provided.
- The plant should be screened with vegetation and well maintained.
- The operation and management should be based on a management plan which specifies raw materials, rendering processes, materials handling, environmental control measures, and the management of waste materials.
- an appropriate maintenance and cleaning schedule for all odour control equipment.
- vehicles should be kept clean, well painted and well maintained.

Technical information

There is the potential for significant odour to be generated from two main components of the abattoir, namely the rendering plant and wastewater treatment ponds.

The basic control practices referred to in the above general principles relate to the following aspects within the operation of the abattoir:

- Receival of animal matter.
- Design and operation of cookers and condensors.
- Design and operation of cooker Discharge Expellers and Presses.
- Design of Meal Conveyors, Mill and Storage Hoppers.
- Design and operation of Ring Driers for Drying Blood.
- Dhe need for whole Building Exhaust Treatment.

The potential for odour from wastewater treatment ponds can be effectively controlled with the following measures:

- Careful design of the anaerobic ponds.
- Avoidance of overloading the anaerobic ponds with BOD.
- Creating conditions which facilitate the formation of a crust on the anaerobic ponds.
- Use of dual pond systems so that individual ponds can be cleaned out as required.

Further details on odour control equipment and measures proposed for the abattoir are contained in the proponent's CER.

Separation distances of 500m and 1000m respectively are recommended between wastewater treatment ponds and rendering plants, and the nearest houses for odour control purposes. The proposed layout of the abattoir has been designed to provide these separation distances from existing houses.

The dispersion of any odour is also dependent on wind conditions. Strong winds tend to dispel odour more effectively than light winds. The direction of the wind also is an important factor in determining whether odour is dispersed towards neighbouring houses. Information on wind conditions at Narrikup as presented in Figure 4 of the proponent's CER suggest that light wind conditions are not common (as shown by the wind roses for Albany Airport). Southerly to south-easterly winds (which would have the greatest likelihood of dispersing odour from the abattoir towards neighbouring houses) also tend to occur mainly in summer and are associated with relatively strong sea breezes.

Comments from key government agency

In its submission, the Shire of Albany noted that the CER had failed to consider localised temperature inversions when predicting odour impacts and wind conditions.

The DEP considers that the proponent should be required to provide details on odour controls, especially in relation to the fellmongery, pickling plant and skin drying process.

4.7.3 Public submissions

Public submissions expressed the necessity to ensure that odour controls be in place prior to the commencement of operation of the abattoir.

Another submission expressed concerns over the meteorological data used (from the Albany Airport) to determine odour impacts as it was felt that the data did not reflect actual wind conditions at Narrikup.

4.7.4 Proponent's response

In response to the issues regarding odour detailed in the submissions, the proponent provided the following comments:

"It is considered that wind conditions for Albany Airport provide sufficient basis on which to predict odour impacts from the abattoir. The DEP generally recommends a separation distance of 1000m from the nearest residence for the management of odours emanating from a rendering plant. This requirement can be met by the proponent. In addition the proponent will establish large areas of woodlots which will act as a barrier to the propagation of odours along localised corridors and will act to break up and disperse these odours."

In relation to the DEP's concerns about the management of odours for the fellmongery, pickling plant and skin drying process, the proponent responded as follows,

"The treatment of sheep skins will be essentially enclosed and there will be no open skin sheds with racks for air-drying skins. Short skins (with a wool length of less than about 35mm) will be transferred directly to the pickling shed for salting. All other skins will be sprayed with acetic acid, sweated in humidifiers, and then passed by hand through a stripping machine to remove the wool. Defleeced skins will then be sent to the pickling plant.

Commitments made by the proponent

11. Benale Pty Ltd will implement an environmental monitoring program as described in the CER in order to provide information relating odour. (Timing - throughout the life of the project).

10. Benale Pty Ltd will undertake background monitoring prior to operation of the abattoir to determine baseline conditions for wind conditions.

14. Benale Pty Ltd will ensure that the design of the rendering plant complies with the Environmental Code of Practice for Rendering Plants (1991) published by the EPA. The detailed design of the plant and operating procedures will be supplied to the DEP for their approval. (Timing - prior to construction).

22. Benale Pty Ltd will ensure that the wastewater treatment ponds are designed and operated in accordance with the principles described in the CER in order to ensure that the potential for odour generation is minimised. The company will also implement regular checks at the site boundary during light wind conditions to determine whether odour is detectable. The results of these tests will be documented and provided to the Shire of Plantagenet and the DEP. (Timing - before construction and during the life of the project).

4.7.5 Evaluation

Following advice from the Shire of Albany and the DEP, (Appendix 5), public comments and the proponent's response to questions raised (Appendix 2), the EPA considers that odours emanating from the abattoir need to be controlled to ensure that the amenity of local residents is not affected. The EPA notes the commitments made by the proponent to monitor odours at the site boundary and to design and operate wastewater treatment ponds to ensure that the potential for odour generation is minimised.

Notwithstanding the above, the EPA concludes that the proponent should prepare and implement an Environmental Management Programme (EMP) to the satisfaction of the EPA, on advice from the DEP, which includes, but is not restricted to, the following:

- Process design, and management measures for odour control with particular attention to the rendering plant and wastewater treatment plant.
- A monitoring and audit programme for odorous emissions generated from abattoir operations.
- A contingency plan in the event of there being unacceptable impacts on nearby odour sensitive premises. **(Recommendation 2)**

Social surroundings

4.8 Traffic impacts

4.8.1 Objective

The EPA's objective is to ensure that the increase in traffic activities resulting from abattoir operations does not adversely impact on the public safety and amenity of local residents.

4.8.2 Evaluation framework

Technical information

It is assumed that the majority of livestock delivered to the abattoir will be transported by large stock haulage vehicles. When fully commissioned the abattoir will potentially accept about 4,800 sheep and 240 cattle each day.

About 400 sheep will be carried by each truck. Cattle trucks can carry up to 40 head of livestock.

The total number of truck movements each day will be as follows:

Table 6. Summary of Abattoir Truck Movements

	From the west:	From the east
Sheep	4	20
Cattle	10	2
Products	16	4
Total truck movements	30	26

The delivery of meat in refrigerated containers to the port may occur in batches for direct loading onto ships rather than by a daily operation. In this scenario, the total number of truck movements from the west would be 134 per day for one day when a ship is in port.

In addition, the 350- 400 employees will drive to work each day, arriving between 6.30am and 7.00am and will depart between 4.00pm and 4.30pm. Most of these workers are expected to use Albany Highway and Settlement Road. The number of cars likely to be involved is between 200 and 400 depending on how much car pooling occurs.

The proponent's CER states that some road upgrading will be needed to provide safer driving conditions for transport to and from the abattoir and for other road users (Figure 2). The potential upgrades include:

- turning lanes on Albany Highway into Settlement Road;
- turning lanes on Chester Pass Road into Jackson Road;
- Increasing the width of seal and improving the depth of pavement and drainage on Settlement Road between Albany Highway and the abattoir; and
- a general upgrade of Jackson Road from Chester Pass Road to the abattoir site, including improvements to corners and drainage, and sealing of the road.

The increase in abattoir-related traffic could have direct implications on current traffic uses in the area; especially the use of Settlement Road by the local school bus and cattle crossings on the road.

The school bus normally passes through the area between 7.30am and 7.45am and travels from Jackson Road west along Settlement Road to Albany Highway. A milk collection truck also passes through the area daily between 7.30am and 9.30am west along Settlement Road. In the afternoon, there is a potential for the school bus and abattoir worker traffic to coincide between 4.00pm and 4.30pm. The proponent considers that the disturbance to local traffic would be minimal on the basis that workers travelling to and from the abattoir would be going in the opposite direction during the above 'peak traffic periods'.

There are three farms on Settlement Road between Albany Highway and the abattoir site which has land on both sides of the road. However, only one has the need for a regular cattle crossing. The car traffic to the abattoir could effectively prevent use of this crossing for 30 to 45 minutes before 7.00am and after 4.00pm each day, or alternatively, cows crossing the road at these times could significantly delay workers travelling to and from the abattoir. The number of truck movements during the rest of the day is not large and therefore is not likely to create any conflicts in road use. The proponent has noted in its CER that there is a potential for delays at this crossing and states that further discussions are required to identify the best option for minimising the potential for disruption.

Comments from key government agencies

In its submission, the Main Roads Department (MRD) stated that road upgrades would be necessary for major traffic routes, such as Settlement Road and major intersections, to accommodate the increase in traffic density once the abattoir is operational. MRD recommended that the proponent should carry out a detailed traffic study and explain what it means by "occasional" campaign hauling. MRD also recommended that it should be informed whenever campaign hauling is proposed and a public information programme could be implemented.

MRD also stated that no increase in truck volumes above that described in the CER should occur without prior discussion with MRD.

The Shire of Albany noted that the tables in the CER indicating truck movements assume a constant directional factor throughout the year but as most farmers only sell sheep after shearing and the timing is often dependent upon area, it would be beneficial to study current timings and movement of sheep for export in this context. Early movement of sheep from drier areas to the east into the Albany area whilst still raining over unsealed roads has the potential to cause damage to the road base and significant costs to the Shire of Albany.

The Shire also questioned why the CER did not propose any upgrades for Churchlane Road as this would be an obvious route for traffic from the Esperance, Ravensthorpe and Jerramungup areas.

4.8.3 Public submissions

Public concerns related to the safety of school children crossing Settlement Road during peak morning and afternoon traffic periods. It was stated that even if abattoir traffic was travelling in

the opposite direction to the school bus, this would not resolve the safety issue. One suggestion to resolve this potential problem was to use Millstream Road as the major access route, due to its low residential density (Figure 2).

Another major concern related to the potential for disruption of cattle crossings across Settlement Road, due to the increase in abattoir related traffic along this road.

The issue of traffic noise and potential dust emissions was also highlighted in submissions.

Other concerns related to the need to reduce the numbers of traffic carrying workers to and from the abattoir, by the use of a company bus service or by encouraging workers to car pool.

4.8.4 Proponent's response

In response to the issues detailed in the public submissions, the proponent provided the following comments:

"The proponent has had preliminary discussions with the Albany office of the Main Roads Department (MRD) to identify potential transport routes and road improvements should these be necessary. The suitability or otherwise of the Kalgan-Napier (now Churchlane) Road is a matter for the MRD to determine. Proper planning for any upgrades required on any of the likely transport routes is a matter for consideration during the detailed design phase of the project. The proponent considers it desirable that all required road upgrades are undertaken prior to commencement of operation of the abattoir. However, the nature and timing of any upgrades should properly be determined by the MRD"

In relation to the issue of campaign hauling, the proponent indicated that campaign hauling of meat is only a possibility and the various transport arrangements and the need for a detailed traffic impact study will be determined during the detailed design phase of the project. All decisions relating to transport matters will be made after consultation with the MRD and the proponent also will inform the MRD whenever campaign hauling was proposed.

The proponent does not consider the use of Millstream Road as suitable for a number of reasons, including the inadequacy of visual sighting distances at the intersection with Albany Highway and the expense of extending the road and constructing a bridge over Mill Brook. The proponent further states that the layout of the abattoir complex would mean that any extension of Millstream Road would have to be aligned along the boundary of the property either to the east or west and this would probably be considered undesirable by adjoining land owners.

The proponent made the following statement in response to the safety of school children,

"The safety of children and livestock as a result of increased use of Settlement Road and other roads in the area will be catered for by appropriate improvements to these roads. The issue of risk will be discussed with the MRD in relation to such improvements during the detailed design phase of the project."

With regard to the potential for disruption to farmers wishing to transfer stock or machinery from one side of the road to the other, the proponent indicated that further discussions are required to identify the best option for minimising the potential for disruption, but the proponent is confident that an effective resolution will result. These further discussions will be undertaken during the detailed design phase of the project.

"The proponent would certainly encourage car pooling for the transport of employees to and from work and would also encourage any bus owner in the district to provide transport for abattoir employees so as to reduce the number of small vehicles travelling along Settlement Road and associated traffic routes."

Commitments made by the proponent

18. Benale Pty Ltd will consult with the community, local government, and the Main Roads Department in order to address road traffic issues. (Timing - throughout the life of the project).

4.8.5 Evaluation

Following advice from the Main Roads Department and Shire of Albany, (Appendix 5), the public submissions and the proponent's response to questions raised (Appendix 2), the EPA considers that the increase in traffic activity in the area will be substantial. Accordingly, every effort should be made to ensure that the amenity of local residents is preserved, once the project is operational. Accordingly, the proponent should continue to consult with the Main Roads Department to ensure that the necessary road upgrades are undertaken.

The EPA notes the commitments made by the proponent to consult with the community, local government and the Main Roads Department in order to address road traffic issues. In particular, the proponent should consult with the residents of Settlement Road to address the disruption to farmers wishing to transfer stock or machinery from one side of the road to the other during operational periods for the abattoir.

5. Conclusions & recommendations

5.1 Overall conclusion

The EPA draws the general conclusion that the proposal by Benale Pty Ltd to establish an export abattoir at Narrikup is environmentally acceptable, subject to the proponent's commitments and EPA recommendations. A summary of the EPA's views are set out in Table 7 and the specific conclusions of the evaluation are detailed in Section 4 of this report.

In reaching the overall conclusion, the main environmental factors requiring consideration were identified as:

Biophysical impacts

- Protection of flora and fauna.

Pollution management

- Potential for drawdown of water table.
- Management of nutrients.
- Management of salinity.
- Management of solid wastes.
- Management of noise.
- Management of odours.

Social surroundings

- Traffic impacts.

5.2 Specific recommendations

The EPA makes the following recommendations to protect the environment and prevent pollution resulting from the abattoir and its related operations.

Recommendation 1

The EPA recommends that the proposal as described in the proponent's CER be approved to proceed subject to implementation of the proponent's commitments and the EPA's recommendations in this report.

Table 7. Summary of Environmental Protection Authority recommendations.

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
BIOPHYSICAL IMPACTS				
Impacts on flora and fauna	To protect flora and fauna from detrimental impacts associated with the development and operation of the proposed abattoir.	Compliance with provisions of Wildlife Conservation Act.	The proponent will ensure remnant vegetation at the site is protected. If any vegetation require removal, approval from the DEP and/or other relevant government agencies will be sought.	Prior to undertaking any widening of proposed roads for abattoir transport, the proponent shall carry out a vegetation survey of the road reserve to determine the potential impacts on rare and endangered species and manage these impacts in a manner which is consistent with the findings of the survey.
POLLUTION MANAGEMENT				
Potential for drawdown of water table	To ensure that the proposed extraction of 210ML per annum of groundwater does not result in drawdown of the water table.	Identification of the characteristics of the groundwater aquifer. Adequacy of information on groundwater availability. Evaluation of proposals for the management of groundwater including groundwater monitoring	The proponent will undertake further groundwater studies to determine potential impacts on the water table and groundwater quality prior to construction. The proponent will undertake background monitoring prior to operation to determine baseline conditions for groundwater quantity and quality.	EMP to include: • results of investigations to demonstrate that sufficient groundwater of adequate quality is available; • a monitoring and audit programme to detect any impacts on the water table and the quality of groundwater due to the abstraction of groundwater; and • a contingency plan in the event of there being unacceptable impacts on the water table and its water quality due to the abstraction of groundwater. EMP shall be released for a four week public comment period prior to finalisation

Table 7. Summary of Environmental Protection Authority recommendations (cont'd).

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
Management of nutrients	To ensure that nutrients are managed on-site so that there is no net export of nutrients from the site	Identification of the characteristics of nutrient types, loads and concentrations. Identification of the characteristics of the receiving environment ie the pastures and woodlots, soil, Mill Brook and groundwater. Evaluation of proposals for the management of nutrients eg use of red mud gypsum soil amendment, monitoring of Mill Brook and groundwater. WA water quality guidelines	The proponent will implement an EMP to provide information on soil conditions, the quality of groundwater, treated wastewater, and water in Mill Brook. If monitoring indicates that the Abattoir is contributing significant nutrients to groundwater or to Mill Brook, the proponent will determine the cause and take corrective action to remedy the situation. The proponent will remove the RMG amended soil layer and replace it when monitoring shows that phosphorus storage capacity is depleted to 90%. The proponent will maintain vegetation and soil structure of the irrigated pastures and woodlots to ensure optimum nutrient uptake. The proponent will determine baseline conditions for Mill Brook. The proponent will comply with all relevant codes and guidelines for stockholding rates in holding areas. The proponent will prevent runoff from the site via cutoff/swale drains which will divert any runoff to the holding dam or the maturation pond.	The proponent shall ensure that no net export of nutrients via surface or groundwater occurs at the property boundary. Proponent's EMP to detail: • an irrigation management plan which when implemented, - allows nutrient uptake in plants and phosphorus retention in amended soil, but not salt build up in the soil; and - balances the requirements for leaching to prevent salt build-up in the soil but not to transfer nutrients to groundwater; • a monitoring and audit programme to detect any impacts on the quality of groundwater due to any increase in nutrients via disposal of wastewater; • a monitoring and audit programme to detect any impacts on irrigated pastures and woodlots, soil conditions, and the quality of groundwater, treated wastewater, and water in Mill Brook due to nutrient input from irrigated wastewaters;

Table 7. Summary of Environmental Protection Authority recommendations (cont'd).

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
Management of nutrients (cont'd)				• a monitoring and audit programme to regularly determine the ongoing phosphorus retention capacity of the amended soils, and reviewed at five yearly intervals; • a contingency plan to ensure adequate retention of phosphorus; and to address unacceptable impacts on the water quality of Mill Brook due to nutrient input EMP shall be released for a four week public comment period prior to finalisation.
Management of salinity	To ensure that salinity in the irrigated wastewaters is managed on-site so that no net export of salinity via surface waters occurs at the property boundary	Identification of the characteristics of salinity loads and concentrations. Identification of the characteristics of the receiving environment ie the pastures and woodlots, soil conditions, Mill Brook and groundwater. Evaluation of proposals for the management of salinity.	The proponent will implement an environmental monitoring program for soil conditions, and the quality of groundwater, treated wastewater, and water in Mill Brook. The proponent will determine baseline conditions for groundwater quality, Mill Brook, and soil. The proponent will undertake further groundwater studies to determine potential impacts on the water table and groundwater quality prior to construction. The proponent will prevent runoff from the site via cutoff/swale drains which will divert any runoff to the holding dam or the maturation pond.	During the operation of the abattoir, the proponent shall ensure that no net export of salts via surface waters occurs at the property boundary. Proponent's EMP to detail: • an irrigation management plan which when implemented, - allows nutrient uptake in plants and phosphorus retention in amended soil, but not salt build up in the soil; and - balances the requirements for leaching to prevent salt build-up in the soil but not to transfer nutrients to groundwater;

Table 7. Summary of Environmental Protection Authority recommendations (cont'd).

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
Management of salinity (Cont'd)				• a monitoring and audit programme to detect any impacts on the quality of groundwater due to any increase in salinity via disposal of wastewater; • a monitoring and audit programme to detect any impacts on irrigated pastures and woodlots, soil conditions and water in Mill Brook due to the salinity of irrigated waste waters; • a contingency plan in the event of there being unacceptable impacts on pastures and woodlots, soil conditions, Mill Brook and the groundwater aquifer due to the salinity of irrigated waste waters. EMP shall be released for a four week public comment period prior to finalisation
Management of solid wastes	To encourage waste minimisation and recycling of solid wastes and to ensure that solid wastes from the abattoir are managed in an environmentally acceptable manner.	Solid wastes are to be managed on-site and disposed of in accordance with the requirements of local government authorities and relevant government agencies.	The proponent will ensure that all solid waste from the Abattoir is either converted to a useful product such as fertiliser or that it is disposed of in an approved manner.	Proponent's EMP to detail: • an inventory of the nature and quantities of solid wastes generated; • identification of solid wastes which are recycled or converted to other materials; • waste disposal approvals obtained;

Table 7. Summary of Environmental Protection Authority recommendations (cont'd).

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
Management of solid wastes (Cont'd)				Proponent's EMP to detail: • the locations and technical designs of waste disposal sites; and • a contingency plan in the event that solid wastes cannot be rendered on site. EMP shall be released for a four week public comment period prior to finalisation
Management of noise	To ensure that the amenity of the surrounding residents is not adversely impacted upon by noise emissions emanating from the proposed abattoir.	Abattoir noise levels to comply with the requirements of the Noise Abatement (neighbourhood Annoyance) Regulations (1979). Traffic noise levels to be restricted to L10 18 hour of 58db(A) wherever practicable and instantaneous (maximum) levels should not exceed 80db(A) but preferably should be closer to 65db(A).	The proponent will implement an environmental monitoring program for noise levels. The proponent will prepare a noise assessment as part of the detailed design of the abattoir in order to confirm that the total noise emission does not exceed a total sound power level of 110dB(A) and that no tonal characteristics exist.	Proponent's EMP to detail: • noise management measures at the abattoir; • a monitoring and audit programme for noise emissions to gauge the effectiveness of noise control measures and compliance with allowable noise levels; and • a contingency plan in the event of there being unacceptable impacts on nearby premises due to noise. EMP shall be released for a four week public comment period prior to finalisation

Table 7. Summary of Environmental Protection Authority recommendations (cont'd).

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
Management of odours	To ensure that odours emanating from the abattoir do not affect the amenity of nearby odour sensitive premises.	To meet buffer criteria and operate in accordance with rendering plant code of practice. Identification of sources and controls to manage odours	The proponent will implement an environmental monitoring program for odour. The proponent will ensure that the wastewater treatment ponds are designed and operated to ensure that the potential for odour generation is minimised. The company will also implement regular checks at the site boundary during light wind conditions to determine whether odour is detectable. The proponent will determine baseline conditions for wind conditions.	Proponent's EMP to detail: • process design, and management measures for odour control with particular attention to the rendering plant and wastewater treatment plant; • a monitoring and audit programme for odorous emissions generated from abattoir operations; and • a contingency plan in the event of there being unacceptable impacts on nearby odour sensitive premises EMP shall be released for a four week public comment period prior to finalisation
SOCIAL SURROUNDINGS				
Traffic impacts	To ensure that the increase in traffic activities resulting from abattoir operations does not adversely impact on the public safety and amenity of local residents	Identification of abattoir related traffic and road modifications necessary to sustain this traffic, and the implications for local residents.	The proponent will consult with the community with the community, local government and Main Roads Department in order to address road traffic issues.	No recommendation. Adequacy of traffic management covered by Main Roads and local authority processes.

Recommendation 2

The EPA recommends that the proponent prepare an Environmental Management Programme (EMP) to the satisfaction of the EPA, on advice from the DEP and Water and Rivers Commission (for components i, ii and iii), which includes, but is not restricted to, the following:

i Protection of groundwater

- Results of investigations undertaken to demonstrate that sufficient groundwater of adequate quality is available so that salinity and groundwater drawdown management objectives can be met.
- A monitoring and audit programme to detect any impacts on the water table and the quality of groundwater due to the abstraction of groundwater.
- A contingency plan in the event of there being unacceptable impacts on the water table and its water quality due to the abstraction of groundwater.

ii. Wastewater disposal

- An irrigation management plan which when implemented,
  - allows nutrient uptake in plants and phosphorus retention in amended soil, but not salt build up in the soil; and
  - balances the requirements for leaching to prevent salt build-up in the soil but not to transfer nutrients to groundwater.
- A monitoring and audit programme to detect any impacts on irrigated pastures and woodlots, soil conditions, and the quality of groundwater, treated wastewater, and water in Mill Brook due to nutrient input from irrigated wastewaters.
- A monitoring and audit programme to detect any impacts on irrigated pastures and woodlots, soil conditions and water in Mill Brook due to the salinity of irrigated waste waters.
- A contingency plan in the event of there being unacceptable impacts on the water quality of Mill Brook due to nutrient input.
- A contingency plan in the event of there being unacceptable impacts on pastures and woodlots, soil conditions, Mill Brook and the groundwater aquifer due to the salinity of irrigated waste waters.

iii. Nutrient uptake

- A monitoring and audit programme to regularly determine the ongoing phosphorus retention capacity of the amended soils, which is reviewed at five yearly intervals.
- A contingency plan to ensure adequate retention of phosphorus.

iv. Noise

- Noise management measures at the abattoir.
- A monitoring and audit programme for noise emissions as a means of gauging the effectiveness of noise control measures and compliance with allowable noise levels.
- A contingency plan in the event of there being unacceptable impacts on nearby premises due to noise above accepted standards.

v. Odours

- Process design, and management measures for odour control with particular attention to the rendering plant and wastewater treatment plant.
- A monitoring and audit programme for odorous emissions generated from abattoir operations.

- A contingency plan in the event of there being unacceptable impacts on nearby odour sensitive premises.

vi Solid waste management on site

- An inventory of the nature and quantities of solid wastes generated.
- Identification of solid wastes which are recycled or converted to other materials.
- Waste disposal approvals obtained from local government authorities and relevant government agencies,
- The locations and technical designs of waste disposal sites.
- A contingency plan in the event that solid wastes cannot be rendered on site.

Recommendation 3

The EPA recommends that the draft Environmental Management Programme should be released for a four week public comment period prior to finalisation. The draft document should be made available to all relevant government agencies, and local authorities, as well as to interested members of the local community so that the EPA can receive comments which will be taken into account by the proponent during its preparation of the EMP.

Recommendation 4

The EPA recommends that prior to undertaking any widening of proposed roads for abattoir transport, the proponent shall carry out a vegetation survey of the road reserve to determine the potential impacts on rare and endangered species in these areas which are protected by the Wildlife Conservation Act, 1950-1979, and manage the impacts on these species in a manner that is consistent with the findings of the vegetation survey. The proponent should provide information on the survey to the EPA, the Shire of Plantagenet, and the National Parks and Nature Conservation Authority.

Recommendation 5

The EPA recommends that during the operation of the abattoir, the proponent shall ensure that no net export of nutrients via surface or groundwater occurs at the property boundary and that there is adequate monitoring and control to meet this objective.

Recommendation 6

The EPA recommends that during the operation of the abattoir, the proponent shall ensure that no net export of salts via surface waters occurs at the property boundary and that there is adequate monitoring and control to meet this objective.

6. Recommended environmental conditions

Based on the assessment of this proposal and recommendations in this report, the Environmental Protection Authority considers that the following Recommended Environmental Conditions are appropriate.

1 Proponent Commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

1-1 In implementing the proposal, the proponent shall fulfil the commitments made in the Consultative Environmental Review and in response to issues raised following public

submissions; provided that the commitments are not inconsistent with the conditions or procedures contained in this statement.

The Department of Environmental Protection will audit the implementation of the proponent's environmental management commitments, which were published in Environmental Protection Authority Bulletin 808 (Appendix 4).

2 Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

2-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal.

2-2 Where, in the course of that detailed implementation referred to in condition 2-1, the proponent seeks to change the designs, specifications, plans or other technical material submitted to the Environmental Protection Authority in any way that the Minister for the Environment determines, on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

3 Proponent

These conditions legally apply to the nominated proponent.

3-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

4 Environmental Management Programme

For sound environmental management, a comprehensive Environmental Management Programme is required.

4-1 Prior to commissioning, the proponent shall prepare an Environmental Management Programme, to the requirements of the Environmental Protection Authority on the advice of the Department of Environmental Protection.

This Programme shall address, but not be limited to the following:

i. Protection of groundwater

- Investigations to demonstrate that sufficient groundwater of adequate quality is available so that salinity and groundwater drawdown management objectives can be met.
- Impacts on the water table and groundwater.
- Contingency planning in the event of there being unacceptable impacts.

ii. Wastewater

- An irrigation management plan which when implemented,
  - allows nutrient uptake in plants and phosphorus retention in amended soil, but not salt build up in the soil; and
  - balances the requirements for leaching to prevent salt build-up in the soil but not to transfer nutrients to groundwater.
- Impacts on irrigated pastures and woodlots, soil conditions, and water quality in Mill Brook (eg from nutrients and salinity);

- A contingency plan in the event of there being unacceptable impacts on the water quality of Mill Brook, pastures and woodlots and soil conditions.
- Phosphorus retention capacity of the amended soils. (This programme should be reviewed at five yearly intervals).
- A contingency plan to ensure adequate retention of phosphorus.

iii. Solid waste

- An inventory of the nature and quantities of solid wastes generated, recycled, or converted to other materials.
- Waste disposal approvals obtained from local government authorities and relevant government agencies.
- The locations and technical designs of waste disposal sites.
- A contingency plan in the event that solid wastes cannot be rendered on site.

iv. Noise

- Noise emissions at the abattoir.
- Process design, and management measures for noise control.
- A contingency plan in the event of there being unacceptable impacts on nearby noise sensitive premises.

v. Odours

- Process design, and management measures for odour control with particular attention to the rendering plant and wastewater treatment plant.
- A contingency plan in the event of there being unacceptable impacts on nearby odour-sensitive premises.

vi. Performance audit

- Annual performance audit of the environmental objectives, and allowance for continous improvement as new operational procedures and knowledge are developed.

4-2 Prior to the proponent's finalisation of the Environmental Management Programme required by condition 4-1, the draft document shall be released for a four week public review period so that the Environmental Protection Authority can receive comments on the document from relevant government agencies and local authorities, as well as from interested members of the local community.

4-3 The proponent shall implement the Environmental Management Programme required by condition 4-1.

5 Road Widening

5-1 Prior to undertaking any widening of roads for abattoir transport, the proponent shall carry out a vegetation survey of the road reserve to determine the potential impacts on rare and endangered species protected by the Wildlife Conservation Act, to the requirements of the Minister for the Environment on the advice of the Department of Conservation and Land Management and the Environmental Protection Authority. This information shall be provided to the Environmental Protection Authority, the Shire of Plantagenet, and the National Parks and Nature Conservation Authority, Department of Conservation and Land Management and any other relevant government agency.

5-2 Prior to undertaking any widening of roads for abattoir transport, the proponent shall manage the impacts on rare and endangered species in a manner that is consistent with the findings of the vegetation survey of the road reserve referred to in condition 5-1, to the requirements of the Minister for the Environment on the advice of the Department of Conservation and Land Management and the Environmental Protection Authority.

6 Export of Nutrients and Salinity

6-1 During the operation of the abattoir, the proponent shall ensure that no net export of nutrients via surface or groundwater occurs at the property boundary and that there is adequate monitoring and control to meet this objective.

6-2 During the operation of the abattoir, the proponent shall ensure that no net export of salts via surface waters occurs at the property boundary and that there is adequate monitoring and control to meet this objective.

7 Decommissioning

7-1 The proponent shall carry out the satisfactory decommissioning of the project, removal of installations and rehabilitation of the site and its environs.

7-2 To achieve the objectives of condition 7-1, at least six months prior to decommissioning, the proponent shall prepare a decommissioning and rehabilitation plan.

7-3 The proponent shall implement the plan required by condition 7-2.

8 Time Limit on Approval

The environmental approval for the proposal is limited.

8-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced.

Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period to the Minister for the Environment.

Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding five years.

9 Performance Review

9-1 Each year following the commencement of construction, the proponent shall prepare an audit of the performance of the Environmental Management Programme referred to in condition 4-1 and in particular the audit shall show rectification and improvement measures where required.

The annual audit shall be presented to the Department of Environmental Protection acting on behalf of the Environmental Protection Authority.

9-2 Each five years following the commencement of construction, the proponent shall prepare a major review of the following:

1 environmental protection, including but not limited to consideration of the environmental objectives;
2 the audit of performance against these objectives; and
3 the audit of the performance of the Environmental Management Programme referred to in condition 4-1;

to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.

These environmental objectives shall include but not be limited to those identified by the Environmental Protection Authority in the assessment report (Environmental Protection Authority Bulletin 808) and account for operating experience and new knowledge.

The environmental objectives may be changed by the Environmental Protection Authority following the review.

10 Compliance Auditing

To help determine environmental performance, periodic reports on progress in implementation of the proposal are required.

10-1 The proponent shall submit periodic Progress and Compliance Reports, in accordance with an audit programme agreed to by the Department of Environmental Protection in consultation with the proponent.

Procedure

1 Unless otherwise specified, the Department of Environmental Protection is responsible for assessing compliance with the conditions contained in this statement and for issuing formal clearance of conditions.

2 Where compliance with any condition is in dispute, the matter will be determined by the Minister for the Environment.

3 The Environmental Protection Authority will undertake a detailed review of the proposal and the results of the Environmental Management Programme referred to in Condition 4-1 after the first five years following commencement of construction.

Note

1 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the Environmental Protection Act.

7. References

Alan Tingay and Associates (1995). Consultative Environmental Review - Narrikup Export Abattoir.

ANZECC (1992). Australian Water Quality Guidelines for Fresh and Marine Waters.

ANZECC, NHMRC, ARMCANZ, (1995). Draft Guidelines for the use of Reclaimed Water.

Environmental Protection Authority, 1993. Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters. Bulletin 711. Environmental Protection Authority, Perth.

Environmental Protection Agency, Victoria, 1991. Guidelines for Wastewater Irrigation.

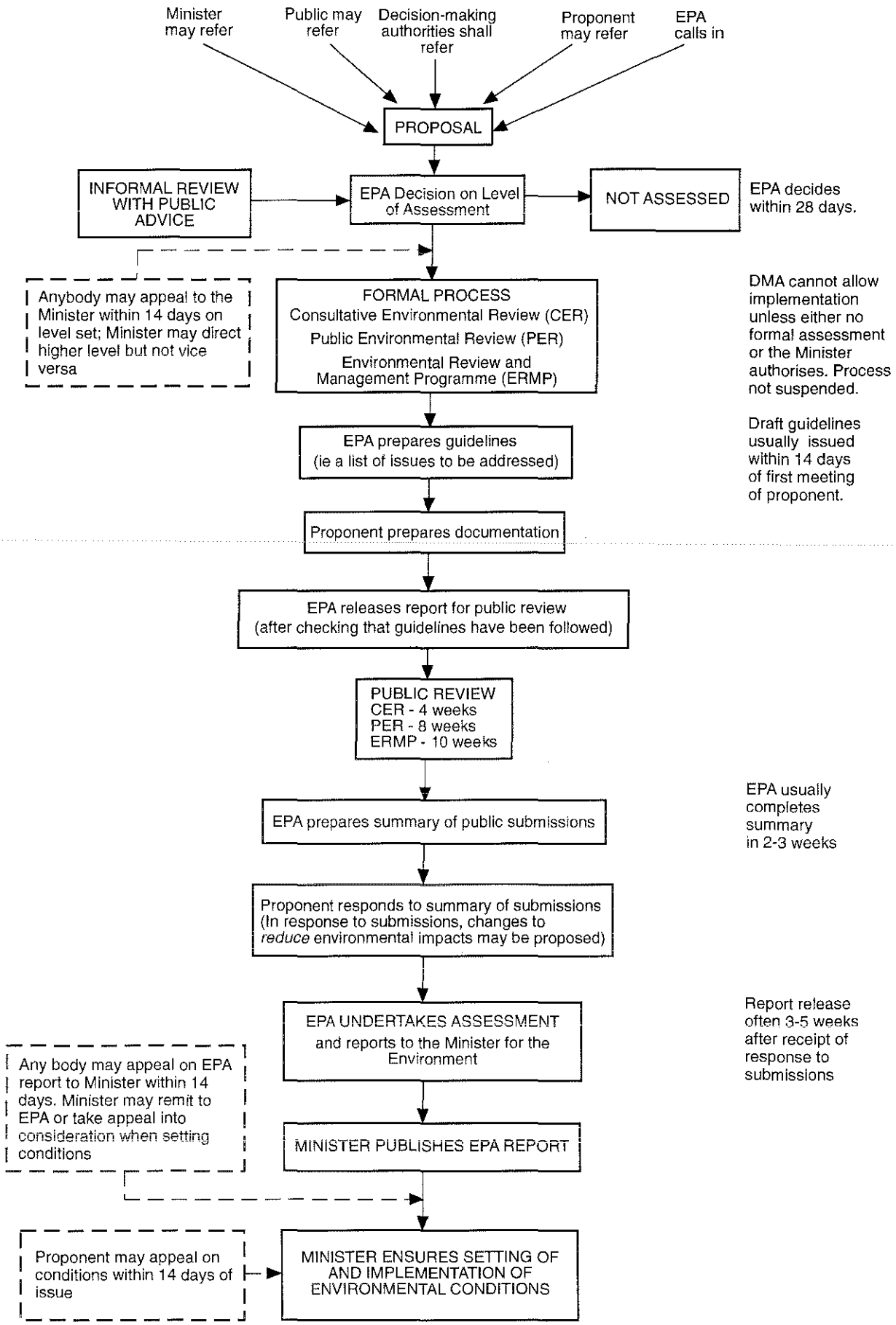
Groundwater Technology Australia, 1995. Hydro-geological Investigations of the Proposed Export Abattoir Site, Settlement Road, Narrikup, W.A.

Metcalf & Eddy, Inc., 1991. Wastewater Engineering - Treatment, Disposal, and Re-use. 3rd edition. McGraw Hill.

Appendix 1

Environmental impact assessment flow chart

EIA PROCESS FLOW CHART



Appendix 2

Summary of submissions and proponent's response to questions

NARRIKUP EXPORT ABATTOIR

PROPONENT'S RESPONSE TO CER SUBMISSIONS

WASTEWATER TREATMENT

Introduction

A number of questions in the submissions on the proposed Narrikup Export Abattoir relate to the treatment of wastewater and protection of the environment from nutrient inflows and elevated salinity. Benale Pty Ltd and its consultants also regard this as the most important environmental consideration associated with the abattoir. For this reason, we have taken extraordinary steps to ensure that the possibility of significant nutrient inflows or salinity to Mill Brook and to Oyster Harbour is extremely remote. These measures are described in detail in Sections 5 and 6 of the Consultative Environmental Review (CER). As this topic is of particular interest however, it is appropriate to reiterate and emphasise the design elements and monitoring commitments for wastewater treatment that are included in the CER.

Major Components

Essentially the proposed wastewater treatment system contains five major elements as follows:

Primary treatment designed to separate waste solids and blood from the wastewater stream.

Secondary treatment of the wastewater stream in anaerobic, aerobic and maturation ponds to reduce biological oxygen demand, suspended solids, and the level of nutrients.

Use of the treated wastewater to irrigate eucalypt woodlots and pasture specifically designed to uptake nitrogen and phosphorus nutrients.

Further uptake of phosphorus from the wastewater by addition of red mud to soils in the irrigation areas.

A monitoring program designed to ensure that the wastewater treatment system is operating in accordance with design objectives and to indicate the need for any adjustments to that system.

Conservative Design

The design of each element of the proposed wastewater treatment system described in the CER is deliberately very conservative. This means that each step of the system has been designed to perform considerably better than would be necessary to achieve adequate wastewater treatment. The overall design objective is to ensure that no detectable increase in nitrogen, phosphorus, salinity, and a range of other water quality parameters, occurs in Mill Brook as a result of the abattoir operations.

This approach to design is very different from that used for most projects of this type. The usual approach typically includes the definition of effluent quality criteria at the point of discharge to the environment. These criteria allow for specified levels of nutrients and other components in the waste but in amounts which are considered unlikely to have any adverse environmental implications.

In contrast, Benale Pty Ltd is proposing to attempt to achieve zero discharge of nutrients and salinity from the Narrikup Export Abattoir. The corner stone of this objective is the conservative design of the integrated wastewater treatment system. The company's proposal is in accordance with its approach of including the best achievable environmental design and practice wherever practicable, and is also in recognition of the fact that Mill Brook, and particularly Oyster Harbour, are sensitive receiving environments.

Conservative Design Elements

The principal elements of the conservative approach to design of the wastewater treatment system are as follows:

Primary Treatment - Maximum recovery of fats and solids will be achieved through the use of both stationary and rotating wedgewire screens in association with a dissolved air flotation unit. It is considered that fat recovery in excess of 90% and solids recovery in excess of 70% will be achieved by this system.

These solid residues together with other solid wastes and blood from the abattoir will be separated from the wastewater treatment stream and directed to the rendering plant.

Secondary Treatment - After removal of fats and solids the wastewater will be discharged to two anaerobic ponds in parallel followed by two aerobic ponds in series (i.e. one after the other) and finally a maturation pond. The wastewater will remain in the anaerobic ponds for 30 days. This hydraulic retention time is six times longer than that recommended by Reed et al, (1995) and 2.5 to 3 times longer than that recommended by the CSIRO. The extra long retention time means that a greater amount of BOD and other constituents will be removed from the wastewater before discharge to the aerobic ponds than would normally be the case.

The use of two anaerobic ponds also means that one pond can continue in operation and with a very high degree of efficiency of treatment while the other pond is being cleaned.

Specific measures which are defined in the CER will also be used to manage the ponds so that the wastewater is treated as efficiently as possible. These measures will include methods recommended by the CSIRO and the University of Queensland for wastewater and odour management. An additional list of design features of the anaerobic ponds which have been incorporated to maximise their performance is presented on Page 37 of the CER.

The aerobic ponds have also been designed to perform better than systems recommended by the CSIRO. In particular, the BOD loading in the ponds will be 54kg/ha/day whereas the CSIRO recommends a BOD loading of about 95kg/ha/day. It is considered that this conservative design should result in a BOD reduction of at least 90% in winter. Again, this is considered to be an under-estimate of the true performance that will be achieved as the retention time for the wastewater in the two aerobic ponds will be in the order of 70 days, whereas the CSIRO recommends that the retention time should be at least 15 to 20 days per pond.

When the treated wastewater leaves the final aerobic pond it will be discharged to a maturation pond. Aerobic treatment will continue in this pond and the pond will also act as a reservoir from which wastewater will be irrigated to pasture and woodlots as the next phase of the treatment. In fact, the maturation pond has been designed so that it will have the capacity to retain all of the wastewater output from the abattoir over a period of 4.5 months. This means that if the proposed monitoring program detects any surface or sub-surface nutrients, salinity or other parameters which have the possibility of flowing into Mill Brook, then the wastewater can be stored rather than used for irrigation until the malfunction in the treatment system has been identified and corrected.

The size of the maturation pond also means that the hydraulic retention time for waste water will vary from 70 to 118 days rather than the 20 days recommended by Reed et al, (1995).

Irrigation of Woodlots and Pasture - It is proposed that the treated wastewater from the maturation ponds will be used to irrigate 40ha of Kikuyu/White Clover pasture and 100ha of eucalypt plantations. These areas of pasture and plantations have been designed specifically to take up all of the nitrogen in the treated wastewater as described in Section 5.9.2 of the CER. Again, the estimated uptake of nitrogen is conservative as it does not include the uptake which will occur as a result of volatilisation and denitrification especially from understorey weeds within the woodlots. In addition, non-irrigated plantations of trees or natural vegetation will be sited downslope from the woodlots and these will take up any residual nitrogen which may move downslope from the irrigated plantations.

The irrigated pasture and plantations will only take up a proportion of the phosphorus in the treated wastewater discharged from the maturation pond. It is expected, however, that the soils in the pasture and plantation areas will take up the remaining phosphorus as these soils have the ability to chemically bond this element. Nevertheless, in keeping with the conservative design approach, the soils in the irrigation areas will be amended by the addition of 25% red mud gypsum (RMG) to a depth of 400mm. RMG has a proven capacity to adsorb considerable quantities of phosphorus. It has been assumed that each kilogram of RMG has the capacity to adsorb 0.0005kg of phosphorus. In fact, however, this is about 400 times less than the proven capacity of RMG to adsorb phosphorus (i.e. it has been assumed that the RMG is far less efficient in taking up phosphorus than is actually the case).

These combined conservative design measures have been applied so that the potential for the release of nutrients to Mill Brook will be extremely remote.

The irrigation system has also been designed so that there will not be any significant potential for salt to build up in the soil profile beneath the pasture and plantations over time. This is described in Section 5.9.3 of the

CER. This will be achieved by ensuring that the irrigation water is leached through the superficial soil layer at sufficiently high rates to prevent salt build up. Again, the leaching rates are based on the assumption that the salinity level in the treated wastewater will be higher than it is actually expected to be.

Monitoring Program

The monitoring program relating to wastewater treatment will have three main components. These are as follows:

Periodic assessment of the level of salt in surface soils collected from depths of 10cm, 50cm and 100cm below the irrigated pasture and plantations during late summer when salt levels can be expected to be at their highest. These soil samples will also be analysed for nutrients. The monitoring program will provide information on the effectiveness of nutrient uptake by the pasture and trees and on any salt accumulation in the soil profile.

Groundwater Monitoring - Groundwater monitoring bores will be installed in the irrigated pasture and plantations and downslope from the treatment ponds and irrigation areas. Water samples will be collected from these bores on a monthly basis and will be analysed for salinity and nutrient levels. This will enable the early detection of any increase in nutrients or salinity.

Monitoring of Mill Brook - Water samples will be collected from Mill Brook where it enters and where it leaves the abattoir site. These samples will be collected monthly and will be analysed for salinity and nutrient levels. The monitoring program will provide information on the quality of surface water in Mill Brook and whether the level of salinity and nutrients increases as the brook flows through the abattoir property.

Corrective Action

The monitoring system will enable any inefficiencies in the wastewater treatment system to be quickly detected. In the unlikely event that this happens, further sampling will immediately occur to determine the source of the problem. Corrective action will then be taken. The entire wastewater treatment system has been designed so that any component can be taken out of action at any time without compromising the overall objective of zero nutrient and salinity discharge from the abattoir operations. In particular, the wastewater can be retained in the treatment ponds for considerable periods in the event that the irrigation system requires modification. This could include the development of additional pasture and plantation areas either on or adjacent to the abattoir property so that the nutrient and salinity load of wastewater from the maturation pond can be more widely dispersed.

Commitments

The CER includes a series of commitments by Benale Pty Ltd. Among other things, these commitments are intended to provide assurance that the wastewater treatment system for the Narrikup Export Abattoir will be built and operated in accordance with the descriptions summarised above and therefore that the environmental performance of that wastewater treatment system will be as described. In particular, Benale Pty Ltd has committed to the implementation of an extensive environmental monitoring program and, in the unlikely event that the monitoring program indicates that the abattoir may be contributing significant nutrients to groundwater or to Mill Brook, to undertake specific studies to determine the cause and to take whatever corrective action is necessary to remedy the situation.

PROPONENT QUESTIONS AND RESPONSES

1. GROUNDWATER

1-1 The Geological Survey of WA is concerned about the adequacy of the pumping test in estimating the amount of groundwater available in the area. According to the bore logs submitted with the Technology report, the aquifer may not be isotropic or homogeneous, contrary to Assumption 2 of the report. Also, pump testing was carried out at about 1/3 of the required abattoir capacity for 24 hours. However, the proponent has assumed that groundwater flow is uniform and continuous in direction and velocity (Assumption 3, Technology report), and uses the model to predict groundwater extractions over a larger area for a period that is 210 times longer. What bearing will this have on the accuracy of modelling results and associated predictions on groundwater availability?

Resp 1-1 There is no doubt that additional information is required to conclusively determine the water yielding capacity of the aquifers underlying the proposed development site. However it must be remembered that it was beyond the scope of the CER to conduct a detailed hydrogeological investigation. It was possible to collect only a limited amount of information and then extrapolate this information, using acceptable assumptions, to the long term requirements of the Abattoir. Obviously the quality of the modelling results are dependent on the quality of the data used in the model. Despite the limited nature of this investigation we concluded from the modelling results that there was cause for considerable optimism for the viability of groundwater abstraction for this development.

1-2 Monitoring bore P7 was constructed with its slotted section in the basement gneiss and sealed off from the interval being pumped (see Geological Survey submission). What effect would this have on the usefulness of data collected from this monitoring bore?

Resp 1-2 During the pumping test there was little or no Resp in monitoring bore P7. The purpose of drilling the monitoring bores was to determine the thickness of the Tertiary sediments at various locations at the site and to determine groundwater quality throughout the Tertiary sequence. No local information was available on these matters prior to this investigation. Three monitoring bores previously installed by Agriculture WA in the vicinity of P7 and screened higher in the tertiary sequence were monitored during the pumping test. None of these showed significant Resp to pumping.

1-3 Assumption 4 of the Technology report was that the hydraulic properties of the aquifer do not vary with temperature or density of the groundwater. Is this assumption valid when hydraulic properties of the aquifer may very likely change with density (TDS) and temperature?

Resp 1-3 Yes, the assumption is valid. As with all the assumptions made in this exercise, it is one that is normally applied in groundwater modelling.

1-4 In section 4.3 of the Technology report, it was stated that ideally, the pump rate in a pump test should be such that the aquifer is placed under significant stress. Was this undertaken? If not, are the assumptions made during the modelling exercise still valid?

Resp 1-4 The lack of response in all monitoring bores, particularly the Agriculture WA bores, gauged during the pumping test suggested that the aquifer was performing better than expected. In hindsight, the constant rate test could have been performed at a higher pumping rate or additional monitoring bores could have been installed closer to the pumped bore. However, the assumptions are still valid.

1-5 Will wastewater irrigation result in aquifer recharge? If so, what effect will this have on the quality of the aquifer? If not, will there be surface runoff into local waterways? If not, will there be an accumulation of salt in the soil?

Resp 1-5 The water balance model indicated that there would be virtually no drainage beyond the root zone of the woodlots. Some (230mm) drainage below irrigated pastures is predicted and therefore aquifer recharge will occur. The irrigation rates used in the model are based on the nitrogen uptake capacity of the pasture and woodlots. Conservative parameters have been used at every stage of the calculations and assume that no nitrogen will be exported past the root zone of the irrigated woodlots and pasture. Therefore, there should be no significant increases in nitrogen in the aquifer beyond the input from current local agricultural practices. The salinity of the irrigation water will reflect the salinity of the groundwater from which it is sourced.

The model predicts some surface runoff from the irrigated pasture during the winter months. This can be controlled by the rainfed woodlots that fringe the pasture areas. With proper management there should be no direct surface runoff into local waterways.

The potential for salt build up in the soil is a reflection of the salt content of the irrigation water and the groundwater from which it is derived. The possibility of soil degradation due to salt accumulation appears to be low due to the permeable nature of the soils, the low natural salt levels in the soil, the quality of the groundwater and dilution due to rainfall.

1-6 Agriculture WA in Albany has stated that the monitoring of groundwater abstraction should require at least ten bores to determine the drawdown from the production bores and to determine the accuracy of the computer modelling that is reported in the CER. Would the proponent comment on the above?

Resp 1-6 Yes, we agree with this comment in the context of final design and testing of the well field and in terms of long term monitoring of well field performance. In terms of the limited assessment undertaken as part of the CER it is well beyond the scope of work.

1-7 Could the proponent clarify how a drawdown of just over 7m was recorded for the 24 hour pumping test and a 10m drawdown was recorded for the 30 minute pumping test? Could the proponent also clarify how in the hydrological study, a potential drawdown of 19.2m was measured given a static water level of 8.8m and a drilled depth of 25m?

Resp 1-7 The 10m drawdown over a 30 minute period was achieved at a pumping rate of 400kL per day during the step test that preceded the 24 hour constant rate test. The constant rate test was conducted at a pumping rate of 300kL per day. The potential drawdown figure of 19.2 metres is incorrect. It should be 13.2 metres, this being the depth from static water level to the top of the screen in production bore PB1.

1-8 Under the proposed groundwater abstraction strategy, is there a potential for springs supplying Mill Brook to periodically "dry up"? If so, could the proponent quantify the extent that this will occur and what effect will this have on the nature reserve downstream? Will the proponent ensure that the water supply to Mill Brook Nature Reserve will not be affected by the drawing off of 1ML/day of groundwater for plant process water, and will not have any excess nutrients added to the Mill Brook Aquifer?

Resp 1-8 The model has indicated that there will be minimal changes in groundwater levels in the vicinity of Mill Brook, therefore the effect on groundwater springs in Mill Brook will also be minimal. It must be remembered that groundwater levels and stream flows appear to have been rising in recent years in response to agricultural practices. This factor, which is very positive in terms of the viability of abstracting 1ML per day from the aquifer, has not been included in the inherently conservative modelling exercise. All these issues can be addressed in greater detail during the design and testing of the well field. The nutrient issue has been addressed in Resp 1-5 above.

1-9 Could the proponent clarify the comment that it is proposed to divert the flow of the headwaters of Mill Brook to the Abattoir?

Resp 1-9 This is a comment made in the Narrikup community Submission. In fact, there is absolutely no intention to interfere with streamflow in Mill Brook.

1-10 It has been suggested that section 5.9.3 of the CER incorporates statements suggesting that additional groundwater may be drawn from the site for irrigation, however this has not been allowed for when discussing water usage. Could the proponent clarify this issue?

Resp 1-10 The comment is based on the possibility of using additional groundwater for irrigation to prevent salt build up in the soil profile below the irrigated woodlots. Additional irrigation would help flush salt through the soil profile without washing additional nitrogen beyond the root zone and down to the water table. This is unlikely to be required however, as our calculations suggest that rainfall will provide the leaching requirement and will prevent excessive salt buildup in the soil profile.

1-11 With the extraction of the freshwater layer from the aquifer, is there a potential for this layer to be replaced by more saline water from lower down? If so, how will this affect the quality of the groundwater and what impacts will result from irrigation of this water?

Resp 1-11 Yes this is possible, but it can be minimised by proper well field design and management. All of the irrigation calculations are based on water quality data collected from the lower section of the aquifer and

therefore represent a worst case scenario. The calculations suggest that, even in this scenario, irrigation is viable.

1-12 In the analysis of groundwater at the site, why was no investigation carried out on the geology or hydrogeology of the remainder of the property or surrounds other than in the northeast section of the site? Did the proponent conduct soil studies in order to conclude that the level of clay in the soils was low? Has the proponent measured soil moisture at the site?

Resp 1-12 Based on the available geological and hydrogeological data for the site and the proposed location of the abattoir infrastructure, the investigations focussed on the north east section of the site. It was beyond the scope of the CER to look at the whole property in the same detail. The clay content of the soil profile was described during drilling activities. Yes, soil moisture was measured at the site as part of the bulk density and falling head permeability tests carried out on shallow soil samples.

1-13 Records of 15 piezometers situated adjacent to the proposed site suggest that water table levels have a cyclic variability. Accordingly, has the proponent taken this aspect into account in its modelling predictions in terms of the potential impacts on supply and quality of bore water at the abattoir, nearby properties and users further downstream?

Resp 1-13 Investigations were carried out in early May when water table elevations are still recovering from the drier summer months. Therefore any calculations or assumptions based on these data would be inherently conservative. Data from the 15 piezometers show a rising trend in water table elevations in addition to seasonal cycles of approximately 300 to 400mm.

1-14 In the event that groundwater supply proves to be unsatisfactory, would the proponent consider the option of piping scheme water from the Albany Highway pipeline?

Resp 1-14 On the basis of information gathered to date, it is most unlikely that groundwater supply will prove unsatisfactory for the purposes of the abattoir. However, further data on the hydrogeology will be collected during the detailed design phase of the project and if the supply does not prove to be satisfactory, then the proponent will be obliged to reconsider its options.

1-15 It has been stated that the average live weight for cattle of 0.36t/head outlined is conservative as live weights would probably range from 0.2-0.6t/head. Is this a valid comment, and if so, how will this affect process water consumption?

Resp 1-15 The figure of 0.36t/head average live weight for cattle to be slaughtered at the proposed abattoir is an approximation that fits within the range 0.2-0.6t/head. If the stated average live weight was slightly higher i.e. 0.4t/head, this would have no noticeable effect on process water consumption as estimated in the CER, since water consumption figures were conservatively estimated.

2. IMPACTS ON MILL BROOK AND OYSTER HARBOUR

2-1 Could the proponent expand on what measures will be undertaken to prevent runoff into Mill Brook from lairage yards and the stockholding areas? Can the proponent address the possibility of nutrient input into Mill Brook from runoff from pastures on the West side?

Resp 2-1 Runoff from the lairage yards and the stockholding areas will be intercepted via cutoff/swale drains and diverted to the holding dam near the eastern boundary of the property.

The holding dam will be sized to hold the runoff from 95% of the storms in any one year for a minimum of 72 hours prior to discharge. Statistically the average storm will be held for at least 21 days, thereby effectively reducing nutrient loads. If the holding dam is approaching capacity the stored runoff can be diverted to the maturation pond.

No direct runoff is expected from the pasture into Mill Brook as strategic recontouring and cutoff/swale drains will direct runoff into the holding dam.

2-2 Could the proponent provide more information on its prediction of the subsequent export rate of nutrients from the irrigation site?

Resp 2-2 A response is provided at the start of this document in the section entitled wastewater Treatment.

2-3 If tree harvesting (and the subsequent soil disturbance) were to occur in certain areas of the site, what measures will be employed to stop nutrient-loaded sediment and dust washing or blowing into Mill Brook Creek and contaminating the surface water?

Resp 2-3 As part of the construction and on-going operation, nutrient-loaded sediment and dust will be controlled by the inclusion of sediment traps, continuous water spraying and mulching.

2-4 Will the proponent make a commitment to design, construct and operate the wastewater treatment ponds in a manner approved by the DEP, Water Authority, Health Department and any other relevant agency so that potential environmental impacts on Mill Brook and the groundwater aquifer are avoided? Would the proponent agree to increasing the proposed 600mm of freeboard designed into the maturation pond to account for storm events or high winds that could occur over a protracted period, and the significant wind fetch during these periods with the potential for overflowing into Mill Brook? What contingencies will the proponent have in place to address overflow or leakage of treatment ponds, holding dams, etc, and potential impacts on Mill Brook and local wetlands?

Resp 2-4 The ponds will be designed, constructed and operated in an approved manner. As part of the detailed design the ponds will be designed with sufficient freeboard to cater for wind fetch. The conservative design of the system, the presence of fringing rain fed trees, and planned drainage contours will all act to minimise problems related to potential leakage or overflow of ponds.

2-5 Given groundwater provides base flow for Mill Brook throughout the year, is there a possibility for nutrient enrichment of groundwater which subsequently gets into the Brook?

Resp 2-5 The purpose of determining wastewater irrigation rates based on the nitrogen uptake capacity of the pasture areas and woodlots is to avoid nutrient enrichment of the aquifer underlying the site and subsequent potential impacts to Mill Brook. As discussed in Resp 2-2 above we believe that the conceptual design essentially fulfils a zero discharge criterion.

2-6 How does the proponent intend to address the potential for vegetation stress along Mill Brook resulting from the available fresh water supply decreasing through the extraction of the uppermost fresh water layer?

Resp 2-6 The proponent does not consider that vegetation along Mill Brook will be stressed by the abstraction of water from the aquifer for the purposes of the abattoir. Information gathered to date indicates that the water table across the site is rising and that the abstraction will have a stabilising effect on this rise, and as a result vegetation stress is most unlikely. Figure 7 of the CER shows groundwater contours developed from a model for water abstraction and indicates that there will be very little alteration to the groundwater contours in the vicinity of Mill Brook and the surrounding vegetation.

2-7 Could the proponent clarify what access will be provided across Mill Brook eg causeways? If construction was required, how will this impact on the Brook?

Resp 2-7 A low level floodway will be constructed such that it has no impact on the existing hydraulic regime of Mill Brook.

3. NUTRIENT UPTAKE

3-1 The CER states that stock could be held in kikuyu/clover grassed lairage yards for up to two days. How will the proponent ensure that stripping of vegetation in the yards which would result in a reduction in the amounts of nutrient uptake is prevented? The 20ha of non-irrigated pasture could also be susceptible to water and wind erosion during the drier months with the estimated stocking rates. How does the proponent intend to reduce the potential impacts of erosion in this area?

Resp 3-1 As discussed in the CER, areas used for short term grazing will be carefully monitored by an agronomist to determine nutrient utilisation and to ensure the soil structure is not adversely affected. It is not the intention of the proponent to intensely irrigate the entire forage area each year. The dry pastures, however, will be maintained at a sufficient moisture content to prevent water and wind erosion.

3-2 It has been stated that kikuyu grass used in the pasture mix is unproductive in winter, especially when exposed to frost. If this is accurate, would the proponent consider mixing this crop with some annual/perennial winter grass species to ensure crop production rates and nutrient uptake remains as efficient as possible? Given that the uptake of nitrogen by irrigated Kikuyu/White Clover crops is reduced by 50% to allow for "short term

grazing" (Appendix 4, sheet 7), should a similar allowance be made for Phosphorus calculations (Appendix 4, sheet 9)?

Resp 3-2 The proponent, as part of the design, will consider the mixture of grass species in detail, and will then decide on the possible inclusion of annual/perennial winter grass species.

The phosphorus uptake for the Kikuyu/White Clover should have been reduced to 50% to allow for short term grazing. Consequently, the expected phosphorus uptake is approximately 600kg/annum. Based on the calculations in Appendix 4 of the CER this would reduce the phosphorus accumulation lifespan by five years to 45 years. This reduction would be partly offset by the removal off-site of the algal bio-mass generated in the ponds.

3-3 The proposed use of white clover in the pasture mix has been questioned due to its intrinsic nitrogen fixing ability. What alternative crop would the proponent suggest be used if the above is true?

Resp 3-3 Advice on the pasture mix will be sought from an agronomist during detailed design.

3-4 What effect will high levels of N/P present in the amended soils have (close to the point of saturation) on pasture vegetation and/or irrigated woodlots? Will there be a point in which the soils will be too "toxic" to support vegetation due to high nutrient (P) levels?

Resp 3-4 The amended soils have been designed for a no leaching storage capacity of 0.0005kg (TP)/kg (RMG) which will result in a concentration of phosphorus well below nutrient toxicity levels.

3-5 The predictions for nutrient adsorption capacity in the CER have been made on the assumption that there is an average depth of 8m of soil available for adsorption. Given that the depth to groundwater at the site varies between 3.6m and 13.5m, and that there will not be 8m available in some areas, how will this affect nutrient adsorption?

Resp 3-5 The average groundwater levels over the spray irrigation sites are approximately 10.0m below the natural surface levels, consequently the use of an average depth of 8.0m for adsorption is an under-estimate in phosphorus storage capacity. This additional 2.0m could effectively lengthen the life span by 20 years.

3-6 The holding of stock in the proposed holding areas will undoubtedly result in the deposition of faeces and urine which will add to the levels of nutrients input to the irrigated pastures. The CER does not include these inputs into the nutrient budget for the site. Also, nutrient budgets in the CER have failed to take into account the nutrients contained in the wastewater produced by staff. Can the proponent clarify these omissions?

Resp 3-6 The deposition of faeces and urine in holding/grazing areas is dealt with in the nutrient budget by reducing the nutrient uptake of the Kikuyu by 50%.

The wastewater produced by staff will most likely be treated by an aerobic treatment unit (ATU) which may include a facility for chemical dosing to precipitate phosphorus. Otherwise this relatively small quantity of effluent will be diverted from the ATU to the aerobic ponds for further processing prior to disposal.

4. RED MUD GYPSUM & PHOSPHORUS RETENTION INDEX (PRI)

4-1 Could the proponent explain how the use of red mud gypsum will increase the accumulation of the "unbudgeted" Phosphorus in the soil to approximately 400kg/ha/m? Can the proponent guarantee the effectiveness of red mud gypsum in increasing the nutrient adsorption capacity of the soil and preventing nutrients from leaching into the groundwater? What is the likelihood of nutrient release from the red mud gypsum prior to the soil reaching nutrient saturation point, ie before the predicted period of 50 years? Would the proponent agree to undertake periodic measurements of PRI to determine the speed at which the soils become saturated with phosphorus?

Resp 4-1 The calculations used to determine the 400kg/ha/m are included on Page 10 of Appendix 4. These calculations are dependent on a no leaching storage capacity of 0.0005kg(TP)/kg(RMG) which has been demonstrated by researchers Ho et al, at Murdoch University, to be a conservative value in practice.

Furthermore, based on data obtained on the utilisation of RMG for phosphorus reduction in the last decade in Western Australia, the determination of a 50 year life span for the RMG and soil phosphorus storage is reasonable.

As part of the ongoing monitoring of the wastewater treatment system the Phosphorus Retention Index (PRI) of the amended soils will be assessed periodically to determine its residual storage capacity.

4-2 Calculations of PRI assume that 100% of the Phosphorus in irrigation water will be retained in the unsaturated soils by adsorption or by being utilised by vegetation. As the aquifer may be heterogeneous in nature, is there a possibility that preferential flow paths exist for infiltrating rain water? If so, once the soils are loaded with nutrients, will the amount of nutrients moving into the groundwater increase significantly?

Resp 4-2 Yes, it is likely that there will be some preferential flow paths in the unsaturated zone. However, given the proper management of irrigation at the site and the conservative nature of all calculations and assumptions used in determining the wastewater loading rates, the proponent is confident that there will be no deleterious effects on the aquifer underlying the site.

4-3 It has been stated that the red mud gypsum will provide a theoretical life of 50 years before any increase in Phosphorus is detectible in the groundwater (pg 43-44). If this approximation is accurate, could the proponent provide more detail in relation to what measures will be undertaken to prevent groundwater contamination at that stage?

Resp 4-3 Once the phosphorus storage capacity of the RMG is depleted, it will be removed progressively around the site and replaced by a new layer of RMG and soil mixture. The degree to which the PRI of the RMG is reducing will be monitored so that it can be programmed for replacement.

4-4 Page 44 of the CER states that chemical precipitation could be an option in removing excess Phosphorus from waste streams should the use of red mud gypsum not prove adequate. Could the proponent detail how this would be achieved?

Resp 4-4 Chemical dosing of the aerobic or maturation pond with either Alum, Lime, or Ferric Salts to precipitate phosphorus is being considered as a contingency plan should the proposed treatment system not meet the predicted performance.

4-5 Could the proponent clarify the quantity of red mud gypsum to soil mixture proposed and how this will be mixed into the soil profile?

Resp 4-5 The RMG to soil mixture will be determined as part of the detailed design, but preliminary calculations have been based on mixing 100mm to 200mm of RMG into 400mm of sand substrate at a rate of 30t to 60t/ha. Mixing will be undertaken using appropriate earthworking machinery.

4-6 What impacts will there be from chemicals already present in the red mud gypsum leaching into groundwater?

Resp 4-6 In a trial using 850t/ha, the salts in RMG leaching into groundwater were equivalent to 20 years of leaching by rainfall of an untreated soil. Therefore at the much lower rates of 30t to 60t/ha proposed the effect of leachates would be minimal. The concentration of the elements iron, aluminium and cadmium was negligible in these trials (Ho et al, 1989).

4-7 How will infiltration rates be affected by the use of red mud gypsum, especially when this is loaded with salt and is compacted by livestock?

Resp 4-7 Some compaction is expected, consequently the soil will be routinely ripped to maintain current infiltration capacity.

4-8 The CER included PRI analyses for only the Redmond soil type. In light of the fact that treated wastewater is to be irrigated over regions containing S6 Minor Valley and Dempster soil types (which could make up to 65ha of the site), does the proponent consider that these regions need to be analysed for PRI, runoff characteristics, salt accumulation, etc?

Resp 4-8 The CER included the PRI analyses for only the Redmond soil type because it is by far the most common soil type on the property. Less than 5ha (out of 100ha) of woodlot will be planted on the S6 Minor Valley Soil Type and nothing will be planted on the Dempster soil type. Furthermore, additional sampling and analysis is likely to occur during the detailed design phase of the wastewater treatment and disposal system to ensure that it will function to requirements. The proponent considers that adequate analyses have been undertaken on the site for the purposes of producing the CER.

5. RUNOFF

5-1 Could the low vertical permeability of soils in the area lead to overloading of nutrients at the surface with possible mobilisation into the surface drainage system?

Resp 5-1 The data collected during the CER suggest that the soil profile has a relatively high vertical permeability, particularly the superficial horizons. The water balance model predicts some runoff from the irrigated pasture areas which the proponent believes can be contained in fringing rain fed woodlots or will soak into the soil in localised depressions.

5-2 In light of the fact that irrigation of pastures and woodlots would result in soils being at a higher moisture level than normal, and that the heavy stocking rate would result in increased soil compaction, could the proponent provide more detail in relation to commitments the proponent intends to have in place to control run off?

Resp 5-2 Should runoff be generated from the grazing pastures this will be collected via cutoff drains/swales and directed to the holding dam.

5-3 Could the proponent clarify how the pasture on the east side is to drain into the sediment dam? How will the proponent ensure that runoff from the site will be prevented from entering the property situated along the eastern boundary and the swamp located in this vicinity which is supposed to be a recharge area for groundwater?

Resp 5-3 See Resps to questions 2-1 and 5-2 above.

5-4 Would the proponent consider enhancing the strategic drainage/contour banks to control surface run off from the irrigated pasture lots?

Resp 5-4 As discussed in the Resps for questions 2-1 and 5-2 above cutoff drains/swales are proposed to intercept runoff along the irrigated pasture areas.

5-5 The CER outlined that "except for the stormwater generated from extreme storm events, no surface discharge will occur from the site into existing water courses". Could the proponent explain how it defines "extreme storm events"?

Resp 5-5 extreme storm events represent runoff generated from rainfall which exceeds 95% of the events in one year. This is discussed further in the Resp to question 2-1.

5-6 Is the volume of the proposed holding dam sufficient to contain runoff from such storm events?

Resp 5-6 The volume of the holding dam will be sized to cater for events representing 95% of the storm events in one year.

5-7 Does the proponent intend to treat stormwater runoff from carparks prior to diversion to the infiltration basin, in light of the fact that these could contain heavy metals and oils?

Resp 5-7 Stormwater from the carparks will enter a gross pollutant and oil trap prior to disposal into the infiltration basin.

5-8 It has been stated that the amount of runoff from the stockholding areas is greatly dependent on the number of stock being held in the area, due to the compaction of soils. Can the proponent confirm that stockholding rates in these areas will comply with the recommended rate for the district, at all times?

Resp 5-8 The proponent confirms that stockholding rates in holding areas will comply with all relevant codes and guidelines. It should be noted that runoff from the stockholding areas will be collected in the holding dam and will ultimately be re-irrigated to either woodlot or pasture.

5-9 It has been stated that it is very likely that there will be some runoff from the lairage area. Would the proponent consider directing this through a 0.5mm screen prior to discharge to a (facultative) pond? (The resultant wastewater could be reused for irrigation onto woodlots).

Resp 5-9 Rainfall from the lairage area will be screened prior to disposal into the aerobic treatment ponds.

6. SALINITY

6-1 Will the proponent ensure that the salinity of the water supply to Mill Brook Nature Reserve will not be affected either by the drawing of fresh water or through leaching?

Resp 6-1 The proponent aims to ensure that the quality of water in Millbrook remains unchanged.

6-2 It has been stated by the Government Technical Advisory Group (GOTAG), that crops such as white clover used in the pasture mix do not tolerate the salt levels expected. Consequently, this could result in addition of nitrogen to the system as opposed to a reduction. Has the proponent investigated the impact of salinity on white clover and what alternative crops are available?

Resp 6-2 The proponent acknowledges the limitations of white clover with respect to salt tolerance. All pasture nutrient balance calculations undertaken in the CER are based on kikuyu only. See also the Resp to 3-3 above.

6-3 Could the proponent comment on the potential for increased salinity in the aquifer due to the fact that there is a reduction in volume of water being recycled into the aquifer (through evaporation and transpiration) but no reduction in the salt content thereof?

Resp 6-3 There will be a slight increase in salinity of the process water due to evaporation from the ponds and through transpiration after irrigation. This would be reflected in an increase in salt storage in the soil below the irrigated lots and higher salinity of water that drains past the root zone. These undesirable side effects will be avoided due to rainfall which exceeds the irrigation depth in the woodlots by 380% and by 180% in the irrigated pasture lots.

6-4 Could the proponent clarify how it intends to minimise the potential impacts of salinity whilst at the same time attempting to achieve satisfactory nutrient uptake rates by woodlots and crop pastures (pp 42-44)?

Resp 6-4 As explained in section 4.5.1 of Appendix 2 of the CER and in question 6.3 above, the additional water that needs to be applied to the irrigation lots to avoid undesirable increases in salt storage is easily provided by rainfall.

6-5 It has been stated (A Lebel) that the pickling process could increase the TDS content of the wastewater to 3900mg/L. Could the proponent provide more detail as to the expected salinity levels of the irrigated wastewater in light of the fact that the pickling wastewater could add to the salinity? Can the proponent confirm that this is an acceptable level for irrigation? It has also been stated (A Lebel) that approximately 1.5tonnes of salt will be irrigated per day, which equates to 2 tonnes of salt per hectare per year over an area of 140 hectares. Are these figures accurate and if so, what impact will this have on vegetation and soil?

Resp 6-5 The pickling wastewater will not add significantly to salinity levels in the general wastewater stream because the brine will be re-used (after contaminants have been removed).

Recycling of pickling plant brine forms part of the sound economic and environmental management practices that will be employed at the abattoir complex. Contaminants removed from the brine prior to recycling will either be flushed into the wastewater stream or removed to an approved landfill, depending on predicted concentrations in the wastewater.

These calculations will be undertaken during the detailed design phase of the project together with calculations of the precise quantities of salt to be irrigated to pasture and woodlots from each part of the abattoir. Preliminary calculations indicate that the wastewater will be suitable for irrigation purposes.

6-6 Given the different soils, rates of addition and landuses, Agriculture WA has suggested that at least 25 profiles would need to be measured to reach conclusions about the effect of the irrigation on salt build up and the accuracy of the calculated leaching factors for pastures and trees. Would the proponent agree to undertaking such measurements?

Resp 6-6 The measurements suggested will be undertaken during the detailed design phase of the project.

6-7 Could the proponent clarify the following. In section 4.5 of the conductivity levels in the monitoring and test bores ranged between 250 and 450µS/cm, however in Table 1, conductivity data for the two pumping tests show excessive figures of 3060 and 3110µS/cm.

Resp 6-7 The data reported in section 4.5 of Appendix 2 are field measurements and may have been reported erroneously. The data reported in Table 1 are from laboratory analysis of water samples. The Table 1 data have been used for all calculations in the CER.

7. WASTEWATER TREATMENT

7-1 The domestic wastewater treatment plant is a prescribed activity and will be required to be licensed. For the volume of wastewater proposed, would the proponent consider using a ponds system or an ATU as opposed to a septic system?

Resp 7-1 The proponent notes that the domestic wastewater treatment plant is a prescribed activity and that it will be required to be licensed. As stated on Page 21 of the CER, sewage originating from the workforce ablution facilities may be treated by a dedicated wastewater treatment system such as an ATU or a conventional septic tank system. The effectiveness (in terms of site nutrient loads) and cost of each system will be assessed in association with advice from the Health Department of Western Australia prior to any decision for a system for the abattoir.

7-2 Would the proponent consider the option of chemical precipitation (eg alum dosing) in removing excess Phosphorus in waste streams prior to irrigation over PRI amended soils? Should the red mud gypsum amendment not work as predicted, would the proponent then consider alum dosing?

Resp 7-2 The proponent does not consider that chemical precipitation (eg alum dosing) is necessary for the proper function of the wastewater treatment and disposal system proposed for the site. However, if ongoing monitoring at the site indicates that the system is malfunctioning in any way, then all options would be considered in finding a solution, including chemical precipitation in the wastewater treatment ponds. See also the Resp to 4-4 above.

7-3 The NAIF for soils beneath the proposed maturation pond indicate that this is one of the most permeable locations on the site. Is this an appropriate location for the pond? What additional measures could be taken to ensure no leaching occurs?

Resp 7-3 The maturation pond will be lined using clay and/or a plastic liner to limit leaching into the groundwater.

7-4 Could the proponent address how it intends to manage wastewater issues with respect to the rendering plant, fellmongery, pickling operation and skin drying?

Resp 7-4 Wastewater from the rendering plant, fellmongery and pickling plant will pass into the wastewater stream from the abattoir and will be dealt with in the same way as wastewater emanating from other parts of the complex. This is illustrated in Figure 12 of the CER.

7-5 Will the detailed design plans for the plant process facilities attempt to allow for recycling of process water wherever possible eg could the pickling plant run on recycled water?

Resp 7-5 All recycling options for process water will be investigated thoroughly during the detailed design phase of the project.

7-6 It has been stated by the Conservation Council that the predicted BOD removal for the anaerobic pond, aerobic pond and maturation pond (75%, 90%, 70%) with the final BOD figure of 10g/m3 are optimistic considering the cold climate and the effect of algae growth in the maturation pond. Figures of 65%, 75% and 55% for the three ponds respectively, have been suggested with final BOD between 30-50g/m3. Could the proponent comment on the above?

Resp 7-6 The conceptual design has been based on the colder climate experienced at the site and the high hydraulic residence times. Consequently BOD removal is not considered to be the controlling parameter in the design, rather, the system is nutrient limited.

7-7 Would the proponent agree to increasing the proposed 600mm of freeboard designed into the ponds to account for storm events or high winds that could occur over a protracted period, and the significant wind fetch during these periods? Has the proponent considered lining treatment ponds with plastic non-permeable membranes as well as compacted clay?

Resp 7-7 The proponent will ensure during the detailed design phase that the freeboard of the ponds will be sufficient to cater for storm fetch, etc. The proponent does not believe that it is necessary to line the treatment ponds with compacted clay and a non-permeable plastic membrane, since each perform the same function and to use both would unnecessarily increase establishment costs.

7-8 Page 37 of the CER outlines that the anaerobic ponds will be designed to allow one pond to be drying out and the dried sludge removed, whilst the other is in use. Also, given that high evaporation rates only occur during limited periods of the year, drying of fatty material and the accumulated sludge may prove time consuming. Could the proponent clarify the methods involved in "drying out" the ponds which could contain up to 7m of effluent?

Resp 7-8 The anaerobic ponds are over designed. Consequently, one of the ponds can be taken out of service for an extended period for desludging and maintenance. Due to the proposed depth of the pond, the majority of the sludge would be removed during the summer months using an excavator.

7-9 Will the proponent ensure that an application for the wastewater treatment system for the workforce ablution facilities is be submitted to the Executive Director Public Health for approval which details the estimated daily wastewater flows, the design of the system, a maintenance and monitoring programme, and the proposed method of effluent disposal?

Resp 7-9 As noted in 7-1, the proponent will ensure that an application for the wastewater treatment system is submitted to the Executive Director, Public Health for approval. This will be undertaken as part of the licensing procedure for the domestic wastewater treatment plant at the proposed abattoir. The application will detail the estimated daily wastewater flows, the design of the system, a maintenance and monitoring program, and will describe the proposed method of effluent disposal.

8. MONITORING

8-1 Given that most flows and associated nutrient loads for the site are episodic in nature, would the proponent commit to installing adequate gauging stations to calculate nutrient load coming into and leaving the property as well as undertaking continuous monitoring of flow rates and water quality of Mill Brook? Would the construction of "v-notch weirs" on Mill Brook at either end of the property for monitoring purposes be carried out by the proponent, if necessary?

Resp 8-1 The proponent believes that the monitoring program described on Pages 54 and 55 of the CER is adequate for the purposes of determining that there is zero nutrient discharge to the groundwater and to Mill Brook. Water levels in the groundwater production bores, in the series of monitoring bores installed close to the production borefield, in selected irrigated pasture and woodlot areas, and in two monitoring bores which will be installed near the eastern boundary of the site, will be measured once a month during the life of the project. This monitoring program will provide information on groundwater levels and any drawdown effects on the water table. Water samples will also be collected from representative production and monitoring bores downslope from ponds and irrigation areas on a monthly basis, and will be analysed for TDS and nutrient levels. This will provide early warning of any nutrients leaching from ponds or irrigation areas.

Samples of surface soils will be collected from depths of 10cm, 50cm, and 100cm below representative irrigated pasture and woodlot areas during late summer (February to March) each year. These soil samples will be analysed for TDS and nutrient levels. This monitoring program will provide information on the effectiveness of nutrient uptake by pasture and tree crops, and on any salt accumulation in the soil profile.

Water samples will also be collected from Mill Brook, upstream of the abattoir operations where Mill Brook enters the site, and close to the southern boundary. Samples will be collected monthly and analysed for TDS and nutrient levels. Flow rates will also be measured at the same time at each site. This monitoring program will provide information on the quality of surface water at Mill Brook as it enters the abattoir site and as it leaves the site. Construction of v-notch weirs on Mill Brook at either end of the property for monitoring purposes will be undertaken by the proponent if necessary. The monitoring program will be designed and implemented in consultation with Agriculture WA and the Albany Waterways Management Authority, and the results will be provided to these Authorities, the Shire of Plantagenet, and to the DEP, and will be made available to the public.

8-2 Would the proponent consider engaging an independent consultant to undertake regular monitoring of various environmental parameters at the plant so as to confirm data collected by the abattoir?

Resp 8-2 Regular monitoring of the various environmental parameters at the plant as described in the CER will be undertaken by an independent consultant at certain times, in order to confirm data collected by abattoir employees.

8-3 Will the proponent ensure that background monitoring stations are in place prior to construction and operation of the plant so that base conditions can be determined?

Resp 8-3 The proponent will ensure that background monitoring stations are in place prior to operation of the plant so that base conditions can be determined. If environmental approval for the project is forthcoming, the proponent will immediately initiate a background monitoring program to establish base levels for all of the parameters that will need to be considered during ongoing monitoring programs. Some of the background monitoring may be established at the same time as initial construction activities such as fencing and levelling of sites.

8-4 Will the proponent commit to having in place a monitoring programme to monitor impacts on flora and fauna communities in the area as well as the impacts on the conservation reserve 3km down Mill Brook from the border of the property?

Resp 8-4 The proponent has indicated that the site will be operated such that there is no off-site export of nutrients. As a result, it is considered that monitoring programs aimed at determining any impacts on flora or fauna communities off the site are not warranted.

9. CONTINGENCY PLANNING

9-1 Would the proponent be prepared to make a commitment to establish and implement management strategies and contingency plans (as part of the proposed environmental monitoring programme) to ensure immediate corrective action in the event of any problems relating to unacceptable nutrient discharge to groundwater and/or Mill Brook, Oyster Harbour and/or King George Sound, unacceptable noise levels, odours, etc.

Resp 9-1 The proponent is committed to establishing and immediately implementing management strategies and contingency plans to ensure immediate corrective action in the event of any problems relating to unacceptable nutrient discharge to groundwater and/or Mill Brook and any other environmental discharges from the abattoir complex. This issue is dealt with on Pages 56 and 57 of the CER which provide details of the commitments the proponent has made with respect to the construction and operation of the Narrikup Export Abattoir.

9-2 Has the proponent taken into account the "10 year rain cycle" in preparing the design for the plant and related operations?

Resp 9-2 The proponent has not yet prepared the detailed design for the plant and the related operations. However, the initial design of the wastewater treatment system and drainage system for the site has taken into consideration cyclic rainfall events. This is particularly evident in the conservatively large capacity of the maturation pond which can hold all wastewater produced for 4.5 months if necessary.

9-3 Will the proponent ensure that a detailed and committed contingency plan is in place which would describe the measures that will be undertaken in the event that red mud amendment fails to prevent any release of nutrients into the groundwater?

Resp 9-3 The proponent will ensure that there is a contingency plan in place in the event that the RMG amendment fails to prevent the release of nutrients into the groundwater. This could include the use of chemical dosing and/or the inclusion of additional forage pasture over woodlots.

9-4 In the event that waste cannot be rendered, will the proponent ensure that a contractual arrangement is in place with another rendering plant to accept the waste?

Resp 9-4 In the event of a breakdown in the rendering plant, the proponent will ensure that the material unable to be rendered will be removed from site either to an approved landfill or to another rendering plant.

9-5 Could the proponent outline if there are sufficient emergency facilities in proximity to the site to cope with a major traffic accident related to operations at the abattoir?

Resp 9-5 It is understood that emergency facilities capable of coping with a major traffic accident in the vicinity of Settlement Road, whether related to abattoir operations or not, exist at Albany and at Mt Barker. It is a matter for Government Agencies to determine the adequacy of this situation.

10. CHEMICALS

10-1 Would the proponent consider using phosphorus free detergents for abattoir cleaning purposes? What chemicals will be used during the processing of stock apart from industrial cleaning detergents? What impacts will these have on the environment and how will these impacts be addressed?

Resp 10-1 The use of phosphorus-free detergents for abattoir cleaning purposes will be considered by the proponent. No chemicals are used during the processing of stock on the abattoir floor but acetic acid, sodium sulphide, and sulphuric acid are used in fellmongery and pickling. These chemicals will eventually pass to the wastewater treatment system in a relatively dilute form. They will be further diluted in the system so that no environmental impacts will result when the wastewater is irrigated to woodlots or pasture.

10-2 What impacts will the wool residue from sheep dips have on the environment and how will these impacts be addressed?

Resp 10-2 Only sheep dips approved by Agriculture WA may be used on stock in Western Australia. Any residue from fleeces resulting from fellmongering and pickling will be passed into the wastewater treatment system where it will be diluted. As a result such residues will have a negligible impact on the environment.

10-3 What mechanisms are in place to ensure that transport of hazardous chemicals (if used in plant processes) is conducted in an approved and environmentally acceptable manner?

Resp 10-3 The transport of dangerous goods, i.e. chemicals that may be used in the processing of skins and wool, is subject to specific Regulations such as the Dangerous Goods (Road Transport) Regulations, 1983 and the Dangerous Goods (Road Transport) Amendment Regulations, 1988. These regulations must be complied with during the transport of certain chemicals. The Regulations are administered by the Explosives and Dangerous Goods Division of the Department of Minerals and Energy. The Commonwealth Code entitled Australian Code for the Transport of Dangerous Goods by Road and Rail must also be complied with during transport of dangerous goods. The proponent is legally bound to comply with all relevant legislation and commits to doing so.

10-4 Fellmongering and pickling plant wastes may contain salt, acetic acid, sodium sulphide and sulphuric acid. How does the proponent intend to manage these wastes?

Resp 10-4 Fellmongering and pickling plant wastes will ultimately pass into the wastewater treatment system and will be managed in the same way as other wastewater discharges. See also the Resp to 10-1.

11. ODOURS AND GASEOUS EMISSIONS

11-1 Local knowledge suggests that January to May inclusive are the most likely periods for inversion formation. Has the proponent taken into account the possibility of localised temperature inversions and funnelling effects to move odours along small corridors, in concluding that a separation distance of 1000m from residents is sufficient?

Resp 11-1 The DEP generally recommends a separation distance of 1000m from the nearest residence for the management of odours emanating from a rendering plant. This requirement can be met by the proponent. In addition the proponent will establish large areas of woodlots which will act as a barrier to the propagation of odours along localised corridors and will act to break up and disperse these odours.

11-2 It has been suggested that the wind conditions for Albany airport do not necessarily correlate with the experiences of the local Narrikup residents. Could the proponent comment on this in terms of the validity of the meteorological data used to predict odour impacts?

Resp 11-2 It is considered that wind conditions for Albany Airport provide sufficient basis on which to predict odour impacts from the abattoir as separation distances are 1000m or greater and a significant portion of the buffer will be occupied by trees that will act to disperse and divert any odours emanating from the facility.

11-3 Could the proponent address how it intends to manage odour issues with respect to the fellmongery, pickling operation and skin drying?

Resp 11-3 The treatment of sheep skins will be essentially enclosed and there will be no open skin sheds with racks for air-drying skins. The method of treatment is described in Section 4.2.2 of the CER. Short skins (with a wool length of less than about 35mm) will be transferred directly to the pickling shed for salting. All other skins will be sprayed with acetic acid, sweated in humidifiers, and then passed by hand through a stripping machine to remove the wool. Defleeced skins will then be sent to the pickling plant.

These are standard treatment methods at modern abattoirs and they are not expected to generate any significant level of odour beyond the plant boundaries.

11-4 Would the proponent commit to installing all necessary odour control measures at the plant prior to commencement of operations?

Resp 11-4 The proponent has committed to install odour control measures at the abattoir prior to the commencement of operations. In particular, the proponent will ensure that the design of the rendering plant complies with the Environmental Code of Practice For Rendering Plants (1995) published by the EPA. The detailed design of the plant and operating procedures will also be supplied to the DEP for their approval and any reasonable additional odour control measures which the DEP considers necessary will also be implemented. The wastewater treatment ponds will also be designed and managed in accordance with recommendations of the CSIRO and the University of Queensland for odour control.

Benale Pty Ltd has also committed to implement an Environmental Monitoring Program which will include ongoing assessment of odour emissions. The monitoring program will be implemented in consultation with relevant Government Agencies and the results will be provided to these Authorities, the Shire of Plantagenet and to the DEP and will be made available to the public.

11-5 What level of methane and carbon dioxide is discharged into the atmosphere to contribute to the greenhouse effect after migrating to the surface of the treatment ponds? Would it be viable to use a methane digester to produce electricity for use on the site?

Resp 11-5 The level of methane and carbon dioxide discharging into the atmosphere is difficult to quantify at this conceptual stage. These discharges will only marginally contribute to the greenhouse effect when trees are added to the site on woodlots which will act as carbon dioxide sinks.

11-6 What is the potential for sulphide to sulphate conversion in the anaerobic ponds, and the resultant reduction of offensive odours?

Resp 11-6 Sulphur is required in the synthesis of proteins and is released as part of their degradation. Sulphate is reduced biologically under anaerobic conditions to sulfide, which in turn can combine with hydrogen to form hydrogen sulphide (H2S). This gas is a colourless, inflammable compound with the characteristic odour of rotten eggs. Other volatile compounds such as indol, skatol and mercaptans, which may also be formed during anaerobic decomposition, may cause odours more offensive than that of hydrogen sulfide.

Therefore, it is essential that the anaerobic ponds are designed and operated in strict accordance with proven methods for odour control as described in the CER. These measures and the inclusion of a buffer will guarantee that odours will not prove to be a nuisance to adjoining residences.

12. NOISE

12-1 Will the proponent commit to ensuring that noise levels emanating from the plant comply with the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979?

Resp 12-1 The proponent will ensure that noise levels emanating from the plant comply with the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979. Commitments in relation to noise are provided on Pages 56 and 57 of the CER.

12-2 It has been suggested that the wind conditions for Albany airport do not necessarily correlate with the experiences of the local Narrikup residents. Could the proponent comment on this in terms of the validity of the meteorological data used to predict noise impacts?

Resp 12-2 It is considered that wind conditions for Albany Airport are sufficiently similar to those experienced at the proposed abattoir site to allow for valid noise impact predictions to be undertaken, as presented in the CER. Nevertheless, the proponent has committed to prepare a noise assessment as part of the detailed design of

the Narrikup Export Abattoir in order to confirm that the total noise emission does not exceed a total sound power level of 110dB(A) and that no tonal characteristics exist. The results of this specific noise assessment will be provided to the DEP for approval.

13. DUST

13-1 Will the proponent make a commitment to ensure that dust will be kept below levels outlined in relevant EPA guidelines during the construction phase as well as when the plant is operational?

Resp 13-1 All relevant EPA guidelines for dust management will be complied with during construction and operation of the proposed abattoir.

13-2 How will the proponent ensure that dust is managed over dry pasture areas as well as in the holding paddocks?

Resp 13-2 The proponent will ensure that stock are removed from dry pasture areas if grass has been denuded to the extent that dust is being generated. Dust management over the holding paddocks will be accomplished by the application of wastewater which will keep the soil moist and will not allow the generation of dust. In addition, the application of wastewater will be designed to promote the growth of grasses which will act to minimise dust emissions.

13-3 How will the potential for dust emanating from abattoir related transport be controlled?

Resp 13-3 Transport-related dust emissions will be managed through either the use of bituminised roads and hardstand areas or the application of water to gravel roads and hardstands.

14. SOLID WASTE

14-1 Where does the proponent intend to dispose of solid waste products from the wastewater treatment units? Where does the proponent intend to dispose of solid waste products from the construction stage? How will the proponent dispose of general rubbish generated onsite? How does the proponent intend to dispose of solid wastes such as salt or other chemicals used in the pickling process?

Resp 14-1 Solid wastes generated at the abattoir will be dealt with either by processing them to produce fertiliser or by disposal to an approved landfill. Solid wastes produced during construction will be disposed of in accordance with the requirements of the Shire of Plantagenet, as will general refuse generated on site and solid wastes such as salt from the pickling process. This will probably mean that these wastes are ultimately placed at the Mt Barker tip site. See also the Resp to question 14-2 below.

14-2 Could the proponent confirm the location of the approved landfill for disposal of solid wastes from the project as well as outlining mechanisms in transporting these wastes?

Resp 14-2 The proponent considers that determination of a suitable landfill for disposal of solid wastes from the abattoir and indeed a discussion of the mechanisms of transporting these wastes is premature at this stage. These matters will be considered during the detailed design phase for the project, if the proposal receives environmental approval. However, discussions with the Shire of Plantagenet and the Waste Management Division of the DEP indicate that solid wastes (including carcasses and faeces) could be disposed of in suitably designed trenches at the Mt Barker tip.

14-3 In light of the fact that it may be difficult to access a landfill in the area for the disposal of the 200tpa of biosolids produced, would the proponent seriously consider the benefits of pelletising the material?

Resp 14-3 As stated on Page 48 of the CER, it is currently envisaged that the proponent will construct an organic fertiliser production plant within the abattoir complex. This plant will include a hammer milling operation and a pelletising machine. The pellets will be conveyed up cooling tower and dropped to a bagging machine. The pelletised organic fertiliser would then be sold off-site.

14-4 Could the proponent demonstrate what contingency plans will be in place to ensure proper disposal of solid waste to landfill when the need arises? (This will require local authority approval and a description of how it will be managed).

Resp 14-4 The development of contingency plans for the removal of solid wastes from the site to landfill is considered premature at this stage and would be developed during the detailed design phase for the project. However, as stated in 14-2 above the Shire of Plantagenet considers that solid wastes from the abattoir could be placed at the Mt Barker tip if necessary.

15. FLORA AND FAUNA

15-1 Has the proponent undertaken a detailed study of flora and fauna at the site? If not, how does the proponent intend to determine the impacts on these communities from the abattoir and related operations, eg transport, noise, etc?

Resp 15-1 The layout of the abattoir has been designed so that the remnant vegetation on the site will not be disturbed. These areas will also be fenced to exclude stock and to minimise the potential for accidental damage. These measures mean that the existing flora and fauna will be able to continue to exist on the site. It is considered most unlikely that indirect effects from noise etc., will have any impact on the wildlife.

15-2 How will the proponent address the potential for dieback fungus spreading through transport of contaminated animals to the site and the pathogen entering Mill Brook through surface runoff?

Resp 15-2 The potential for dieback fungus to be transported to the site on animals or vehicles is considered to be remote. In support of this, there is no evidence that dieback has been introduced to vegetation near the cattle saleyards at either Mt Barker or Albany, both of which are intensively used. Drainage from the abattoir will also be managed so that there is no surface runoff to Mill Brook.

15-3 Will the proponent commit to preparing a detailed management plan to protect remnant rare and endangered vegetation at the site and along the southern boundary of the property and within the vegetation lining Mill Brook for all stages of development at the site? The plan should ensure that the rare and endangered floral species are not impacted upon through nutrient runoff and salinity.

Resp 15-3 The proponent will take steps to ensure that the remnant vegetation on the site is protected. The layout of the abattoir as described in the CER has been designed to avoid the remnant vegetation, and the remaining areas of vegetation will also be fenced to provide further protection. The wastewater treatment system has also been designed so that there will be virtually no potential for nutrient runoff or spreading salinity effects.

15-4 Will clearing of vegetation need to occur for the western and southern woodlots and for the tertiary treatment pond or for any other area? If so, has the proponent assessed any data on the flora and fauna in these areas and the impacts of clearing on these communities?

Resp 15-4 The proponent intends to protect all significant areas of remnant vegetation on the abattoir site. It is recognised that the plant layout and remnant vegetation figure in the CER suggests that certain areas of vegetation may need to be removed. However, it is expected that it will be possible to protect these areas of vegetation during the preparation of the detailed design for the abattoir. Should any clearing of vegetation be considered unavoidable, the proponent will make a specific assessment of that vegetation and will seek approval from the DEP for its removal.

16. GENERAL

16-1 The buffer zones around the abattoir have been proposed on the basis of the existing residential properties. If further housing were to occur near the abattoir, will the proposed buffer zone protect these residents as well? Is there anything to prevent new houses being built near the abattoir site, thus compromising the buffer distances which have been used for designing the plant layout? Will the proposal have an effect in the devaluation of properties near the abattoir?

Resp 16-1 It is correct that the buffer zone surrounding the abattoir has been proposed on the basis of existing residential properties. Should any land owner construct a house closer to the abattoir, then it is possible that noise levels or odour may be higher at that residence. The proponent will therefore request the Shire of Plantagenet to inform any land owner who proposes to construct a house in the vicinity of the abattoir that advice should be sought from the abattoir manager regarding the possible implications in terms of noise or other effects. The Shire of Plantagenet may also choose to establish a buffer around the abattoir by means of planning controls.

It is not expected that the abattoir will have any effect on the value of nearby locations as agricultural properties.

16-2 As no detailed drawings of the plant or ponds are available in the CER, would the proponent ensure that the Works Approval document specifies the layout and construction details of pollution control devices for the rendering plant/fellmongery, pond design, lining, storage, etc?

Resp 16-2 The proponent will provide details of the layout and construction of pollution control devices for the rendering plant/fellmongery, pond design, lining, storage, etc to the DEP during the design phase. This could be part of the application for a Works Approval, if this is requested by the DEP.

16-3 Is the proponent aware that, under the Health Act 1911, the abattoir is considered an offensive trade as opposed to noxious industry (CER Page 4) and therefore, the Shire of Plantagenet is responsible for approving the establishment and controlling the operation of this abattoir as an offensive trade, and not the Health Department?

Resp 16-3 The proponent notes that under the Health Act, 1911 the abattoir is considered an offensive trade and not a noxious industry, and as a result the Shire of Plantagenet is responsible for approval and control of the abattoir rather than the Health Department.

16-4 Would the proponent provide further detail on the potable water supply for employees when an approval is sought from the Shire of Plantagenet?

Resp 16-4 Further details of the potable water supply will be provided when an approval is sought from the Shire of Plantagenet.

16-5 Will the proponent submit the design of the effluent disposal system for the abattoir to the Health Department for approval?

Resp 16-5 The proponent will submit the design of the effluent disposal system for the abattoir to the Health Department for its approval.

16-6 Can the proponent clarify why the rainfall figures in tables 4 and 5 (water balance) are different to the precipitation figures in appendix D (loading rates) sheet 1?

Resp 16-6 The precipitation data used in Appendix D to calculate hydraulic loading rates are effective precipitation, or the component of precipitation that is available to enter the soil following interception by leaf canopy or foliage. The data should be the same as that used in the water balance calculations. However it does not change the fact that the rate of irrigation is limited by the nitrogen uptake capacity of the woodlots and pasture rather than the hydraulic capacity of the soil.

16-7 Although up to 400 staff are expected to be employed, is further automation of plant processes expected? What effect will this have on the number of employees at the abattoir?

Resp 16-7 The abattoir will be designed as a state of the art facility and it is not envisaged that further automation of the plant will occur. This means that staffing numbers will remain constant at the abattoir.

16-8 Is there any potential for expansion of throughput, thereby increasing potential impacts due to salinity, nutrients and solid waste disposal?

Resp 16-8 It is not currently envisaged that throughput at the abattoir will be increased. As a result there will be no increase in the potential for impacts due to salinity, nutrients, and solid waste disposal.

17. LIFESTYLE AND AMENITY

17-1 Would the rezoning of the area for the proposed abattoir leave the area open for other industries to be established in the area eg woolscouring industries, saleyards, etc? What impact will these have on the environment and lifestyle of the people of Narrikup?

Resp 17-1 Rezoning of the site for the proposed abattoir does not have ramifications for the future use of adjacent sites. Use of any adjacent site for the purposes suggested requires rezoning of the land involved. As a result, any impacts on the environment and the lifestyle of the people of Narrikup will be determined on the basis of a specific assessment of any separate proposal.

17-2 A submitter has stated that insufficient investigations had been carried out by the proponent in relation to the impacts of the large increase in numbers of people and workers on the presently sparsely populated area, and question whether the proponent had considered undertaking a "critical population analysis" to determine the effect of the increase in population?

Resp 17-2 The proponent has not considered undertaking a critical population analysis as it is not expected that there will be any significant increase in the population of the local area. It is most likely that the majority of the workforce will either be existing local residents or will live in Albany or Mt Barker.

18. TRAFFIC

18-1 It has been stated that Kalgan-Napier (now Churchlane) Rd is not a suitable route from the east due to the width of the road reserve and alignment. Could the proponent comment on this? Are any upgrades planned for this road? In light of the fact that Churchlane Road which links Hassell Highway to Chester Pass Road are likely to be used for some truck and vehicle movement, does the proponent consider that upgrades are necessary for this road? Will the proponent commit to ensuring that the proposed upgrades outlined in the CER be undertaken prior to commissioning of the abattoir.

Resp 18-1 The proponent has had preliminary discussions with the Albany office of the Main Roads Department (MRD) to identify potential transport routes and road improvements should these be necessary. The suitability or otherwise of the Kalgan-Napier (now Churchlane) Road is a matter for the MRD to determine. Proper planning for any upgrades required on any of the likely transport routes is a matter for consideration during the detailed design phase of the project, since any investment of time in determining these matters will be wasted if the project does not receive environmental approval. The proponent considers it desirable that all required road upgrades are undertaken prior to commencement of operation of the abattoir. However, the nature and timing of any upgrades should properly be determined by the MRD.

18-2 The CER alludes to an additional, occasional campaign hauling of meat when a ship is in port. Could the proponent clarify how often "occasional" is to be? Will the campaign hauling be towards Albany Port, Fremantle Port or both? If, both, what are the relative proportions of each? Would the proponent consider undertaking a detailed traffic impact study to address this issue? On campaign hauling days, would there be an additional 120 truck movements per day on top of the usual 30 trucks per day? Has the Acoustic Study taken this into account? Would the proponent commit to informing Main Roads Department of WA (MRD) whenever campaign shipping is proposed?

Resp 18-2 Campaign hauling of meat would replace the daily transport of meat to either the Port of Albany or the Port of Fremantle, rather than be in addition to these movements. As stated in the CER, campaign hauling of meat is only a possibility and the various transport arrangements and the need for a detailed traffic impact study will be determined during the detailed design phase of the project. All decisions relating to transport matters will be made after consultation with the MRD and the proponent also will inform the MRD whenever campaign hauling was proposed. The noise study used the correct truck numbers to determine the impacts of noise during the campaign hauling operation.

18-3 A concern was expressed regarding the possibilities for rapid expansion of facilities and that the MRD is informed within an appropriate timeframe if expansion is being considered. Would the proponent commit to not increasing truck volumes beyond the maxima outlined in the CER without prior discussion with MRD?

Resp 18-3 Rapid expansion of facilities at the abattoir complex is unlikely and any expansion would require significant forward planning. As a result, any concerned Authority, including the MRD, would be informed within an appropriate time frame if expansion was being considered. The proponent also will advise the MRD if it expects that truck volumes predicted in the CER are likely to be exceeded.

18-4 Figure 11 of the CER illustrates Millstream Road as a transport route yet this is not referred to in the text as a possible transport route. Could the proponent clarify whether Millstream Rd will be used. If so, could the proponent outline the proposed extent of its use, and what upgrading will be necessary to make the road acceptable. If not, would the proponent consider using this as the main route linking the abattoir to Albany Highway in light of the fewer residents living along this road that could be affected?

Resp 18-4 Figure 11 of the CER incorrectly illustrates Millstream Road as a transport route. This route is not considered suitable for a number of reasons, including the inadequacy of visual sighting distances at the intersection with Albany Highway and the expense of extending the road and constructing a bridge over Mill Brook. In addition, the layout of the abattoir complex would mean that any extension of Millstream Road

would have to be aligned along the boundary of the property either to the east or west and this would probably be considered undesirable by adjoining land owners.

18-5 In the late afternoons, drivers going home from the abattoir will be meeting the school bus whilst facing directly into the sun. Considering the possible visual impairment from this, would the proponent consider widening parts of Settlement Road to allow parking bays for the bus to pull into?

Resp 18-5 Preliminary discussions with the MRD indicate that significant a upgrade of Settlement Road would be required to accommodate the increased traffic volumes generated by the abattoir. Currently, Settlement Road has a sealed width of 5.6m, a nominal 150mm gravel pavement depth, and table drains in a 20m wide road reserve. It is probable that any upgrade would include an increase in the sealed width of the road to 7m, with a 1m gravel shoulder each side and an increase in the depth of pavement to 300mm. The increase in the width of pavement would negate the need for additional widening of small parts of the road. However, it may be considered necessary to construct special bays for the school bus to allow for the safer transfer of children. The necessity for such bays will be determined during the detailed design phase of the project, when transport matters will be considered in detail.

18-6 Has the proponent considered the issue of risk (in relation to safety of children and livestock) created by the large numbers of people and vehicles using local roads?

Resp 18-6 The safety of children and livestock as a result of increased use of Settlement Road and other roads in the area will be catered for by appropriate improvements to these roads. The issue of risk will be discussed with the MRD in relation to such improvements during the detailed design phase of the project.

18-7 Concern has been expressed over the possibility of trucks arriving at the abattoir outside of opening times ie 7am to 4pm and consequently having to remain parked outside the abattoir. This could impact on the amenity and accessibility of Settlement Road. Could the proponent comment on this issue and confirm that access to and along Settlement Road will not be affected?

Resp 18-7 The proponent is aware of the potential for trucks to arrive at the abattoir outside opening hours and as a result preliminary discussions with the MRD on this matter have occurred. Potential solutions include the installation of suitable truck bays on main access roads some distance from the abattoir site or the installation of a hardstand area at the abattoir which will allow orderly parking of vehicles during abattoir closure. The proponent is confident that a solution to this potential problem will be reached and confirms that access to and along Settlement Road will not be affected by vehicles transporting livestock to the abattoir.

18-8 The tables indicating truck movements assume a constant directional factor throughout the year but as most farmers only sell sheep after shearing and the timing is often dependent upon area, it would be beneficial to study current timings and movement of sheep for export in this context. Early movement of sheep from drier areas to the east into the Albany area whilst still raining over unsealed roads has the potential to cause damage to the road base and significant costs to the shire of Albany. Would the proponent comment on the above statements?

Resp 18-8 The proponent acknowledges that it is extremely difficult, if not impossible, to predict changes in the level of traffic on minor roads as a result of the abattoir. This situation will need to be monitored. However, it is considered that the majority of heavy traffic will use major sealed roads and that it is unlikely that significant deterioration of minor roads will occur. The abattoir will also be closed for 10 weeks during winter when damage to unsealed roads would be more likely.

18-9 Would the proponent consider encouraging car pooling or the use of company owned buses to transport employees to and from work, so as to reduce the number of small vehicles travelling along Settlement Road and associated traffic routes to the abattoir?

Resp 18-9 The proponent would certainly encourage car pooling for the transport of employees to and from work and would also encourage any bus owner in the district to provide transport for abattoir employees so as to reduce the number of small vehicles travelling along Settlement Road and associated traffic routes.

18-10 Could the proponent comment on the fact that school children will be transferring from a school bus from Mt Barker to a local school bus on the corner of Albany Highway and Settlement Road at 4.15pm each day i.e. during one of the busiest times when up to 400 abattoir workers will be using the roads? Could the proponent clarify how the safety of these children is not considered to be a problem on the basis that abattoir traffic will be travelling in the opposite direction?

Resp 18-10 The transfer of children from the school bus from Mt Barker to a local school bus on the corner of Albany Highway and Settlement Road at approximately 4.15pm Monday-Friday will be considered during the detailed planning phase for any upgrade of the intersection. Provision for a special parking bay could easily be made. However, any such decision will be made by the MRD.

18-11 It has been suggested that the construction of a railway line from the Great Southern Line to Settlement Road could reduce the number of vehicles travelling to and from the abattoir, related noise impacts and reduce wear and tear on road routes. Could the proponent comment on the above?

Resp 18-11 The construction of a railway line to the abattoir complex has not been considered because of the cost and potential social ramifications. The volume of produce from the abattoir would also not make this option economically viable and the fact that land would need to be obtained from land owners along Settlement Road could lead to significant (and unnecessary) problems.

18-12 With the large amounts of vehicles carrying stock to the site, will there be a washdown area for stock transport? If so, what measures are planned to be taken to ensure that the wastewater is managed appropriately?

Resp 18-12 The proponent does not propose to provide a washdown area for stock transport vehicles at the abattoir site however, hardstands used for stock transport will be appropriately drained, as described in the CER, such that any nutrient enriched water will be passed into either the holding dam or through the full wastewater treatment process.

19. SECURITY

19-1 Some concern has been expressed regarding the impact the proposed abattoir will have on the security of residents eg the potential for "outsiders" entering properties divided by Settlement Road. It has been stated that a reasonable expectation of the proponent would be to provide security fencing for those Settlement Road properties which are to be bisected by a future main transport route. Could the proponent comment on the above?

Resp 19-1 The proponent considers it unreasonable to suspect that abattoir workers may pose a security risk for residents of Settlement Road and that specific security measures will not be necessary.

20. COMMUNITY CONSULTATION

20-1 The CER describes only two properties divided by Settlement Road, when the road divides a third residence (the Swain residence) as well. Could the proponent clarify this omission?

Resp 20-1 The text in the CER should read ì...there are three farms on Settlement Road between Albany Highway and the abattoir site which have land on both sides of the road This error was the result of a typographical mistake but does not change the context of the next sentence which reads ì...however, only one has the need for a regular cattle crossing

20-2 The Napier King Land Conservation Committee have stated that members were failed to have been informed of community meetings held onsite, early in 1995. Could the proponent comment on this issue?

Resp 20-2 The proponent apologises to the Napier King Land Conservation Committee for not informing them of the community meeting held on site in early 1995. It should be noted however, that the proponent did not organise this meeting and that subsequent consultation has occurred.

20-3 Would the proponent commit to undertaking further consultation with affected residents prior to the commencement of abattoir operations to ensure that an agreement can be reached to minimise the potential for abattoir traffic disrupting stock or farm machinery crossing Settlement Road?

Resp 20-3 The proponent recognises the issues in relation to traffic densities on Settlement Road and the potential for disruption to farmers wishing to transfer stock or machinery from one side of the road to the other. The CER states on Page 27 that further discussions are required to identify the best option for minimising the potential for disruption, but the proponent is confident that an effective resolution will result. These further discussions will be undertaken during the detailed design phase of the project.

20-4 Will any clearing of roadside vegetation for upgrades to transport routes require the resumption of private farm land? If so, what consultation has occurred with the affected residents?

Resp 20-4 It is uncertain whether any clearing of roadside vegetation will be required for upgrades to transport routes and whether any such clearing would require the resumption of private farmland. As a result, no consultation on this matter has occurred. However, if the MRD indicates that such clearing and resumption may be required, then this matter will be discussed with residents at that time.

21. DECOMMISSIONING

21-1 Will the proponent commit to having a detailed decommissioning plan in place prior to cessation of plant operations?

Resp 21-1 The proponent will have a detailed decommissioning plan in place prior to cessation of plant operations.

21-2 If the abattoir permanently ceased operations, and was not replaced with another form of animal processing or similar industry on the same site, how will the proponent commit to ensuring that the site is rehabilitated to, at least, its present state?

Resp 21-2 The proponent is prepared to carry out rehabilitation of the site on decommissioning of the abattoir, if this is required by relevant Government agencies such as the DEP or Agriculture WA.

Appendix 4

Proponent's consolidated list of commitments

1. Benale Pty Ltd will ensure that the Narrikup Export Abattoir Is designed and constructed in accordance with the descriptions provided in the CER. (Timing - prior to and during construction).

2. Benale Pty Ltd will submit detailed designs and specifications for wastewater treatment and disposal to the DEP and/or other relevant government agencies for approval. (Timing - prior to construction).

3. Benale Pty Ltd will ensure that the construction and operation of the Narrikup Export Abattoir conforms with environmental conditions and regulations as determined by the Minister for the Environment. (Timing - prior to construction and during the life of the project).

4. Benale Pty Ltd will undertake further groundwater studies to determine potential impacts on the water table and groundwater quality prior to construction. (Timing - prior to construction).

5. Benale Pty Ltd will continue to liaise with local communities, local authorities and government agencies to provide information about the Narrikup Export Abattoir. (Timing - prior to construction and during the life of the project).

6. Benale Pty Ltd will ensure that dust emissions generated at the abattoir site during the construction and operation phases will comply with relevant EPA/DEP dust guidelines. (Timing - during construction and during the life of the project).

7. Benale Pty Ltd will implement dust control measures to minimise dust emissions from stock holding areas. (Timing - during the life of the project).

8. Benale Pty Ltd will maintain the vegetation and soil structure of the irrigated pastures and woodlots to ensure optimum nutrient uptake. (Timing - during the life of the project).

9. Benale Pty Ltd will undertake to remove the red mud gypsum (RMG) amended soil layer and replace it with a new layer of RMG when monitoring of the RMS amended soils shows that the phosphorus storage capacity is depleted to 90%. (Timing - during the life of the project).

10. Benale Pty Ltd will undertake background monitoring prior to operation of the abattoir to determine baseline conditions for groundwater quantity and quality, Mill Brook, soil, and wind conditions. (Timing - prior to operation).

11. Benale Pty Ltd will implement an environmental monitoring program as described in the CER in order to provide information relating to noise levels, odour, soil conditions, and the quality of groundwater, treated wastewater, and water in Mill Brook. The monitoring program will be implemented in consultation with the Department of Agriculture and the Albany Waterways Management Authority and the results will be provided to these authorities, the Shire of Plantagenet and to the DEP and will be made available to the public. (Timing - throughout the life of the project).

12. In the unlikely event that the environmental monitoring program indicates the Narrikup Export Abattoir may be contributing significant nutrients to groundwater or to Mill Brook,

Appendix 3

List of submitters

1. Water Authority of Western Australia.
2. Western Australian Department of Agriculture.
3. Geological Survey of Western Australia.
4. Main Roads Western Australia.
5. Albany Waterways Management Authority.
6. Great Southern Development Authority.
7. Town of Albany.
8. Ministry for Planning, Albany Regional Office.
9. Conservation Council of Western Australia.
10. Napier/King Land Conservation District Committee.
11. Ministry for Planning.
12. Oyster Harbour Catchment Group.
13. Government Officers Technical Advisory Group.
14. Health Department of WA
15. Grace Vaughan House.
16. Mr & Mrs TR & Y Waycott.
17. Ms M Waycott.
18. Mr/Mrs/Ms D DeLandgraffl.
19. Mr Craig DeLandgrafft.
20. Mr & Mrs Murray & Fay McClean.
21. Mrs E L Ranvern.
22. Mr & Mrs G S & J S Ravenhill.
23. Mr & Mrs G & J Williamson.
24. Mr/Mrs/Ms T C F Patterson.
25. Mr & Mrs DC & BA Smith.
26. Mr Jack Liddiard
27. Mrs/Ms Verna Pearse.
28. Mr Tim Carruthers.
29. Mr Andre Lebel.
30. Mr & Mrs R Woodward.
31. Mr & Mrs J & E Gorman.
32. Mr & Mrs B & G Woodward.
33. Managing Director, Lawrence Stoddart Pty Ltd. (Group submission)
34. Mr David Smith.
35. Mr R J Williams.
36. Mr & Mrs G B & J A Swain.

Benale Pty Ltd will undertake specific studies to determine the cause and will take whatever corrective action is necessary to remedy the situation. (Timing - throughout the life of the project).

13. Benale Pty Ltd will comply with all relevant codes and guidelines for stock holding rates in stock holding areas. (Timing - during the life of the project).

14. Benale Pty Ltd will ensure that the design of the rendering plant complies with the Environmental Code of Practice for Rendering Plants (1991) published by the EPA. The detailed design of the plant and operating procedures will be supplied to the DEP for their approval. (Timing - prior to construction).

15. Benale Pty Ltd will prepare a noise assessment as part of the detailed design of the Narrikup Export Abattoir in order to confirm that the total noise emission does not exceed a total sound power level of 110dB(A) and that no tonal characteristics exist. The results of this noise assessment will be provided to the DEP for their approval. (Timing - prior to construction).

16. Benale Pty Ltd will ensure that runoff from carparks will be collected and treated. (Timing - during the life of the project).

17. Benale Pty Ltd will ensure that remnant vegetation at the site is protected. If any vegetation needs to be removed, approval from the DEP and/or other relevant government agencies will be sought. (Timing - throughout the life of the project).

18. Benale Pty Ltd will consult with the community, local government, and the Main Roads Department in order to address road traffic issues. (Timing - throughout the life of the project).

19. Benale Pty Ltd will prevent runoff from the site via cutoff/swale drains which will divert any runoff to the holding dam or the maturation pond. (Timing - throughout the life of the project).

20. Benale Pty Ltd will ensure that all solid waste from the Narrikup Export Abattoir is either converted to a useful product such as fertiliser or that it is disposed of in an approved manner. (Timing - throughout the life of the project).

21. Benale Pty Ltd will provide shrouding for lights or other means of light attenuation if any bright lights at the Narrikup Export Abattoir are prominently visible from nearby residences or roads. (Timing - throughout the life of the project).

22. Benale Pty Ltd will ensure that the wastewater treatment ponds are designed and operated in accordance with the principles described in the CER in order to ensure that the potential for odour generation is minimised. The company will also implement regular checks at the site boundary during light wind conditions to determine whether odour is detectable. The results of these tests will be documented and provided to the Shire of Plantagenet and the DEP. (Timing - before construction and during the life of the project).

23. Benale Pty Ltd will submit detailed decommissioning plans prior to cessation of plant operations. (Timing - prior to decommissioning).

Appendix 5

Copy of letters from relevant government agencies

DEPARTMENT OF MINERALS AND ENERGY WESTERN AUSTRALIA

GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

MINERAL HOUSE
100 PLAIN STREET (CNR ADELAIDE TCE)
EAST PERTH
WESTERN AUSTRALIA 6004

TELEPHONE (09) 222 3333
FACSIMILE (09) 222 3633

Your Ref:
Our Ref: CJP:MF 4008/95
Enquiries to: CJ Prangley
Telephone: (09) 222 3672

Director
Evaluation Division
Department of Environmental Protection
8th Floor Westralia Square
141 St Georges Terrace
PERTH WA 6000

Attention: Mr P. Jansen

COMMENTS ON NARRIKUP EXPORT ABATTOIR CONSULTATIVE ENVIRONMENTAL REVIEW

Thank you for your letter of 27 October 1995 requesting comments on a proposed Abattoir at Narrikup. Hydrogeological aspects of the proposal have been reviewed, and the following comments are offered:

The pumping test

- The pumping test design was inadequate for the local hydrogeological conditions because the aquifer is heterogeneous. Monitoring bores were not screened in the aquifer being stressed. Monitoring bores P8 and P9 were both inappropriately constructed with their slotted section at the base of the aquifer in a clayey silty sand above the weathered basement.

- The aquifer tested is heterogeneous not homogeneous, it exhibits considerable facies variation on a local basis, where spongolite facies is present in pumping bore PB1 and monitoring bore P7 and absent in monitoring bores P8 and P9. Generally the spongolite has a much higher porosity and permeability than the surrounding fine grained sands.

- The greatest aquifer thickness was intersected in bore P7, consequently the pumping bore PB1 was constructed at this site. The pumping bore PB1 was constructed in a manner that allowed the spongolite to drain into the gravel packed annulus of the bore.

...../2

The monitoring bore P7 was constructed with its slotted section in the basement gneiss and sealed off, using cement or bentonite, from the interval being pumped. As a result no useful data was collected from this monitoring bore. The monitoring bore should have been constructed to monitor groundwater in the spongolite and/or the fine grained sands. It should not have been sealed off in the gneissic rock at the base of the sequence.

- The pumping test of PB1 applies to one point on the property, and the calculated transmissivity, hydraulic conductivity and storage coefficients have been applied to a model which indicates that up to 1 ML of water per day is available. The results from test pumping PB1 are probably representative of the spongolite intersected in the bore rather than the surrounding fine grained sand aquifer. It is likely that the pump test results have over-estimated the amount of groundwater available in the area.

Mill Brook Creek

- The headwaters for Mill Brook Creek are northwest of the investigation area and groundwater provides base flow throughout the year (Appendix 2, Hydrogeological Investigation p.3 and p.15, Groundwater Technology Report). The CER has apparently not addressed the possibility of groundwater discharging nutrients to Mill Brook Creek as base flow for the river.

Nutrient loading

- Calculations of PRI assume that 100% of the phosphorus in the irrigation water will be retained in the approximately 8 m of unsaturated soils above the water table by adsorption or by being utilised by vegetation. It is assumed that all of the phosphorus will adsorb onto soil particles while the water is in transit to the water table. As this is an heterogenous aquifer it probably has preferred flow paths for infiltrating rain water and once these are loaded with nutrients then the amount of nutrients moving into the groundwater will increase significantly.

- The vertical permeability is low – could this lead to overloading of nutrients at surface with possible mobilisation into the surface drainage system?

- Following tree harvesting and soil disturbance what measures will be employed to stop nutrient-loaded sediment and dust washing or blowing into Mill Brook Creek and contaminating the surface water?

- The uptake of nitrogen on irrigated Kikuyu / White Clover crops is reduced by 50% to allow for "short term freezing" (Appendix 4 Wastewater Treatment Calculations Sheet No 7). Should a similar allowance be made for Phosphorus calculations on Sheet No 9?

I hope that the above comments will enable you to assess the proposal. Should you require additional information, please contact Mr Praagley on the above telephone number.

P Guj
DIRECTOR
GEOLOGICAL SURVEY

27 November 1995

Shire of Albany

Western Australia

Our Ref DAL:nlk PS.1

Your Ref

Enquiries Mr David Lynch

Department of Environmental Protection
8th Floor, Westralia Square
141 St George's Terrace
PERTH WA 6000

- 7 DEC 1995

5/12/95 PJA

ATTENTION : Victor Talbot

Dear Sir,

RE: CER - NARRIKUP ABATTOIR

I refer to the above and submit the enclosed submission for your attention.

The Shire of Albany is supportive of the concept of an abattoir in the region due to the increased employment opportunities and economic benefits that such an industry will foster. That said, Council has a responsibility to ensure that the proposal is sustainable and will not have unacceptable long term environmental and social impact upon the Shire of Albany.

Any final decision on transport routes should be deferred pending further consultation with the Albany Shire Council and its residents.

It is hoped that the points raised in this submission will be seen as requests for clarification and suggestions rather than in a negative light.

Should you wish to discuss this matter please do not hesitate to contact a member of our Town Planning team.

Yours faithfully,

WF SCHIEGGIA
CHIEF EXECUTIVE OFFICER

December 4, 1995

Encl.

092337

FAXED

PO Box 809, Albany, Western Australia, 6330. DX60825, Telephone (098) 412311, Fax (098) 418384

SUBMISSION - CER, NARRIKUP ABATTOIR

3.8 *It is agreed that all available evidence indicates that the proposed groundwater abstraction of 1000m3/day of relatively fresh water is achievable. However, the report does not outline the possible effects upon the riparian vegetation along the Millbrook Watercourse. It is possible that the alteration to the groundwater system by removal of only the uppermost fresh water layers, as discussed in the report, may result in increased vegetation stress along Millbrook through the available fresh water supply decreasing. Unfortunately the drilling program on the site was limited to a small area and no maps of the present groundwater levels are provided to enable a more detailed assessment.*

3.11 *The presence of rare and endangered flora within the vegetation lining the Millbrook watercourse suggests that as part of the development it should be protected by some means. The report does not outline any protection measures and it is suggested that the remnant vegetation be fenced to exclude any stock that may graze outside of the irrigated pasture areas.*

4.3.1 *The figures that are given for liveweight of cattle are conservative. Liveweights would probably range from 0.2-0.6 t/head depending upon the animal and age and would most probably average higher than the 0.36 t/head quoted in the report. This in turn would affect the water consumption of the plant.*

5.1 *The statement that 'The recommended separation distance of 1000m is independent of prevailing wind conditions and is considered a conservative figure' does not take into account the possibility of localized temperature inversions and funneling effects to move odours along small corridors. Local knowledge suggests that January to May inclusive are the most likely periods for inversion formation.*

5.4.1 *There exists a potential for some truck and vehicle movement along roads not specifically mentioned for upgrading in the report. Foremost amongst these is Churchlane Road which links Hassell Highway to Chester Pass Road and is an obvious route for trucks carting livestock from the Esperance, Ravensthorpe and Jerramungup areas. The tables indicating truck movements also assume a constant directional factor throughout the year but as most farmers only sell sheep after shearing and the timing is often dependent upon area it may be beneficial to the report to study current timings and movement of sheep for export in this context. Early movement of sheep from the drier areas to the east into the Albany area whilst still raining over unsealed roads has the potential to cause damage to the road base and significant costs to the Shire of Albany.*

5.8.3 *A number of minor points that are unclear are:*

(i) *where will the waste products from the DAF unit be utilised and how will they be disposed of? This is not discussed until 5.12.*

(ii) *the 600mm freeboard designed into the ponds may be of concern should a storm event or high winds occur over a protracted period. The wind fetch across 300m-425m (max. length and diagonal of TM pond when full) may be significant during these periods. The wind waves on the smaller anaerobic treatment ponds may be sufficient to break up surface scum reducing the efficiency of its operation.*

(iii) *the depth of the anaerobic ponds at 2.5-5.0m may make removal of accumulated sludge difficult. If a sludge does accumulate to a maximum depth of $^1/_3$ as stated drying of fatty material by evaporation may prove to be time consuming given that high evaporation rates only occur during limited periods of the year.*

5.9.2 *The choice of white clover as part of the irrigated pasture is questioned because of its intrinsic nitrogen fixing ability (adding N to the soil rather than removing it) and whether irrigation with the saline wastewater will allow growth. Specialist advice from Agriculture WA may result in a different pasture selection.*

5.9.3 *This portion of the report incorporates statements suggesting that additional groundwater may be drawn from the site but this does not appear to have been calculated or allow for when discussing water usage.*

5.10 *The construction of a holding dam to prevent off-site export of nutrients is sound however its effect may be enhanced by strategic drainage/contour banks to control surfical run-off from the irrigated pasture lots.*

6.5 *It is suggested that v-notch weirs are constructed on Millbrook at either end of the property for monitoring purposes.*

7. *As the subject land borders the Shire of Albany it is requested that copies of ongoing environmental monitoring be forwarded as available.*

Groundwater Analysis (Appendix 2)

1. *The analysis of groundwater on the site leaves many unanswered questions. The investigation of the site culminated in the drilling of 4 bores in the north eastern section of the property. No investigation was carried out (or reported) on the geology/hydrogeology of the remainder of the property or on the surrounds.*

2. *The computer modelling package relies upon some basic and fundamental assumptions which only provide a rough estimate of groundwater characteristics on the site. Whilst the assumptions may not be significant in themselves no discussion on their suitability to the proposal are offered as follows:*

Assumption 2 - the aquifer may not be isotropic or homogenous (see bore logs submitted with report).

Assumption 3 - it seems reasonable to make this assumption only after pump testing for an extended period to ensure that no localised basining of groundwater is apparent. The pump test only pumped at $^1/_3$ of the required abattoir capacity for 24 hours and then seeks to create a model for extracting this amount over a larger area for at least 210 times as long.

Assumption 4 - hydraulic properties of the aquifer may very likely change with density (dependent upon TDS) and temperature.

3. *Point 4.3 of the report states that ideally a pump test should stress the aquifer to determine extent and capability. As this was not done Assumption 3 of the modelling cannot be relied upon and the effect upon the aquifer any reasonable distance beyond the monitoring bores cannot be accurately determined.*

4. *Point 4.4 effectively contradicts itself in that because the aquifer was not stressed, and no geological data is known (or reported) other than for a small portion of the site the statement that "knowing the extent and composition of the aquifer, valid assumptions can be made in modelling the long term effects of abstracting IML/day from the Narrikup site" is at odds.*

5. *In the discussion the report makes a number of extrapolations that may need to be reconsidered. The report indicates that modelling of the groundwater response to pumping indicates that the target of IML/day abstraction is achievable. This modelling was completed on the basis of only 4 bores which were screened over a large range and therefore produced from a similar range. The fact that salinity increases with depth is not challenged and the need to produce only relatively fresh water from the site will necessitate a large number of low yielding bores screened at higher levels. The effect upon the watertable for this scenario is not discussed or modelled. It is likely that pumping from a larger shallow borefield will produce smaller groundwater draw-downs but over a much larger area. This may have follow on effects if leaching of salt from the soil profile occurs as planned and it reaches the watertable. As the production of water for the proposal is reliant upon the upper fresher groundwater layers there is a potential for the system to become closed to a certain extent. This may not be significant over the lifetime of the abattoir but should be discussed.*

Shire of Albany PO Box 809, ALBANY WA 6330

(1) Will the pickling solution & general liquid waste increase the salinity in the soil and aquifer

(2) Potential dust from the storage areas.

(3) Are phosphate (P) detergents necessary.

(4) It suggests that 32 kg of (P) would be spray irrigated per hectare. It is acknowledge this can be chemically retained by the soil through varying PRI levels. However, would this loading of (P) have a detrimental effect on the trees in the "tree lot" areas.

5 I also have concern that in the long term the abattoir may have a detrimental effect on the salinity & volume of water in the Millbrook Creek, which I own a area.

DEPARTMENT OF AGRICULTURE
WESTERN AUSTRALIA

Your Ref:
Our Ref:
Enquiries:
Date:

The Chairman
Environmental Protection Authority
8th Floor, Westralia Square
141 St Georges Tce
Perth WA 6000

Att Peter Jansen

RE: CER NARRIKUP EXPORT ABATTOIR BENALE PTY LTD

The Consultative Environmental Review has been discussed by several officers from the Albany Office of Agriculture Western Australia (AgWA). The Albany office members who read the review would like to congratulate Alan Tingay and Associates for the concise and succinct way in which the report has been prepared.

Concern was expressed on the adequacy of monitoring, of the groundwater resource, the surface flow and quality of Millbrook and the effect of irrigation on the salinity and PRI of the soils.

Monitoring of Groundwater Abstraction (p54)
It is recommended that at least ten bores be monitored to determine the drawdown from the production bores and to determine the accuracy of the computer modelling that is reported in the CER. Use may be made of existing bores on the site (installed by AgWA) but additional bores will also be needed.

Monitoring of Soil Salinity (p55)
The size of this program needs to be specified to determine its adequacy. Given the different soils, rates of addition and landuses, we feel that at least 25 profiles would need to be measured to reach conclusions about the effect of irrigation on salt build-up and the accuracy of the calculated leaching factors for pastures and trees. Consideration should also be given to periodic measurement of PRI to determine the speed at which the soils become saturated with phosphorus. These figures would also provide a guide to when soil amendments may need to be used.

Monitoring of Millbrook
Adequate gauging stations need to be established in order to calculate the nutrient load coming into and leaving the property with the any degree of accuracy. Continual monitoring of flow rates and quality needs to be carried out. Sampling on a monthly or bimonthly basis is inadequate for this purpose since most flows and associated nutrient loads are episodic in nature and would be missed using discontinuous sampling.

Thank you for the opportunity to make a submission on this project.

Dr Don McFarlane
Manager,
Southern Agriculture SRD Sub-program

cc Ashley Prout, Greg Faust, David Weaver, Kevin Goss

ALBANY DISTRICT OFFICE
120 Albany Highway Albany Western Australia 6330
Tel: (098) 42 0500 Fax: (098) 42 0579

DEPARTMENT OF AGRICULTURE
WESTERN AUSTRALIA

Your Ref:
Our Ref:
Enquiries:
Date:

The Chairman
Environmental Protection Authority
8th Floor, Westralia Square
141 St Georges Tce.
Perth WA 6000

Att Peter Jansen

RE CER NARRIKUP EXPORT ABATTOIR - BENALE PTY LTD.

The Consultative Environmental Review was discussed at the November meeting of the Government Officers Technical Advisory Committee (GOTAG). GOTAG members include technical representatives from most State Government and local government agencies in the Albany region. The member agencies are, Agriculture WA, WAWA, CALM, DEP, Albany Waterways Management Authority, Ministry for Planning, Bush Fires Board, local Government staff of Albany Town, Albany Shire, Denmark and Plantagenet Shire Councils.

Although not all members had read the review or were prepared to discuss it until they had studied it, there was general agreement and support for the document amongst those that had. Individual agencies may make their own submissions.

Set out below are several points made during that meeting.

Run-off Issues

There was general agreement with the mass balances for water and nutrient recycling. However because of the need to irrigate both tree and perennial pasture lots, it was felt that run off from rainfall would be increased due to the soils being at a higher moisture level (due to the irrigation) than would normally be the case resulting in increased risk of nutrient rich water draining into adjacent creek lines. The risk of run off from rainfall events is further increased due to the relatively heavy stocking rate causing increases in soil compaction. Members considered that more detail on run off control should be provided in the document.

091980

ALBANY DISTRICT OFFICE
120 Albany Highway Albany Western Australia 6330
Tel: (098) 42 0500 Fax: (098) 42 0519

On p47, the report refers to "storm water run off from areas such as the lairage yards and the irrigated forage pasture areas will be directed to, and stored in, the holding dam shown in Fig 10. The stored water will be irrigated onto wood lots as necessary." Members suggested that more detail of methods to be used to "direct" run off needs to be provided so that risk of contamination of water bodies on the eastern side and south of the site can be addressed. Page 47 in the last paragraph before section 5.12 "Except for storm water generated from extreme storm events, no surface discharge will occur from the site into existing watercourses". Members believed that **"extreme storm events"** needs to be defined.

Salinity

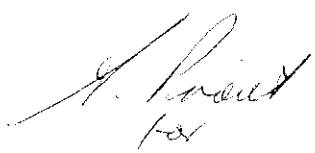
Several members of GOTAG expressed concern about the yield of perennial pastures irrigated with saline water. It is expected that white clover will not survive such salinity levels. The use of clover in the pasture mixture appears to serve no real purpose and could possible be omitted. The effluent nitrogen levels should be sufficient to provide adequate nitrogen for grass growth. A total grass perennial pasture may be more appropriate.

Overtopping of Ponds.

Over topping by wave action on the aerobic maturation pond is a possibility with a surface area of 9 hectares and a wind fetch of 300m. Consideration for the provision of greater freeboard or structures to reduce risk of water escaping is recommended.

General

The committee was pleased with the report and the fact that problems and issues discovered in the earlier drafts were rectified.
Monitoring of water quality appears appropriate and if run-off risk is well managed, the project should enjoy success.



Greg Paust

Chairman
Government Officer's Technical Advisory Group
Friday, 24 November 1995

Western Australia

Health Department of Western Australia Environmental Health Service

Your Ref
Our Ref 7286/95
Enquiries R Taylor (09) 388 4917

The Chairman
Environmental Protection Agency
8th Floor, Westralia Square
141 St George's Tce
PERTH WA 6000

ATTENTION: PETER JANSEN

Dear Sir

EXPORT ABATTOIR - NARRIKUP (935)

Thank you for your letter of 30 October 1995 and providing this Department with copies of the Consultative Environmental Review on the above project for comment.

Officers from this Department have examined the report and our comments are as follows:

1. Page 4 of the Consultative Environmental Review states that the Health Department of WA controls the operation of the abattoir as noxious industries under the Health Act 1911.

   This statement is not correct, abattoirs are decreed offensive trades under the Act which states that it shall not be lawful to establish any offensive trade, unless with the consent in writing of the local authority. The Act also empowers the local authority to regulate the condition subject to which such trades may be carried on, to prevent or diminish the offensiveness of the trades, and to safeguard the public health.

   Therefore the Shire of Plantagenet is responsible for approving the establishment and controlling the operation of this abattoir as an offensive trade.

2. An application for the wastewater treatment system for the workforce ablution facilities must be submitted to the Health Department of WA for approval by the Executive Director Public Health. The application should include detail on the estimated daily wastewater flows, the design of the system, a maintenance schedule and monitoring program, and the proposed method of effluent disposal. In accordance with the Australian Code of Practice for the

As Narrikup Export Abattoir is expected to operate indefinitely the possibilities of the whole operation going over to container shipping or more than one container ship being filled at one time will need to be considered. If rapid expansion of container transport occurs before the Albany - Narrikup section of Albany Highway is dualled there will be increased safety and congestion problems.

Recommended Action
The possibilities for rapid expansion of facilities or container shipping must be considered in greater detail and a mechanism of ensuring that Main Roads is informed within an appropriate time frame if expansion is being considered. No increase in truck volumes beyond the maximums outlined within the CER should occur without prior discussion with Main Roads WA.

1.3 Traffic flow

Upgrading Settlement Rd and Jackson Rd through to Chester Pass Rd is not desirable from a strategic point of view as such upgrading could attract freight traffic moving from the South West of WA to Eastern Australia and duplicates Yellanup Road which is to be reviewed for upgrading to provide for this movement.

Upgrading the Settlement Road section only would be acceptable and practical as the abattoir will be serving the Ports of Fremantle and Albany.

Recommended Action
Further investigation should be undertaken by the proponent to determine the origin of trucks from the east and whether they could approach the site using an alternative route such as Yellanup Road.

2.0 Transport of hazardous chemicals

An issue that was not raised in the CER was the movement of hazardous chemicals to the site and the nature of any hazardous chemicals used in the processing.

3.0 Discussion with proponent

The concerns raised above are not serious enough to warrant objecting to the project proceeding, but advice on details of truck movements and further liaison with Main Roads Region Albany and Main Roads Rural Planning and Strategies will ensure the potential problems are addressed.

Sue Millthorpe
Perth

SIGNATURE: Della-Bosa

WARNING

Facsimilies on thermal paper will deteriorate quickly. Important documents should be photocopied if they need to be kept for a period of time.

MRWA 498A

FACSIMILE TRANSMISSION

In reply please transmit to facsimile number (09) 323 4629

MAIN ROADS
Western Australia

Don Aitken Centre
Waterloo Crescent
East Perth WA 6004

TO: **The Chairman**
Environmental Protection Authority

FROM: Jeanette Della-Bona
Environment Strategy

FACSIMILE NUMBER: 322 1598

TELEPHONE NUMBER: 323 4566

NUMBER OF PAGES: 2
(Including this one)

DATE: November 27 1995

YOUR REFERENCE: 18/95

OUR REFERENCE: 90-24-24

SUBJECT: Narrikup Export Abattoir Consultative Environmental Review (CER).

MESSAGE:

Comments on the above CER from Main Roads Planning Branch (strategic issues) and from the Great Southern Regional Office are as follows:

1.0 Traffic impacts

1.1 Traffic density

The average truck and traffic numbers proposed (about 30 trucks per day and 200 to 400 private vehicles per day) will not significantly affect the B priority for dualing Albany Highway between Albany and Narrikup recommended in ROADS 2020. However some intersections such as Albany Highway-Settlement Road may need to be upgraded.

1.2 Traffic safety and congestion

The additional "occasional" 134 semi-trailers with containers resulting in an extra truck every 9 minutes (every 5.5 minutes for a large ship and every 18 minutes for a small ship) will potentially have an impact on safety and congestion during those periods, especially on Albany Highway.

Recommended Action
Main Roads WA need to know how often "occasionally" will be and whether the campaign hauling will be to Albany or Fremantle Port, and if both, the relative proportions to each. A detailed traffic impact study addressing this issue should be carried out.

It is probable that the campaign hauling while having some potential short term impacts will not justify bringing forward the programmed dualing of Albany Highway.

Recommended Action
Another strategy will likely need to be implemented to minimise the potential negative impacts. Main Roads WA would at least like to be informed whenever campaign shipping is proposed. Also a public information programme could be implemented. Has the possibility of using rail for construction containers been considered?

Construction and Equipment of Abattoirs, the waste from the workforce ablution facilities must be separate from the abattoir effluent disposal system.

3. In addition, the design of the effluent disposal system for the abattoir must be submitted to this Department for approval. The system design must comply with the requirements of the Treatment of Sewage and Disposal of Effluent and Liquid Wastes Regulations' and be certified by a practicing engineer.

4. It is noted that no detail has been provided in relation to the potable water supply for the employees and abattoir use. Further detail is required on this aspect when an application is submitted to the Shire of Plantagenet for final approval. In addition, it was noticed that the supply for process water in the abattoir is relatively saline. Although it is not expected that the salinity of the wastewater will be significantly different from the salinity of the groundwater, further justification of this may be necessary in the formal application to the Local Authority to assess the suitability of the quality of the wastewater for irrigation.

Any additional detail required for the proposal should be addressed once the formal applications have been received.

As the premises will be producing meat for the export market, the Australian Quarantine and Inspection Services (AQIS) will be in control of all construction and operational procedures at the premises.

We hope the above comments and recommendations are of assistance to you, and should you require any further information please contact Barry Bowden on (09) 388 4930.

Yours faithfully

Brian Devine
A/DIRECTOR
ENVIRONMENTAL HEALTH

28 November 1995
(SD24TR3A.LET)

W A T E R W A Y S
C O M M I S S I O N

ALBANY WATERWAYS
MANAGEMENT
AUTHORITY

Our Ref: RA81/95
Your Ref: 18/95
Enquiries: Chris Gunby

PROTECTING OUR WATERWAYS

The Chairman
Environmental Protection Authority
Westralia Square
8th Floor
141 St George's Terrace
PERTH 6000

Attention: Peter Jansen

Dear Sir

EXPORT ABATTOIR AT NARRIKUP (935)

Thank you for the opportunity to comment upon the above.

AWMA resolved at its meeting on 16 November 1995 to advise the DEP that it has no objection to the proposed abattoir, as the proponent has addressed the need to retain nutrients on-site and has provided, through its commitments to monitoring, the means of policing this requirement. AWMA strongly supports the need for a monitoring programme that involves AWMA and DAWA, as detailed and recommended in the CER. A copy of AWMA's resolutions is attached.

Officers from the Waterways Commission have had considerable involvement in the project to date, and are satisfied that the proponent has taken on board this officers advice. It is recognised further detailed information and guidelines need to be prepared for nutrient take up from the tree and pasture area, and also on the impact livestock will have on this nutrient uptake and on soil stability. These outstanding matters are not considered likely to significantly alter the overall nutrient balance suggested in the CER, and are therefore matters that AWMA feels could be addressed at the detailed design stage, in a manner to the satisfaction of the DEP or DAWA.

These matters have been discussed in past correspondence with the proponent, and a copy of this correspondence is attached for your information. This correspondence also details officers past concerns with the draft CER and provides the proponent's response. Officers of the DEP should find this correspondence of value in assessing the CER.

031561

85 Brunswick Road, P.O. Box 525, Albany, Western Australia, 6330, Telephone: (098) 41 4988, Fax: (098) 42 1204

I trust the above comments and attached reports/correspondence provides sufficient information on AWMA's advice on this proposal, but should you require any further information please do not hesitate to contact Chris Gunby at the address shown.

Yours faithfully

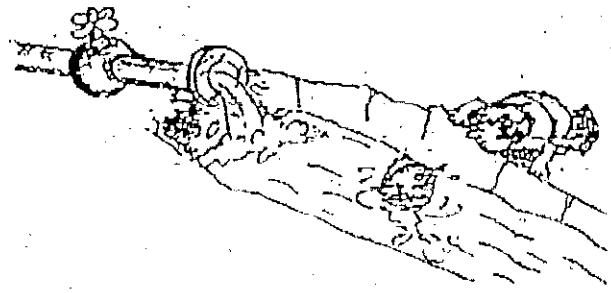
MATT STEPHENS
CHAIRMAN

16 November 1995

Attach

CG013465.DOC

Water AUTHORITY



P.O. Box 100
Leederville,W.A. 6007

FACSIMILE MESSAGE

From: **Water Authority of WA**
Pollution Control Section
Water Quality Protection Branch

Fax: **(09) 420 3176**

To: Mr Peter Jansen

Of: DEP - Evaluations Division

Fax No: 322 2850

Copies To: Regional Water Resources Manager
Attn: Mr Peter Helsby

Subject: Narrikup Export Abattoir
Consultative Environmental Review (935)
Works Approval Application

Our File: A 30183 **Your File:** 935

INTRODUCTION

The Consultative Environmental Review (CER) describes the proposal by Benale Pty Ltd (Proponent) to develop an export abattoir at Karrikup to the south of Mt Barker in the Shire of Plantagenet, Albany.

The proposal involves the establishment of an abattoir at Narrikup 28km south of Mt Barker which includes transport of livestock to the abattoir from locations throughout the lower south-west of Western Australia and the transport of products off-site. The works will have a design capacity to process one million sheep and 50,000 cattle each year.

The proposal identifies a number of issues including its benefits at regional and national levels, particularly in terms of providing a market for livestock producers, local employment and export earnings. Others issues discussed in the report include water use, wastewater management and disposal.

The WAWA has reviewed the CER with particular attention to the wastewater management strategies. The Authority believes that, although the proposed treatment for wastewater is technically feasible particularly in relation to the removal of organic material (BOD) and suspended solids, the proponent has not adequately addressed the issue of wastewater disposal.in relation to the:

- management of the total nutrient (nitrogen and phosphorus) budget particularly in relation to the removal of total phosphorus through uptake by wood lots, irrigated and dry pastures, and soil adsorption using soil amendment techniques
- potential impact to Oyster Harbour due to export of total phosphorus from abattoir site through surface runoff
- management/contingency plans in the event of problems ie storm events resulting in excessive runoff, erosion due to high application rates of wastewater effluent to land.

The WAWA also considers that the proponent has not adequately addressed the Guidelines for the CER given in "Appendix 1 -Guidelines for the CER", particularly in relation to *Environmental Impacts and Management* (ref section 6.0) dealing with wastewater disposal and *Commitments* (ref section 9.0).

SPECIFIC COMMENTS

Management of total Nutrient Budget

Proposed nitrogen uptake rates of pasture crops under irrigation are inconsistent.

Nitrogen uptakes rates of 480kg/ha/yr for irrigated pasture (Ref: Summary section 5.6, page iii & iv) are significantly higher than the 240kg/ha/yr quoted in Table 6 (Ref: page 43). It is unclear how this reduction is estimated to be mainly attributable to the loss of pasture crops as a result of short term grazing by sheep on the site (Ref 5.9.2, page 43).

It is unclear, from the management strategy proposed, how the proponent intends to minimise the potential threat of increased salinity levels in soil (due to poor flushing rates through the soil profile as a result of low volume application rates)(ref section5.9.2, page 42-44), whilst at the same time attempting to achieve satisfactory nutrient uptake rates of nutrients by wood lots and crop pastures.

It is also unclear how the "unbudgeted" quantity of total phosphorus (ref 5.9.2, page 43-44) will "accumulate in the soil" (ref: page 43) using soil amendment techniques such as the addition of red mud gypsum(RMG) to the soil. It is claimed that the total uptake rates for fodder and wood lots will be 1,720kg per year. This quantity is significantly less than the annual load in the irrigation water (6,300kg per year)(Ref, page 43). The statement

"However, in keeping with the conservative design approach the irrigation areas will be amended to a depth of 400mm with 25% red mud gypsum (RMG). This will increase the phosphorus absorption capacity of the soil to approximately 400kg/ha/m.

and will provide a theoretical life of 50 years before any increase in phosphorus is detectable in the groundwater" (ref page 43-44).

is unclear in relation to the quantity of RMG to soil mixture proposed and how the RMG will be mixed into the soil profile. Also there is no comment on the potential impact of the chemicals present in RMG through leaching.

The statement " *In the unlikely event that the performance of the RMG.....may undertake chemical precipitation of nutrients in the maturation pond*" (section 5.9.2, page 44) suggests that the proponent is uncertain of the effectiveness of RMG to remove total phosphorus. The proponent suggests that an alternative method (chemical precipitation) may be used to remove the nutrients. The removal of phosphorus from wastestreams is complex, however the proponent did not provide any detail on how this may be achieved.

Potential Impact to Oyster Harbour

The WAWA notes the discussion on the "Down Stream Effects of Wastewater Irrigation" (ref: section 5.9.4, page 45) and believes that the proponent has not adequately assesses the potential impact of wastewater disposal via irrigation on the Oyster Harbour.

Although the proponent provides data on estimated runoff volumes in Tables 4 and 5 (refer Appendix 2 "Hydrogeological Investigations"), there is no prediction on the subsequent export rate of material from the irrigation site.

Management/Contingency Plans

The WAWA has reviewed the "Summary of Commitments" section (Ref: section 7, page 56) and notes that, although the proponent briefly discusses the proposed "Environmental Monitoring" program (ref: section 6.0, page 54), the proponent has not discussed any contingency plans/strategies in the event of any problems.

The proponent suggests however that *"in the unlikely event that the environmental monitoring program indicates that the Narrikup Export Abattoir may be contributing significant nutrients to groundwater or to Mill Brook, Benale Pty Ltd will undertake specific studies to determine the cause and will take whatever corrective action is necessary to remedy the situation"* (ref: section 7.0, page 56)

The Authority does not consider this to be a satisfactory management strategy and therefore recommends that the proponent clearly identify and discuss potential impacts and establishes management strategies to ameliorate or minimise these impacts.

Sent By: Raymond P Claudius **Pages sent**: 3
Senior Scientific Officer
Pollution Control **Date**:27 November 1995

Phone: (09) 420 2133 **Time**:

Great Southern Development Commission

144 Stirling Terrace
Albany WA 6330
Phone: (098) 41 4088
Fax: (098) 41 4579

Our Ref: D45:2095
Your Ref:
Enquiries: Duane Schouten

24 November 1995

Dr Victor Talbot
Environmental Protection Authority
8th Floor, Westralia Square
141 St George's Terrace
Perth, WA 6000

Dear Dr Talbot

NARRIKUP EXPORT ABATTOIR CER SUBMISSION

I write on behalf of the Great Southern Development Commission (GSDC) to provide this agency's comments on the Consultative Environmental Review prepared on the Narrikup Export Abattoir. The GSDC strongly supports the project and bases its support on the following:

- the Narrikup Export Abattoir has the potential to bring significant economic benefits to sheep and cattle producers, businesses and community members in the Albany and Mount Barker region and the Great Southern as a whole.

- the enhanced level of economic activity from the abattoir can be obtained within acceptable levels of environmental impact.

Our submission briefly addresses these two points.

Economic benefits

The GSDC has been actively involved in promoting the Albany region as a prime location for a meat processing facility since the closure of the Metro Meats abattoir in 1993. Meat processing has been a long standing industry in the Albany area primarily due to its comparative advantage in being able to supply the processor with quality sheep and cattle. It was widely recognised that Metros played a major role in sustaining the Albany area's economy and that its closure would have a constricting effect.

Through a Ministerially appointed Abattoir Task Force, the GSDC combined efforts with other State Government agencies, local government and producer groups to market the region as an opportune location for a high-tech meat processing operation. Research undertaken by the Task Force highlighted that new technology and modern work practices had changed the way abattoirs could operate, making them highly profitable, not only as a business venture, but also to the community as whole through enhanced economic activity, while at the same time reducing their environmental impacts to levels that meet today's standards set by the Environmental Protection Authority. The abattoir being proposed by the Benale Pty Ltd would appear to be such a facility.

GSDC's own investigations support the comments in Section 2 of the CER on the economic benefits that could accrue to the region as a result of the proposed abattoir. In August representatives of the GSDC, along with local government representatives, went to Dubbo, NSW where Roger Fletcher operates an abattoir similar to the one proposed for Narrikup. The purpose of the trip was to ascertain the effects that the proposed Narrikup abattoir could have on the Albany and Mount Barker region.

We found that Fletcher's Dubbo plant has had a significant economic impact on that city. The Dubbo plant employs over 450 workers and contributes $1.7 million into the city's economy through wages alone each month. The Dubbo abattoir has brought a greater degree of sustainability to the region's economic base, as that region was predominantly, like ours, agriculture-linked and suffered under the boom/bust fate of agriculture-based communities. This sustainability helps to provide constant employment therefore guaranteeing the economic benefits of regular wages into the economy. This regular influx from wages has a multiplier effect causing new industries to establish and existing ones to grow, creating additional employment demand.

We believe a similar scenario to Dubbo could apply to the Albany area. The benefits to producers, businesses and the community in general as outlined in Section 2 of the CER appear realistic. GSDC believes the economic benefits of a modern high-tech abattoir in the region will undoubtedly have a major sustained economic impact.

Limited Environmental Impact

From the information provided in the CER on the environmental implications of the abattoir, it is GSDC's view that the proponent is committed to containing any environmental impacts well within acceptable levels determined by EPA parameters. All of the major environmental issues that fall within the realm of responsibility of the proponent are addressed. The assessment concludes that the environmental effects will be insignificant. Subsequent monitoring procedures will ensure that the abattoir continues to meet environmental standards over the life of the project.

Section 5.4 of the CER addresses traffic implications of the abattoir. It is assessed that the levels of traffic resulting from abattoir operation will not cause significant disturbance to nearby residents. For safety reasons the CER correctly recognises that road enhancements, such as turning lanes from Albany Highway and increased width

and pavement depth to Settlement Road and other potential routes, will be necessary. The overall impact of the increased traffic is assessed to be insignificant given the relatively low levels of traffic projected during operating hours.

It is GSDC's view that while the CER attempts to assess traffic implications, the overall management of traffic flow issues fall outside the realm of responsibility of the proponent as it relates to this project. It is our understanding that the local authorities and State government are examining potential traffic routes to the site and will determine which roads need to be upgraded.

Conclusion

The GSDC supports economic development in the Great Southern region. The Narrikup Abattoir has the potential to provide significant economic and community benefits to the region. The groundwater tests proving adequate water supplies and the high-tech nature of the plant itself, utilising modern effluent treatment techniques, will ensure that the development has minimal impacts on the environment.

The GSDC supports the environmental assessment procedure for new developments. While all new developments affect the environment to some degree, the implications for Narrikup Abattoir appear to be well within acceptable levels.

Yours sincerely

PETER COOK
DIRECTOR

TOWN OF ALBANY

SUBMISSION ON THE NARRIKUP EXPORT ABATTOIR CONSULTATIVE ENVIRONMENTAL REVIEW

Submission to:

The Chairman
Environmental Protection Authority
8th Floor, Westralia Square
141 St Georges Terrace
PERTH WA 6000

Attention: Peter Jansen

1.0 INTRODUCTION

The development of the Narrikup Export Abattoir will provide economic and social benefits to the Albany Region and the Albany Town Council promotes the development of this regional facility. The proposed Narrikup Abattoir will become a major employer in the region, through direct and indirect job opportunities, it will allow farmers in the region to increase stock numbers in the knowledge that their produce has a stable market, exports through the Albany Port will increase once the abattoir commences production and the regional economy will directly benefit from the increased spending power of abattoir workers.

The Albany Town Council is also conscious of the need to balance the environmental and regional benefits of any new project. Considerable regional resources have been committed over the last decade addressing the nutrient inputs into Albany's waterways. That work has seen a marked improvement in the health of the harbours. Research has also shown that it is more cost effective to control point discharges of nutrients at their source, rather than clean up the downstream receptacle.

The Town of Albany has considered the Consultative Environmental Review (CER) of the Narrikup Export Abattoir, prepared jointly by Alan Tingay and Associates, Evangelishi and Associates (Aust) Pty Ltd and Groundwater Technology Australia. The following comments relate to those aspects of the CER where Council considers the proposed abattoir (a point discharge of nutrients) may have an impact upon Albany's waterways.

2.0 COMMENT

2.1 Section 3.7: Soils (p.11)

There are three soil types identified from a Mount Barker-Albany Soils Map, which occur on the abattoir site. They are the Redmond, Dempster and S6 Minor Valley soil types. Of the three types, the CER advises that only the Redmond soil type was augured to determine the Phosphorus Retention Index (PRI) and infiltration rates. The Dempster and S6 Minor Valley soil units cover approximately 65 Ha of the abattoir site.

As the treated wastewater is to be irrigated over, or adjacent to these two soil types, the applicant is requested to ensure that there will be adequate uptake of nutrients, planned runoff characteristics are achieved, and that salt accumulation in the soil profile does not occur.

2.2 Section 4.2: Abattoir Process Description (p.17)

The abattoir proposes to process approximately 4 800 sheep and 240 cattle a day. There are two holding yards for incoming stock covering 40 hectares, which are to be irrigated with treated wastewater. The stock could be held in these clover/kikuyu grassed yards for up to two days. In excess of one million sheep and 50 000 cattle on 40 ha in one year are likely to denude these areas of any vegetation. In addition, the stock could deposit substantial levels of nutrients in these yards via their faeces and urine. The addition of these nutrients does not appear to have been included in the CER's Nitrogen and Phosphorus budget. In all probability, constant stocking of the 40 ha area will destroy any kikuyu and clover growth and prevent harvesting of this pasture (pg.42).

In order to remove the nitrogen from the system, the vegetation must be harvested. Will the nitrogen contained in the little vegetation that does grow be recycled through the faeces of the stock? If not and the stocking results in soil compaction, runoff from these areas towards Mill Brook is a possibility.

The remnant vegetation alongside Mill Brook would act as a biological filter, but it is also possible that the introduced nutrients can alter the ecosystem; it may jeopardise the survival of those species of rare and endangered plants protected under the Wildlife Conservation Act (p.15) and favour weed invasion. The 20 ha that is not irrigated (pg.iii) could also be susceptible to water and wind erosion during the dryer months with the estimated stocking rates.

2.3 Section: 4.3.2 Sewage Disposal (p.22)

The nutrients contained within the estimated 40-50 cubic metres of wastewater produced daily by staff, does not appear to have been identified and accounted for in Nitrogen & Phosphorous budgets. These levels may be minimal in the Scheme of the project, but should be budgeted for.

2.4 Section 5.9.2: Disposal of Treated Wastewater (p.41)

Should the 40 ha of holding yards be denuded of pasture for all or some of the year, and the nutrient uptakes as shown on Table 6 are not achieved, approximately 8 300kg of Nitrogen and 1 520kg of Phosphorous would not be removed from the irrigated waste water. In that event some, or most of these nutrients may find their way into Mill Brook and eventually into Oyster Harbour and King George Sound. The impact of these amounts of nutrients reaching Oyster Harbour each year is not known. The EPA is asked to ensure the effects on the remaining seagrass meadows are considered.

Council questions the levels of monitoring proposed and requests that an action plan be prepared to resolve this contingency, if presented.

3.0 WASHDOWN FACILITY

With the large amount of vehicles carrying stock to the site, will there be a washdown area for stock transport? If so, what measures are planned to be taken to ensure that the wastewater is managed appropriately?

4.0 CONCLUSION

The Town of Albany appreciates the opportunity to be able to comment on the Narrikup Export Abattoir and gives its full support to the proposal, due to its regional economic and social significance. The Town does not want the proposed abattoir to become a nutrient point source which could jeopardise the seagrass meadows in Oyster Harbour and King George Sound and is confident that the proponent and the EPA can resolve the management issues identified above. The Environmental Protection Authority may wish to seek further assessment on the areas listed in this submission to ensure the long term viability of this important project.

Council awaits your determination on this project.

M A Jorgensen
General Manager/Town Clerk

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Ministry for Planning
WESTERN AUSTRALIA

Your Ref: 18/95
Our Ref: 0055/5/14/1, 853/5/14/4 P10

31 October 1995

- 3 NOV 1995
9/12/95 EJL

The Chairman
Environmental Protection Authority
8th Floor Westralia Square
141 St George's Terrace
PERTH 6001

ATTENTION: PETER JANSEN

EXPORT ABATTOIR AT NARRIKUP - SHIRE OF PLANTAGENET (935)

I refer to your letter of 27 October 1995 which sought submissions on the CER for the above proposal.

The document is a very thorough one and the only comments to be made are as follows:

Page 10 - 3.3 - second paragraph - This is not strictly correct and after the conclusion of the first sentence which ends "... public comment." the following should replace the second sentence:
"The Shire however, considered the overall extent of the proposal was significant enough to warrant rezoning the land to Special Site (Abattoir and Associated Uses). That Scheme Amendment has now received final approval."

Page 22 - 4.4.1 - This refers to Figure 11 and talks about the use of Settlement Road and Jackson Road as access roads to the facility. Figure 11 however shows Millstream Road highlighted as a transport route. If Millstream Road is to be used then the text should refer to the proposed extent of its use and what upgrading is needed to make the road acceptable. If it is not to be used then Figure 11 should be adjusted and the text should state it is not to be used.

I trust the above comments will assist the Authority in its determination of the proposal.

PETER DUNCAN
REGIONAL MANAGER
GREAT SOUTHERN REGION
PLANNING IMPLEMENTATION DIVISION

090995

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CONSERVATION COUNCIL
OF WESTERN AUSTRALIA INC.
79 Stirling Street, Perth 6000
Phone (09) 220 0652 Fax (09) 220 0653

The Chair
Environmental Protection Authority
8th Floor, Westralia Square
141 St George's Tce
Perth WA 6000

Attn: Dr Victor Talbot

Dear Sir,

RE: NARRIKUP EXPORT ABATTOIR - CER

The Conservation Council would like to submit the following comments on the above CER.

The Conservation Council has a number of concerns about this proposal particularly with the treatment and disposal of wastewater from the plant. Our review of the CER has raised a number of questions that must be dealt with prior to any approval for the project.

Having closed and removed the previously polluting abattoir it would be disappointing if it were to be replaced with a plant that also polluted the environment. As the site for the abattoir is in the upper catchment of Mill Brook which flows into Oyster Harbour, this project has the potential to pollute this sensitive system.

The wastewater treatment appears to be very similar to the model used by the Albany sewerage farm. However this project is itself still under trial and the future impact on groundwater is unknown. This appears to be the same for this project, in many instances we consider this impact assessment to be speculative and based on a lot of assumptions.

The proposal outlined in the CER appears to be based on very optimistic figures which we believe may not be met and will therefore lead to pollution of the environment. The commitments by the proponent are very woolly. Much firmer and quantified commitments are required by the proponent. These commitments must include triggers for remedial action for biochemical oxygen demand, salt, phosphorus and nitrogen content and other persistent chemicals.

Wastewater

The proponent believes that the anaerobic pond would remove about 75% of the biochemical oxygen demand (BOD) while the aerobic pond would remove 90% and the maturation pond about 70% of the remaining BOD with the final BOD predicted to be

10g/m^3. The Council believes that these figures are far too optimistic, particularly considering the cold Albany climate. We consider that once the growth of algae in the maturation pond is taken into account (ie, adding to total BOD) the more likely results will be 65%, 75% and 55% respectively. Nor do we believe that this would be improved by increasing the detention time in the ponds or by increasing the size of the ponds. The result of the over estimation in the CER would be that the final BOD would be about 30-50g/m^3. We are concerned about the impact of these elevated levels.

Nutrient Adsorption

While the Conservation Council is not opposed in principle to the use of pasture and woodlots to remove nitrogen and phosphorus we have some concerns about the proposals outlined in this CER. These concerns include:

Large proportions of the site proposed for pasture and woodlots have a low phosphorus retention index (PRI) eg. less than 20. This includes areas near sampling points 20, 1 or 1A, 5,6,10 and 11. Most of the high PRI sites are on top of ridges which will not be used. Therefore large areas of soil will require red mud application, the CER states that all the pasture and woodlots would be treated with red mud to improve PRI. It would appear to the Council that the proponent has failed to calculate the cost of this application. On our calculations it would cost nearly $1 million in materials alone to treat 10% of the soil volume to 0.5m over the 140ha. Given that they may decide not to treat all the area the cost may be reduced however we estimate that the cost of application would be $.5 million at a minimum. Has the proponent considered this cost? Are they prepared to pay this cost? If not, what happens to the proponents estimates for nutrient absorption?

The Council also questions the estimates of production for the irrigated kikuyu pasture. If production estimates are not obtained the calculated amounts of nutrients will not be used. We also question the net export of nutrients by animals in paunch to killing floor, we are not convinced that nutrients will not be recycled onto the pasture and will therefore add to nutrient load.

The CER has not explained how the pasture on the east side is to drain into the sediment dam?

We are concerned that the pastures on the west side will be able to feed nutrients straight into the river especially if fully saturated at the time of a big rain.

The CER works on an 8m depth of soil available for adsorption. However the depth to groundwater varies from 3.6m to 13.5m, it would therefore appear that in some areas there will not be 8m of soil depth available - how will this affect nutrient adsorption? The proponent does not outline the application rates saying these will be determined later we would like to see these more clearly articulated.

Salinity

The proponent states that salinity would not be a problem in the irrigated wastewater, as it is expected to be the same as in the water supply. However we believe that the pickling wastewater is likely to be quite saline and could contribute significantly to salinity. The proponent must supply specific data for the expected salinity of the wastewater to be irrigated.

Saturated Soils

The Council is concerned about the saturation of the soils with consequent reduction of soil adsorption capacity and export of nutrients. We believe that the proposed closure during winter will not be enough.

Remnant Vegetation

The proponent claims there will be no clearing of native vegetation (p25). However it appears from Figure 10 that there will be substantial clearing for the western and southern woodlots and for the tertiary treatment pond. Is clearing to occur? If so, data on the flora and fauna needs to be assessed.

Other Chemicals

We question the statement that no other chemicals will be involved. What about chemicals associated with wool such as sheep dips etc, we are concerned that residue may end up in the wastewater.

Conclusion

This proposal could have large adverse environmental impacts. We have identified a number of significant issues that must be resolved before this project is given approval. The proponent must be tied to very strict and clear commitments and environmental conditions. Careful and extensive monitoring is required to ensure that nutrient export is not occurring and that the groundwater table is not being affected.

Yours sincerely

Rachel Siewert
Co-ordinator

Appendix 6

Submission from Water and Rivers Commission on Recommended Water Quality Protection Guidelines

WATER AND RIVERS
COMMISSION

Department of Environmental Protection
141 St Georges Terrace
PERTH 6000

OUR REF: Mr R P Claudius
TELEPHONE: 278 0378
FAX: 278 0301

Attention: Mr Rob Sippe

SUBJECT: NARRIKUP EXPORT ABATTOIR - KARRIKUP CONSULTATIVE ENVIRONMENTAL REVIEW (935) WATER QUALITY PROTECTION GUIDELINES

As discussed on 13 February 1996, the Water and Rivers Commission has reviewed the above proposal and have identified that water resources in the vicinity of the proposed site need to be protected.

Management of Nutrients

The Commission recommends that the following water quality protection conditions be incorporated in the operating conditions for Benale Pty Ltd.

1 There shall be no nett increase in the nitrogen and phosphorus concentration of the Mill Brook water quality

2 No surface water runoff shall occur from the site.

3 Monitor bores shall be installed as indicated below:

a) Monitor bores (3) shall be installed at the western boundary of the site adjacent to the aerobic treatment and tertiary maturation ponds. Bores with a 3m slotted interval shall be installed above the permanent water table in the laterite, at the water table and at the base of the aquifer.

b) Monitor bores shall be installed in the middle of each irrigation area at the water table. There shall be a 3m slotted intervals below the water table with a minimum internal diameter of 50mm(preferably 80mm).

c) Monitor bores (3) shall be installed between the aerobic treatment ponds and the maturation ponds and constructed as detailed in 3a.

4 Water quality monitoring shall be carried out on all bores on a 3 monthly basis. Water quality parameters shall include:

- ammonia, 0.05 mg/L
- nitrate plus nitrite-nitrogen,
- total nitrogen, 1.0 mg/L
- filterable reactive phosphorus,
- total phosphorus, 0.1 mg/L
- total dissolved solids (by evaporation), 1000mg/L
- pH. 4.5-9.0

The salinity (total dissolved soilds) criteria may be reviewed depending on the results of the drilling and testing, and the salinity tolerance of crop.

Sample shall be collected and preserved in accordance with AS2031.1 and analysed in accordance with Standard Methods APHA-AWWA-WEF.

The Water and Rivers Commission is concerned that the proposed treatment and disposal facility may not be able to meet the above conditions. Should the monitoring determine that the conditions are not being met, the Company should be required to upgrade the facility so that the Company complies with the above water quality protection conditions.

Water Supply

Although investigations carried out by the proponents suggest that there is adequate groundwater for the abattoir onsite, work carried out by the Geological Survey of WA has indicated that there is limited fresh to brackish groundwater in the area. The salinity of groundwater near the abattoir site is highly variable, and salinity commonly increases with depth in the aquifer. It is possible that long term use of groundwater at the abattoir site could cause salinity increases, and water could be unsuitable for irrigating pasture or woodlots. The proponents therefore should indicate whether they have identified alternative water sources if groundwater onsite becomes unsuitable for use.

K J Taylor
A/Director- Policy and Planning

13 February 1996