Horticultural development on 200 hectares of land — Sussex Location 4158 Governor Broome Road, Shire of Augusta-Margaret River

P C & J M Horne

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 839
December 1996

ISBN. 0 7309 8009 X
ISSN. 1030 - 0120
Assessment No. 1044

Summary and Recommendations

This report provides the Environmental Protection Authority's (EPA) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal to develop 200 hectares (ha) of land for horticultural purposes on Sussex Location 4158 Governor Broome Road, Shire of Augusta-Margaret River .

The proponent proposes to develop five, 40ha centre pivot irrigation sites. The five centre pivot sites, in addition to the existing centre pivot site on the property will result in a total developed area of 240ha. The centre pivots will be used in rotation so that only three of the six pivot sites will be used for horticulture at any time.

The proponents are P C & J M Horne who own Sussex Location 4158 Governor Broome Road. They are referred to singularly as the proponent in this report.

It is the EPA's opinion that the following are the environmental factors relevant to the proposal:

(a) surface and groundwater quality;

(b) Scott River and Hardy Inlet;

(c) nutrients;

(d) pesticides; and

(e) remnant vegetation.

It is the EPA's opinion that subject to the satisfactory implementation of the recommended conditions and the proponent's commitments, the proposal can be managed to meet the EPA's objectives.

In the EPA's opinion the proposal should be subject to the following conditions and procedures:

(a) the proponent's commitments should be made enforceable;

(b) the proponent should be required to prepare and implement a property management plan to manage nutrients, pesticides, irrigation and drainage. This should include recording the amount and timing of application of fertilisers and pesticides; and

(c) the proponent should be involved in a nutrient monitoring programme as part of a catchment monitoring program co-ordinated by the Water and Rivers Commission, to be reviewed after five years.

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment notes the relevant environmental factors and the EPA's objective for each factor as set out in Section 3 of the report.

Recommendation 2

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

Recommendation 3

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

Recommendation 4

That the Minister for the Environment requests that the Minister for Primary Industry give consideration to the preparation of a catchment management plan or land use strategy with the support and involvement of agencies, landholders and industry in the catchment (such as BHP Mining and Simplot Australia Ltd) through the Scott Coastal Plain Steering Committee.

Recommendation 5

That the Minister for the Environment request the Water and Rivers Commission to prepare and implement a co-ordinated catchment monitoring program for nutrients and pesticides on the Scott Coastal Plain.

Recommendation 6

That the Minister for the Environment acknowledges and supports the preparation by industry with advice from government agencies of Environmental best management practices for horticulture on the Scott Coastal Plain and the implementation of the best management practices on the Scott Coastal Plain.

Contents

Tables

Appendices

1. Introduction and background

This report provides the Environmental Protection Authority's (EPA) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal to develop 200 hectares (ha) of land for horticultural purposes on Sussex Location 4158 Governor Broome Road , Shire of Augusta-Margaret River. Horticultural crops will be grown on a rotational basis so that only part of the land will be used at any one time. The property is located approximately 20 kilometres east of Augusta on the Scott Coastal Plain (Appendix 1: Figure 1).

Further details on the proposal are given in Section 2 of the report. Section 3 discusses the environmental factors relevant to the proposal.

Conditions and procedures to which the proposal should be subject if the Minister determines that it may be implemented are set out in Section 4, and Section 5 presents the EPA's recommendations to the Minister.

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

2. The proposal

Sussex Location 4158 comprises of 527ha and has been largely cleared with small areas of native remnant vegetation. Until 1995, cattle and sheep grazing were the dominant farming landuses on the property. In 1995, one 40 ha centre pivot site was established on the property to grow potatoes.

The proponent now proposes to develop five additional 40ha centre pivot irrigation sites. The five centre pivot sites, in addition to the existing centre pivot site will result in a total of six centre pivot sites on the property with a total area of 240ha. Only three of the six pivot sites will be used for horticulture at any time as disease build up in the soil is managed by growing potatoes and other crops in rotation (Appendix 1: Figure 2).

The application for a groundwater licence to irrigate 80 hectares of land (two centre pivot sites) was referred to the EPA by the Water and Rivers Commission on the 29 July 1996 for environmental impact assessment. The level of assessment was set at Consultative Environmental Review (CER) on the 21 August 1996.

A Consultative Environmental Review report, hereafter called the CER, addressing the proposal was prepared by P C & J M Horne, with assistance from Agriculture Western Australia. The CER was made available for public review between the 18 November and 29 November 1996.

3. Environmental factors

3.1 Relevant environmental factors

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

(a) Scott River and Hardy Inlet;

(b) surface and groundwater quality;

(c) nutrients;

(d) pesticides; and

(e) remnant vegetation.

These relevant environmental factors are discussed in Section 3.2 to 3.6 of this report.

3.2 Scott River and Hardy Inlet

Aspects of Scott River and Hardy Inlet

Sussex Location 4158 is located on the Scott Coastal Plain within the catchment of the Scott River which flows into the Hardy Inlet.

Increasing concentrations of nutrients in the Hardy Inlet will lead to an increasing intensity of algal blooms and possibly domination of certain toxic species. The current load of phosphorus in the Scott River is estimated to be 36 tonnes per year (Gerritse *draft* 1996). This figure will increase if horticulture expands on the Scott Coastal Plain without having appropriate catchment and property management plans in place.

Nutrient levels, river flows and the estimated volume of the Hardy Inlet indicate that the Inlet is well flushed and very little of the dissolved nutrients and pesticides entering the Inlet are likely to be retained. What remains in the Inlet after the winter flush, will be strongly diluted by tidal flushing in the spring to autumn period. However, concentrations of suspended particulate matter can be quite high and it is this particulate matter that can affect the trophic status of the river and Inlet (Gerritse *draft* 1996).

Decreasing the export of particulate matter could be the most important method of managing the trophic status of the Scott River and Hardy Inlet (Gerritse *draft* 1996). This management strategy is supported by the Water and Rivers Commission.

Assessment

The area considered for assessment of this relevant environmental factor is the Scott River and Hardy Inlet.

The EPA is concerned that development of horticultural landuses on the Scott Coastal Plain may result in increased nutrients flowing to the Scott River, and that this may cause water quality problems in the Scott River and Hardy Inlet.

The EPA's objective in regard to this environmental factor is "to maintain or improve water quality in Scott River and Hardy Inlet to ensure existing and potential uses, including ecosystem maintenance are protected". Insufficient investigation and monitoring has been conducted at this stage to determine environmentally acceptable target loads for nutrients.

The EPA notes that Sussex Location 4158 lies within the catchment of the Scott River and may potentially affect part of the water quality of the river and Hardy Inlet.

Having particular regard to the potential expansion of horticulture on the Scott Coastal Plain to significantly add to the current nutrient loads entering the Scott River, it is the EPA's opinion that a catchment management plan and a co-ordinated catchment monitoring program should be prepared with the support and involvement of agencies, landholders and industry (such as BHP Mining and Simplot Australia) through the Scott Coastal Steering Committee.

It is the EPA's opinion that a catchment management plan together with a catchment monitoring program for the Scott Coastal Plain can meet the EPA's objective of maintaining or improving water quality within the Scott River and Hardy Inlet .

3.3 Surface and groundwater quality

Aspects of surface and groundwater quality

Based on trends found in catchments on the Swan Coastal Plain with similar soil and groundwater characteristics, the application of fertilisers on horticultural crops on the Scott Coastal Plain may result in increased nutrients being exported to the Scott River via surface and/or groundwater flow. These nutrients could cause water quality problems in the Scott River and Hardy Inlet (Water and Rivers Commission pers com).

Drainage lines on Sussex Location 4158 generally flow in an east west direction, with most water flowing to the wetland in the south west corner of the property. The summer water table on the property is typically less than one metre below the ground and the winter water table is close to or at the surface over much of the winter.

The grey sands on the Scott Coastal Plain have a poor ability to retain nutrients. In these areas phosphorus can be leached through the soil profile to reach the shallow groundwater table. The phosphorus can then flow laterally into nearby drains or watercourses and eventually into the Scott River. However, soil and groundwater sampling conducted by Agriculture Western Australia at four sites on Sussex Location during 1995 indicate low levels of soluble phosphorus under both the coloured and grey sands. The results of the sampling are provided in the CER. This is attributed to the presence of substantial areas of coloured sands on the property with a high phosphorus retention index (PRI), and the small area of grey sand which extends to the summer water table. There is also considerable opportunity for groundwater to pass areas of high phosphorus retention soil before eventually seeping to the Scott River. The results of the monitoring conducted by Agriculture Western Australia are presented in the CER.

Approximately half of the land contained within the proposed centre pivot sites on Sussex Location 4158 consists of orange brown sands. These sands have high PRI values in the order of 300-400 increasing to at least 1000 below 50cm (P C & J M Horne, 1996). On the orange brown sands, phosphorus is fixed to the soil particles rather than being leached through the soil to the groundwater table. Heavy rainfall can cause runoff and erosion of soil particles which can carry the phosphorus into drainage lines and eventually the Scott River. Pesticides can also be transported on particulate matter in the same manner. Export of particulate phosphorus is a concern prior to planting (Autumn), and after harvest (Spring), before sufficient pasture/ground cover can be re-established to reduce soil loss during storm events.

Decreasing the export of particulate matter has been identified as possibly the most important method of managing the trophic status of the Scott River and Hardy Inlet (Gerritse *draft* 1996). This is especially important in relation to the proposal on Sussex Location 4158 given the close proximity of the land to the Governor Broome Creek and Scott River.

The proponent has made a number of commitments to undertake a series of nutrient, irrigation and drainage procedures to minimise the export of particulate nutrients and pesticides from the centre pivot sites, including the reconstruction of a 15ha wetland in the south western corner of the property to serve as a nutrient stripping wetland (refer Table 1). The commitments also include an undertaking to prepare and implement a property management plan and a monitoring programme.

Assessment

The area considered for assessment of this relevant environmental factor is the Scott Coastal Plain. The plain is a defined geomorphological land area with common soil and groundwater characteristics.

The EPA's objective in regard to this environmental factor is "to maintain or improve the quality of surface and groundwater on the Scott Coastal Plain to ensure existing and potential uses, including ecosystem maintenance, are protected".

The EPA notes that:

(a) the key environmental factor raised by horticulture on the Scott Coastal Plain is the export of particulate phosphorus via surface water flow to the Scott River and Hardy Inlet. This environmental factor is of particular concern on Sussex Location 4158 due to the close proximity to the Governor Broome Creek and Scott River;

(b) the loss of nutrients is most likely to occur when the soils are exposed during the planting (autumn) and harvesting (spring) periods;

(c) the loss of nutrients via groundwater flow is not likely to be significant due to the substantial areas of coloured soil with a high PRI on Sussex Location 4158;

(d) the proponent has committed to preparing a property management plan which will include a monitoring program and a series of nutrient, pesticide, irrigation, drainage and erosion management procedures;

(e) the proponent has also committed to reconstructing a 15ha wetland to serve as a nutrient stripping basin, to minimise the loss of nutrients; and

(f) a proposed catchment management plan has been recommended (Section 3.2).

Having particular regard to:

(a) the proponent's commitment to prepare and implement a property management plan aimed at minimising the loss of nutrients and pesticides from the property in accordance with best management practices;

(b) the proponent's commitment to implement a nutrient and pesticide monitoring program for Sussex Location 4158; and

(c) provided that a catchment management plan and a co-ordinated catchment monitoring program are developed for the Scott Coastal Plain and incorporates the proposal;

it is the EPA's opinion that the proponent is unlikely to compromise the EPA's objective of maintaining or improving the quality of surface and groundwater to ensure existing and potential uses, including ecosystem maintenance, are protected.

3.4 Nutrients

Aspects of nutrients

Horticulture requires large quantities of fertiliser compared to other types of agriculture. Details of the fertiliser applications rates for growing potatoes are provided in the CER.

The nutrients applied to the proposed horticultural development on Sussex Location 4158 may result in increased export of nutrients to the Scott River and Hardy Inlet which could cause water quality problems.

The proponent has advised that centre pivot irrigation allows uniform water delivery and minimises the amount of fertiliser that needs to be applied and potential off site losses.

The proponent has made a commitment to prepare and implement a nutrient management program involving soil testing of the surface 20cm of each soil type at each centre pivot site, and foliar analysis, to keep application rates as low as possible.

Assessment

The area considered for assessment of this relevant environmental factor is the land contained within Sussex Location 4158.

The EPA's objective in regard to this environmental factor is to "ensure that horticulture does not result in unacceptable export of nutrients, particularly phosphates, off-site".

The EPA notes that the Environmental Best Management Practices for Horticulture on the Scott Coastal Plain being prepared Agriculture Western Australia and the commitments made by the proponent will assist in reducing the amount of nutrients exported from the property. However, the EPA is not satisfied the objective can be fully achieved by the nutrient management plan. The EPA propose that the monitoring program will determine the success of the nutrient management plan and Environmental Best Management Practices for Horticulture on the Scott Coastal Plain.

Having particular regard to:

(a) the proponent's commitment to prepare and implement a nutrient management programme to keep fertiliser application rates as low as possible and to monitor nutrient discharge from the property;

(b) the nutrient monitoring program to be prepared by the Water and Rivers Commission as part of the overall monitoring of the Scott Coastal Plain; and

(c) the proponent's commitment to comply with the Environmental Best Management Practices for Horticulture on the Scott Coastal Plain being prepared by Agriculture Western Australia;

it is the EPA's opinion that the proponent's commitments will enable the horticultural development to be managed so that the export of nutrients off-site is kept to a practical minimum.

3.5 Pesticides

Aspects of pesticides

A list of pesticides likely to be applied on the horticultural development on Sussex Location 4158 is presented in the CER document.

The particulate matter exported from the Scott Coastal Plain into the Scott River and Hardy Inlet could carry pesticides as well as nutrients. The pesticides from horticulture that are exported on particulate matter could have a toxic effect on the Scott River and Hardy Inlet ecosystems (Gerritse *draft* 1996).

The same drainage management procedures proposed to reduce the export of phosphorus via surface water flow (refer Table 1) may also be effective in reducing the impact of pesticides on the Scott River and Hardy Inlet.

Assessment

The area considered for assessment of this relevant environmental factor is the land contained within Sussex Location 4158.

The EPA's objective in regard to this environmental factor is to "ensure that horticulture does not result in unacceptable export of pesticides".

The proponent has committed to preparing a property management plan and implementing a monitoring program. The EPA considers that the monitoring program should include:

(a) requirements to record the quantity and timing of pesticide applications; and

(b) monitoring of surface and groundwater discharged from the property.

Having particular regard to:

(a) the proponent's commitments to prepare a property management plan, which will include a pesticide recording program and drainage management to reduce the export of suspended particulates in the surface water;

(b) the pesticide monitoring program to be prepared by the Water and Rivers Commission as part of the co-ordinated catchment monitoring program; and

(c) the Environmental Best Management Practices for Horticulture on the Scott Coastal Plain being prepared by Agriculture Western Australia;

it is the EPA's opinion that the proponent's commitments will enable the horticultural development to be managed so that the export of pesticides off-site is kept to a practical minimum.

3.6 Remnant vegetation

Aspects of remnant vegetation

It is proposed to clear 23ha of remnant vegetation as part of the proposed horticultural development. The Conservation Through Reserves report for the South Coast (System 2) does not identify Sussex Location 4158 as an area that should be conserved or protected.

The Department of Conservation and Land Management (CALM) has advised that:

(a) the remnant vegetation proposed to be cleared has been subject to heavy grazing;

(b) there are no known populations of rare flora on Sussex Location 4158; and

(c) Sussex Location 4158 appears to drain into Gingalup Nature Reserve which is located to the south of the property.

The proponent has lodged an Agreement to Reserve with the Commissioner for Soil and Land Conservation which commits them to retain and protect 33ha of native vegetation on Sussex Location 4158. This represents the majority of the native vegetation remaining on the property. The Agreement to Reserve also commits the proponent to plant almost 30ha of blue gums (Appendix 1: Figure 2).

It is proposed to plant blue gums as a measure to lower summer water tables and possibly increase phosphorus absorption.

Assessment

The area considered for assessment of this relevant environmental factor includes the land contained within Sussex Location 4158 and Gingalup Swamp Nature Reserve, which is located immediately south of the subject property.

The EPA's objective in regard to this environmental factor is to:

(a) maintain adequate representation of native vegetation associations; and

(b) ensure the proposal does not impact on the vegetation communities in the Gingalup Nature Reserve.

Having particular regard to:

(a) CALM's advice that the remnant vegetation proposed to be cleared is degraded and has little conservation value due to over grazing;

(b) the relatively small area of vegetation proposed to be cleared as part of the proposal compared to the overall areas of native vegetation that are in nature reserves and national parks in close proximity to the property and on the Scott Coastal Plain;

(c) the management and monitoring procedures and best management practices aimed at minimising the loss of nutrients from the property to protect the environmental values of the Scott River and Hardy Inlet will also provide the same protection to Gingalup Nature Reserve; and

(d) the Agreement to Reserve with the Commissioner for Soil and Land Conservation, 33ha of native vegetation on the property;

it is the EPA's opinion that the proposal can meet the EPA's objectives on the basis that;

(a) the vegetation associations that are proposed to be cleared as part of the horticultural proposal are adequately represented within existing reserves; and

(b) management and best practice procedures will be put in place to reduce the impact on the vegetation communities in the Gingalup Nature Reserve to a practical minimum.

4. Conditions and Procedures

In the EPA's opinion, the proposal should be subject to the following conditions and procedures if implemented:

4.1 Proponent's commitments

The proponent's commitments set out in the CER (P C & J M Horne 1996) and summarised in Table 1 should be made enforceable conditions.

4.2 Property management plan

The proponent should be required to prepare and implement a property management plan containing environmental management procedures and the proponent's commitments to manage the relevant environmental factors, to ensure that the EPA's objectives as set out in Section 3 of this report are met.

4.3 Monitoring programme

The proponent should be required to prepare and implement a monitoring program, to be reviewed after five years, to the satisfaction of the Department of Environmental Protection, Water and Rivers Commission and Agriculture Western Australia. The monitoring program should include the recording of fertilisers and pesticides applied on the property and the monitoring of nutrients in the surface and groundwater flowing from Sussex Location 4158.

The monitoring program should be co-ordinated with a catchment monitoring program for the Scott Coastal Plain by the Water and Rivers Commission. Pesticide levels in the surface and groundwater should be monitored by the Water and Rivers Commission as part of this catchment monitoring program.

4.4 Audit

The conditions and proponent's commitments should be audited by the Department of Environmental Protection.

5.0 Recommendations

The EPA submits the following recommendations:

Recommendation 1

> That the Minister for the Environment notes the relevant environmental factors and the EPA's objective for each factor as set out in Section 3 of the report.

Recommendation 2

> That subject to the satisfactory implementation of the EPA's recommended conditions and procedures as set out in Section 4 of the report, including the proponent's environmental management commitments, the proposal can be managed to meet the EPA's objectives.

Recommendation 3

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

Recommendation 4

> That the Minister for the Environment requests that the Minister for Primary Industry give consideration to the preparation of a catchment management plan or land use strategy with the support and involvement of agencies, landholders and industry in the catchment (such as BHP Mining and Simplot Australia Ltd) through the Scott Coastal Plain Steering Committee.

Recommendation 5

> That the Minister for the Environment request the Water and Rivers Commission to prepare and implement a co-ordinated catchment monitoring program for nutrients and pesticides on the Scott Coastal Plain.

Recommendation 6

That the Minister for the Environment acknowledges and supports the preparation by industry with advice from government agencies of Environmental best management practices for horticulture on the Scott Coastal Plain and the implementation of the best management practices on the Scott Coastal Plain.

RELEVANT FACTORS	ENVIRONMENTAL OBJECTIVE	RELEVANT ENVIRONMENT	PROPONENT''S COMMITMENTS	EPA's OPINION
1.Surface and Ground Water Quality	•To maintain or improve the quality of surface and ground water to ensure existing and potential uses, including ecosystem maintenance, are protected.	•Scott Coastal Plain catchment	**Surface water** •Prepare detailed contour mapping to design earthworks for managing surface water movement. •Establish and fence the nutrient stripping areas identified on the farm plan. •Sedges will be established in the outer 10 metres of the fenced nutrient stripping areas. •Construct bunds and shallow drains on the north eastern and eastern boundaries of Location 4158 to redirect surface water flow around the pivot sites during major storm events in accordance with the farm plan. •Redirect and modify drainage lines on Location 4158 so that they have shallow wide profiles. •Vegetation will be retained in drainage lines at all times. •Construct earthworks that will retain storm events, of up to 120mm within 3 to 4 hours, to reduce the quantity and rate of surface water flow off Location 4158. •Construct earthworks that will retain storm events on site for a period of 24hours during planting and harvesting. •Collect data on nutrient flow from the pivot sites, and make this available to the EPA annually for 5 years. •Establish a complete pasture of mixed grasses and clovers on the pivot sites immediately after harvest. •Continue the existing monitoring sites that have regional significance. **Ground water** •Conduct a detailed soil analysis to clarify the risk of soluble phosphorus loss in groundwater. •Establish 20-30 hectares of bluegums or an equivalent deep-rooted woody perennial on the property in accordance with the farm plan. •Immediately after harvest of the timber a deep-rooted woody perennial must be re-established. •Manage irrigation with the aid of electronic soil moisture probes to minimise water movement beyond the root zone.	The proposal can be managed to meet the EPA's objective subject to the implementation of the proponent's commitments and EPA recommendations.

Table 1. Summary of relevant environmental factors, objectives, proponent's commitments and the Environmental Protection Authority's opinion.

RELEVANT FACTORS	ENVIRONMENTAL OBJECTIVE	RELEVANT ENVIRONMENT	PROPONENT''S COMMITMENTS	EPA's OPINION
2.Scott River and Hardy Inlet	•To maintain or improve water quality to ensure existing and potential uses, including ecosystem maintenance are protected.	•Scott River and Hardy Inlet		The proposal can be managed to meet the EPA's objective subject to the implementation proponent's commitments and EPA recommendations.
3.Nutrients	•Ensure that horticulture does not result in unacceptable export of nutrients, particularly phosphates, off-site.	•Sussex Location 4158 Governor Broome Road, Shire of Augusta-Margaret River.	•Prepare a detailed property management plan, which is to include the proponent's commitments. •Comply with the Environmental Best Management Practices for Horticulture on the Scott Coastal Plain. •Manage and monitor fertiliser (rates and timing) use to ensure lowest possible rates and most effective delivery mechanisms. •Test soils to determine fertiliser application rates	The proposal can be managed to meet the EPA's objective subject to the implementation of the proponent's commitments and EPA recommendations
4.Pesticides	•To ensure that horticulture does not result in unacceptable export of pesticides.	•Sussex Location 4158 Governor Broome Road, Shire of Augusta-Margaret River.	•Ensure that all pesticides are applied within label specifications. •Ensure that pesticides are not applied to sites during the wet season. •Manage and monitor pesticide use (rates and timing) to ensure lowest possible rates and most effective delivery mechanisms.	The proposal can be managed to meet the EPA's objective subject to the implementation of the proponent's commitments and EPA recommendations

Table 1. Summary of relevant environmental factors, objectives, proponent's commitments and the Environmental Protection Authority's opinion. (cont'd)

RELEVANT FACTORS	ENVIRONMENTAL OBJECTIVE	RELEVANT ENVIRONMENT	PROPONENT''S COMMITMENTS	EPA's OPINION
5.Remnant vegetation	•To ensure maintenance of adequate representation of native vegetation associations. •To ensure that surface or groundwater flow from Sussex Location does not impact on the vegetation communities in Gingalup Nature Reserve	•Sussex Location 4158 Governor Broome Road, Shire of Augusta-Margaret River; and •Gingalup Swamp.	•To protect and retain 33ha of remnant native vegetation on the property in accordance with the Agreement to Reserve.	The proposal can be managed to meet the EPA's objective subject to the proponents commitments.

Table 1. Summary of relevant environmental factors, objectives, proponent's commitments and the Environmental Protection Authority's opinion. (cont'd)

Appendix 1

Figures

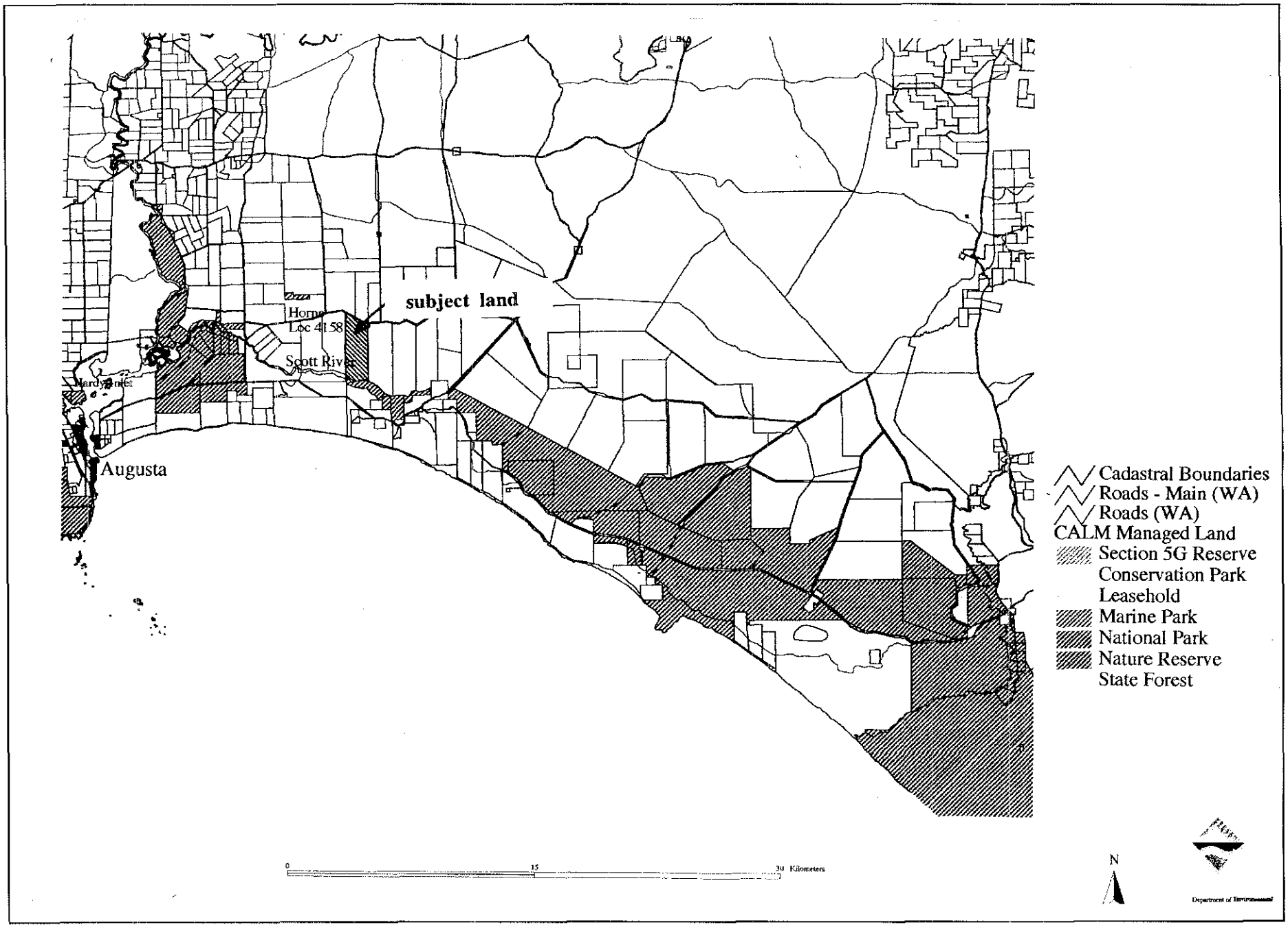

Figure 1. Locality plan.

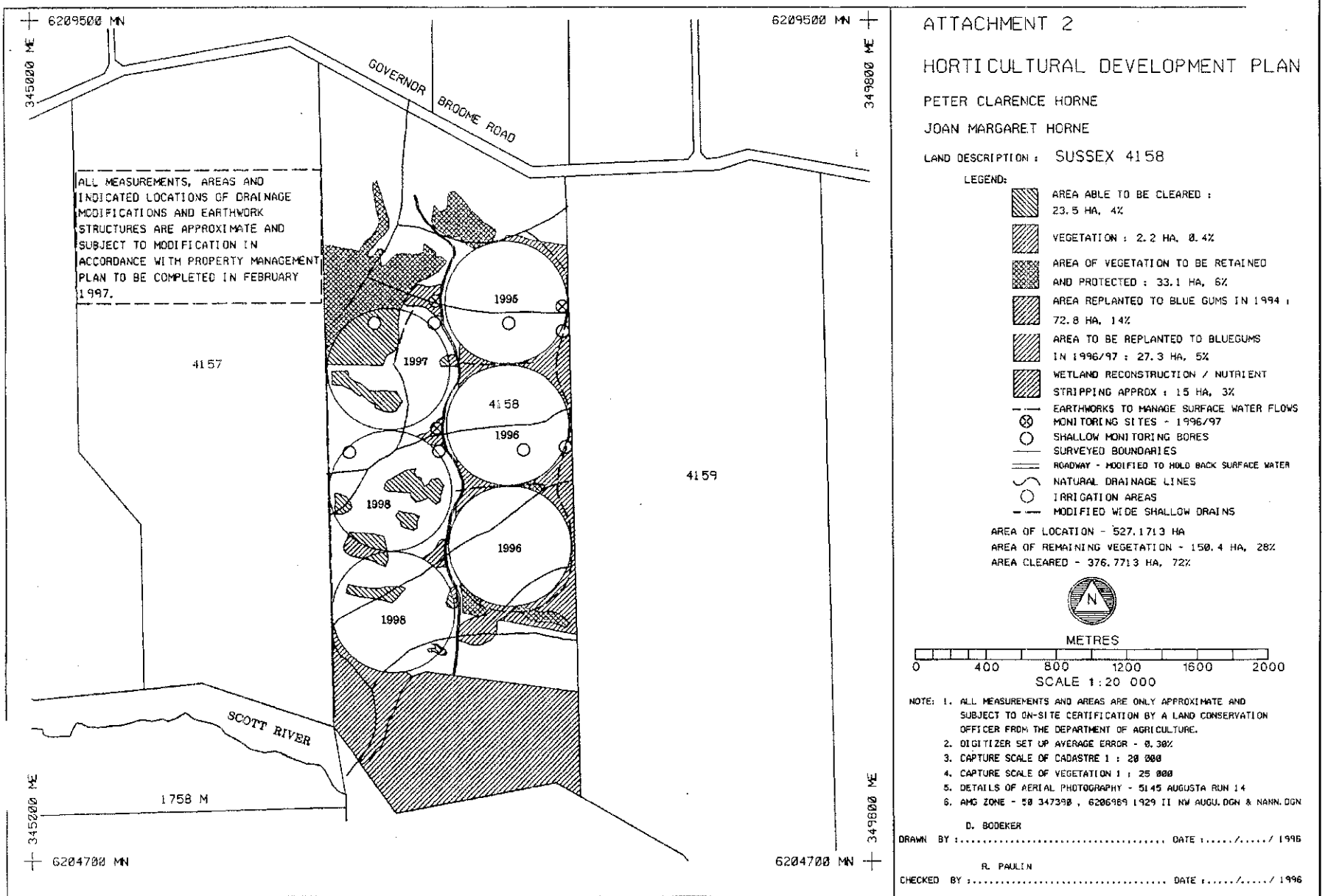

Figure 2. Horticultural development on 200 hectares of land — Sussex Location 4158 Governor Broome Road, Shire of Augusta-Margaret River.

Appendix 2

List of people and organisations that made submissions

1. Water and Rivers Commission
2. Department of Conservation and Land Management
3. Ministry for Planning

Appendix 3

References

Deeley, D. (1996). *Water quality targets for the Scott River catchment.* Murdoch University. Perth, WA.

Environmental Protection Authority. (1993). Western Australian water quality guidelines for fresh and marine waters. Environmental Protection Authority. Perth, WA.

Gerritse, R. (1996). *Leaching of nutrients and pesticides from the Scott River catchment: A critical overview of existing data and a comparison with the Ellen Brook, Harvey River and Gingin Brook catchments.* CSIRO. Perth, WA.