

ORD RIVER IRRIGATION SCHEME STAGE 2 ENVIRONMENTAL MANAGEMENT ASSESSMENT

ENVIRONMENTAL MANAGEMENT ASSESSMENT REPORT AND RECOMMENDATIONS

BY THE

OFFICE OF ENVIRONMENT AND HERITAGE

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ABBREVIATIONS AND GLOSSARY

NT	Northern Territory
WA	Western Australia
NT DIPE (DIPE)	Northern Territory Department of Infrastructure, Planning and Environment
WA DEP	Western Australian Department of Environmental Protection
WA EPA	Western Australian Environmental Protection Authority
NT ORD (ORD)	Northern Territory Office of Resource Development
WA DRD (DRD)	Western Australian Department of Resources Development
EA	Environment Australia
SMEC	Snowy Mountains Engineering Corporation
EIS	Environmental Impact Statement
ERMP	Environmental Review and Management Plan
WA WRC	Western Australian Water and Rivers Commission
CALM	Western Australian Department of Conservation and Land Management
NT PWS (PWS)	Northern Territory Parks and Wildlife Service

EXECUTIVE SUMMARY

This is the second report in the two part environmental assessment impact assessment of Stage 2 of the Ord River Irrigation Area (M2 supply channel). The first assessment report (Assessment Report No 34A) addressed the fundamental issue of whether or not the proposal can sustain the biodiversity of the region. The following conclusion was made:

‘The outcome of this assessment is that the environmental issues in relation to the conservation of biodiversity have been satisfactorily addressed, and that the proposal may proceed to the second stage of environmental assessment provided the undertakings and commitments detailed in the draft EIS/ERMP, as modified by recommendations in this report, are implemented.’

This second assessment determines whether or not the project can be managed in a manner that is not deleterious to the environment.

Major Issues

The major environmental issues identified in relation to the environmental management of the proposed Ord River Irrigation Area Stage 2 development are:

- Buffer management.
- Surface water management.
- Groundwater management
- Environmental management structure and program.
- Chemical and pesticide management.
- Dust and particulate management.
- Greenhouse gas emissions.
- Social Impacts.

Conclusion

It is considered that the environmental issues associated with the project have been adequately identified. Some of the issues have been resolved through this assessment process, while the remainder will be addressed through the Environmental Management Plan and the Aboriginal Socio-Economic Impact Assessment (ASEIA).

Initially, the commitments made in the EIS/ERMP and recommendations detailed in this Assessment Report and Assessment Report 34A will form the basis for the proponents' management and monitoring commitments. The Environmental Management Plan will be a working document for the operation of the area and will require continual review and updating in the light of operational experience and changed circumstances.

In addition, the project will require licensing under the NT *Water Act*, and the WA *Environmental Protection Act 1986*. The project will be required to comply with any licence conditions as well as regulations set down by these acts.

Provided that the environmental commitments and safeguards detailed in the EIS/ERMP are implemented, the recommendations in this Assessment Report and Assessment Report 34A are adopted and periodic reviews and reporting are undertaken as required, long term environmental impacts should be minimised.

Summary of Recommendations

Recommendation 1

The proponents shall ensure that the proposal is implemented in accordance with:

- **the environmental commitments and safeguards identified in the Ord River Irrigation Area Stage 2 draft Environmental Impact Statement as modified in the Supplement to the draft EIS; and**
- **as recommended in assessment report 34A and this report, and consolidated in Appendix B.**

Recommendation 2

The proponents, prior to ground disturbing activities, should prepare a Buffer Management Plan for approval by the NT DIPE and WA DEP. This plan should cover the following issues:

- **tenure of the buffer area;**
- **the role and purpose of the buffer area;**
- **management objectives and priorities for the buffer area;**
- **management practices to apply to the buffer area;**
- **management of chemicals within or potentially affecting the buffer;**
- **the environmental values of the buffer area;**
- **methods to control human and vehicular access to environmentally sensitive portions of the buffer area;**
- **methods to minimise the impacts of construction activities;**
- **rehabilitation of disturbed portions of the buffer area; and**
- **responsibilities for the maintenance of the buffer area.**

Recommendation 3

The Northern Territory and Western Australian governments and the proponents should seek to resolve the issue of ownership/tenure of the buffer as a matter of urgency, and select a body to manage the buffer area according to the approved buffer management plan, prior to commencement of the project.

Recommendation 4

The proponents should prepare a Hydrodynamic Survey Plan as part of the Environmental Management Plan, prior to any drainage or intended discharge from the project area. This plan should include:

- surveys of the flushing characteristics of the Keep River;
- surveys of the flushing characteristics of Sandy Creek;
- surveys of the flow characteristics of Border Creek; and
- hydrodynamic investigations of the estuarine portion of the Keep River.

The proponents should commence implementation of the plan 5 months prior to any ground disturbing activities.

Recommendation 5

Prior to ground disturbing activities, the proponents should demonstrate to the satisfaction of the NT DIPE and WA DEP that there is in place an environmental management system which includes the following elements:

- an environmental policy and corporate commitment to it;
- mechanisms and processes to ensure:
 - planning to meet environmental requirements;
 - implementation and operation of actions to meet environmental requirements;
 - measurement and evaluation of environmental performance;
- review and improvement of environmental outcomes; and
- nominate environmental management responsibilities.

Recommendation 6

The proponents should prepare an Environmental Management Plan to the satisfaction of the NT DIPE and WA DEP.

Recommendation 7

A Greenhouse Gas Emissions Management Plan should be prepared and implemented as part of the Environmental Management Plan.

Recommendation 8

Relevant outcomes from the ASEIA should be incorporated in the final project design prior to construction. The design, with appropriate amendments, should be forwarded to the NT DIPE and WA DEP for approval prior to construction.

1 Introduction and Background

This is the second report in the two part environmental assessment impact assessment of Stage 2 of the Ord River Irrigation Area (M2 supply channel). The first assessment report (Assessment Report No. 34A) addressed the fundamental issue of whether or not the proposal can sustain the biodiversity of the region. The following conclusion was made:

‘The outcome of this assessment is that the environmental issues in relation to the conservation of biodiversity have been satisfactorily addressed, and that the proposal may proceed to the second stage of environmental assessment provided the undertakings and commitments detailed in the draft EIS/ERMP, as modified by recommendations in this report, are implemented.’

This second assessment report will determine whether or not the project can be managed in a manner that is not deleterious to the environment.

The assessment process has been conducted in accordance with the requirements of the Administrative Procedures of the Northern Territory *Environmental Assessment Act* 1982 and the Western Australian *Environmental Protection Act* 1986, and an agreement made between the Northern Territory and Western Australia in 1993. The proponents for the project are Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia.

This report reviews the draft Environmental Impact Statement (draft EIS); comments on the draft EIS by members of the public, community groups and government bodies; and the proponents’ response to these comments in the Supplement to the draft EIS. This report also relies on information, comments and advice provided by Northern Territory Government agencies, the Western Australian Department of Environmental Protection (WA DEP) and the Western Australian Environmental Protection Authority (WA EPA)

The Ord River Irrigation Area commenced agricultural land development in the 1960’s and this proposal represents the second stage of irrigated land development, with water supplied from the existing Ord River dams.

There has been substantial change in the context within which Stage 1 and Stage 2 are being considered. The Stage 1 development preceded Self-Government in the Northern Territory and the Western Australian *Environmental Protection Act 1986* and the related growth in community environmental awareness and statutory assessment. In addition, heritage legislation, water legislation reform, national and international biological diversity agreements, greenhouse gas protocols, and the national agreement on ecologically sustainable development have all been major additions to the broad context within which this Stage 2 proposal is being examined.

The Ord River Irrigation Area Stage 2 (M2 Supply Channel) development (hereafter referred to as the M2 project) involves the development of irrigated farmland predominantly for growing sugar cane, the development of a sugar mill and the development of storage facilities at the port of Wyndham.

1.1 Environmental Impact Assessment Process

Environmental impact assessment is the process of defining those elements of the environment which may be affected by a proposed development and determining the significance, risks and consequences of the potential impacts of the proposal at a local and regional level.

This proposal is being assessed jointly by the Northern Territory Department of Infrastructure, Planning and Environment (DIPE) and the WA EPA as an Environment Impact Statement (EIS)/Environmental Review and Management Program (ERMP). The draft EIS/ ERMP (Kinhill Pty Ltd, 2000) was released for a ten week public review period between 24 January and 31 March 2000.

Given the complexity of the project the DIPE and the WA EPA decided to assess the proposal in two parts. The first part relates to clearing approximately 35,000 ha of land in terms of the potential loss of biodiversity, and the second part, which makes up this report, will focus on detailed management of the development in the short and long term. As a consequence of this approach, the DIPE and the WA EPA will be reporting twice.

In addition, the assessment reports address the whole project area and are not limited to that portion of the project area within respective State/Territory borders. The Commonwealth, through Environment Australia (EA), has been involved in the assessment under cooperative arrangements with the NT and WA.

It is the intention of the NT and WA Governments that environmental conditions issued under the *WA Environmental Protection Act 1986* should apply to the whole of the Project Area. However, the environmental conditions cannot be set for the whole of the Project Area until the NT Parliament passes enabling legislation. In the meantime, any Statement of Approval issued under the *WA Environmental Protection Act 1986* can only apply to that portion of the Project Area located within WA.

The contents of this report form the basis of advice to the Northern Territory Minister for the Environment on the environmental management issues associated with the proposal.

1.2 Environmental Impact Assessment History

In March 1996, the then NT Minister for Lands, Planning and Environment and the WA Minister for Environment agreed that the development of the second stage of the Ord River Scheme should be jointly assessed at the level of Public Environment Report (PER). The WA process was determined to be the lead process, with provision being made for incorporating NT requirements. PER guidelines were developed incorporating comments from government agencies and the public.

The WA Department of Resource Development and consultants SMEC and the Queensland Department of Natural Resources then prepared a Preliminary Design Study on behalf of both governments.

In April 1998, the NT and WA governments selected Wesfarmers Ltd and Marubeni Corporation as the preferred proponents for the development, based on the Preliminary Design Study documentation. The proponents then notified the WA DEP of additions to the development. The main additions were a proposed 400,000 tonne per annum raw sugar mill and an upgrade of the

port of Wyndham. Four sites for the mill were under consideration, two in WA, one on the border and one in the NT. On the basis of advice from the proponents and the WA DEP, the WA EPA determined the proposal should be assessed at the higher level of an ERMP, equivalent to an EIS under the NT *Environmental Assessment Act*.

Guidelines for the EIS/ERMP (based on the original PER guidelines) were finalised by both the DIPE and the WA DEP and jointly issued to the proponents in August 1999.

The draft EIS/ERMP and technical appendices were submitted by the proponents on the 20 January 2000 and placed on public review for a 10-week period from 24 January 2000 until 31 March 2000. The documentation was also distributed widely to relevant NT and WA Government departments and agencies.

With WA taking the lead role, all public submissions were forwarded to the WA DEP. The NT Government provided a consolidated submission to the WA DEP and the proponents, incorporating the comments received from other NT departments and agencies. The WA DEP forwarded a summary of all submissions to the proponents for a response. The proponents provided a response to submissions on 1 June 2000. The response was then distributed to various agencies for further comment.

To aid the WA EPA further in providing its advice on biodiversity to the WA Minister for Environment, the WA EPA convened a one-day workshop comprising technical experts, government agencies and proponents' representatives.

The workshop was held on 29 July 2000 and the WA EPA generated an outcome statement arising from the workshop. A summary by the WA EPA of the outcomes from the workshop is attached in Assessment Report No. 34A.

Based on advice given to both governments on the response to the submissions and outcomes from the WA EPA workshop, the proponents were asked to clarify some issues relating to biodiversity. Further submissions were made to the WA EPA and documentation copied to the DIPE.

Both the NT and WA governments reported on the first stage of assessment on 25 August 2000.

The WA report was open for appeal for 2 weeks following this release. The NT *Environmental Assessment Act* does not cater for appeals, however officers from the NT DIPE and WA DEP worked closely to address the appeals. Any changes arising from the appeals on the first and second WA assessment reports (Bulletin Nos. 988 and 1016) that affect the NT assessment are incorporated in this report.

A further one-day workshop was held on 4 October 2000 to discuss issues surrounding the environmental management of the project. Key issues discussed were:

- the management structure and the need for a single entity having legal responsibility for key approvals;
- responsibilities of the co-proponents and government agencies and the need for these to be clearly defined;
- annual reporting and major triennial reporting with peer review;
- the inclusion of independent members on the management entity;

- the need for social impacts and aboriginal issues to be addressed;
- the buffer zone, its purpose and management, and responsibility for management;
- the need for hydrological information on the Keep River;
- the need for clarity and understanding of Commonwealth assessment involvement and possible conditions under the *Environmental Protection and Biodiversity Conservation Act 1999*;
- the need for the NT and WA Parliaments to pass enabling legislation identifying the WA *Environmental Protection Act 1986* as the key environmental instrument to apply to the whole of the project area, including the NT portion and the buffer;
- the application of the *Environmental Protection Act 1986* to, for example, a townsite within the Project Area but within the NT; and
- the Interim Water Allocation Plan (IWAP) for the Ord River.

The provision of water to the proposal is also being considered by the WA EPA and is not an issue for the NT Government to assess.

The WA Government released its second assessment report (Bulletin No. 1016) on 5 June 2001. An appeal period of 2 weeks followed this. To incorporate any changes that may affect the NT assessment, the release of this report was delayed until the WA appeal process was completed.

All documentation provided by the proponents, submissions made by both government agencies and the public, issues raised in the WA EPA workshop, and relevant appeal documents are the basis for this assessment report on environmental management.

1.3 Major Issues

The major environmental issues identified in relation to the environmental management of the proposed Ord River Irrigation Area Stage 2 development are:

- Buffer management.
- Surface water management.
- Groundwater management
- Environmental management structure and program.
- Chemical and pesticide management.
- Dust and particulate management.
- Greenhouse gas emissions.
- Social Impacts.

2 The Proposal

The M2 Project is located near Kununurra (see Figure 1), within the Victoria-Bonaparte Biogeographic Region. The Project Area extends over approximately 76,000 ha of land comprising the Weaber, Keep River and Knox Creek Plains, and involves approximately equal areas within WA and the NT.

The M2 project as outlined in the ERMP/draft EIS (Kinhill Pty Ltd 2000a) (see Figure 2) involved the following components:

- development of 30,500 ha for irrigated agriculture;

- the development of 3,000 ha for irrigation, drainage and flood protection infrastructure by the Water Corporation;
- the construction and development of a raw sugar mill by Wesfarmers-Marubeni with a capacity of approximately 400,000 tonnes per annum (tpa) of raw sugar and 160, 000 tpa of molasses;
- the management of 42,500 ha of land surrounding the farm land; and
- raw sugar and molasses storage and handling facilities at Wyndham.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 3 of the ERMP/draft EIS (Kinhill Pty Ltd, 2000b).

Lot numbers throughout the document refer to the plain on which they are located. W for Weaber, K for Keep and X for KnoX.

Table 1 - Summary of key proposal characteristics (Kinhill Pty Ltd, 2000b)

Element	Description	Amount
Land within the Project Area	<ul style="list-style-type: none"> • Project area • Land managed as a buffer • Land for irrigation development • Infrastructure 	<ul style="list-style-type: none"> • 76,000 ha* • 42,500 ha* • 30,500 ha* • 3,000 ha*
Land outside the Project Area	<ul style="list-style-type: none"> • M2 Channel (Lake Kununurra to Project Area) • Wyndham Port Facilities 	<ul style="list-style-type: none"> • 690 ha • 1 ha
Production	<ul style="list-style-type: none"> • Raw sugar • Molasses 	<ul style="list-style-type: none"> • 400,000 tpa • 160,000 tpa
Infrastructure (total area approx. 3000ha)	<ul style="list-style-type: none"> • Irrigation channels • Annual water requirement • Drains • Flood protection levees • Balancing storage dams (operating volume) • Roads • Power lines 	<ul style="list-style-type: none"> • 160 km* • 740 GL* • 153 km* • 142 km* • 5.6 GL • 161 km • 165 km
Wyndham Port	<ul style="list-style-type: none"> • Raw sugar store • Molasses store 	<ul style="list-style-type: none"> • 180,000t • 75,000t

Key:

* = approximate
 GL = Gigalitres
 km = kilometres
 ha = hectares
 tpa = tonnes per annum
 t = tonnes

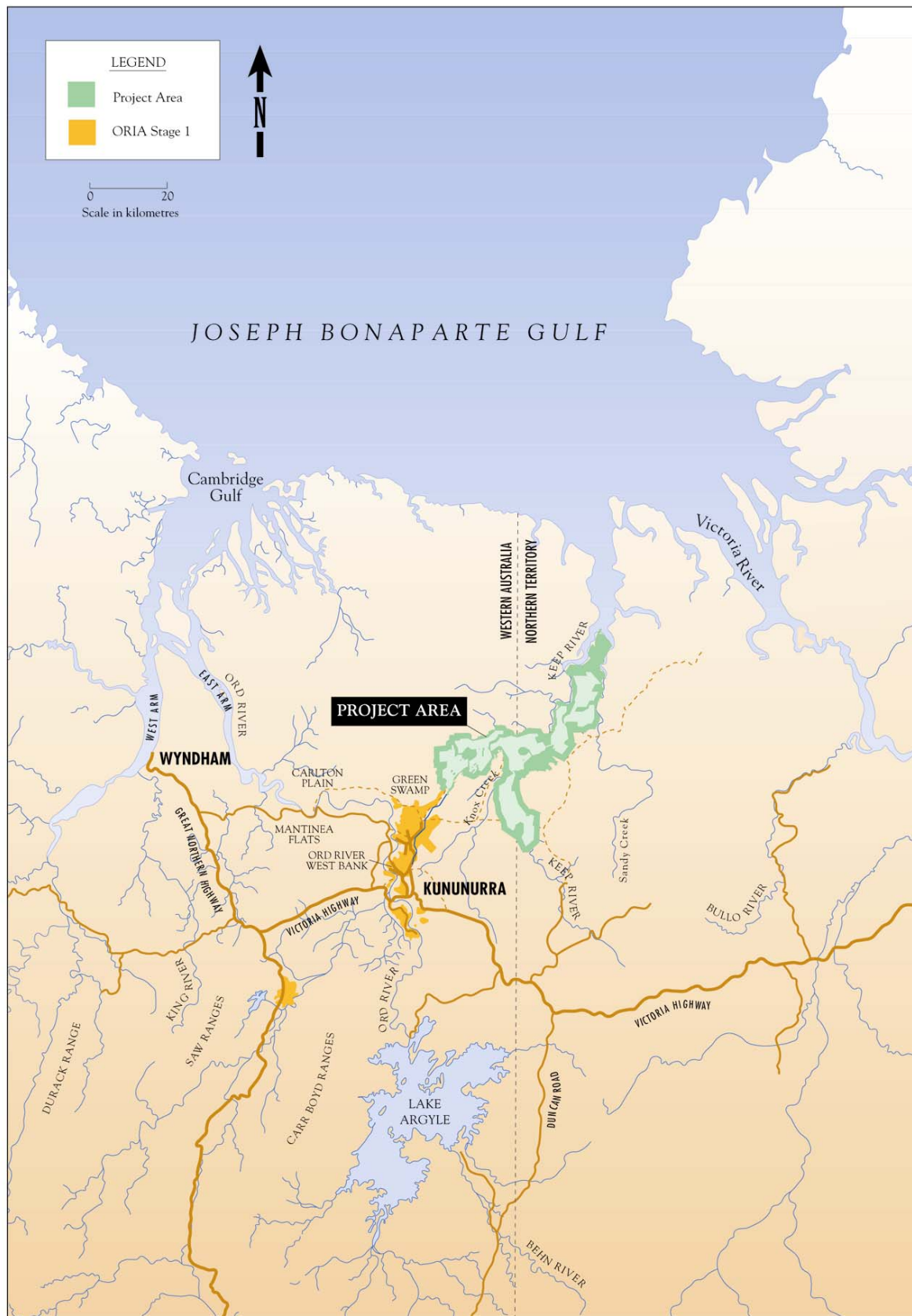
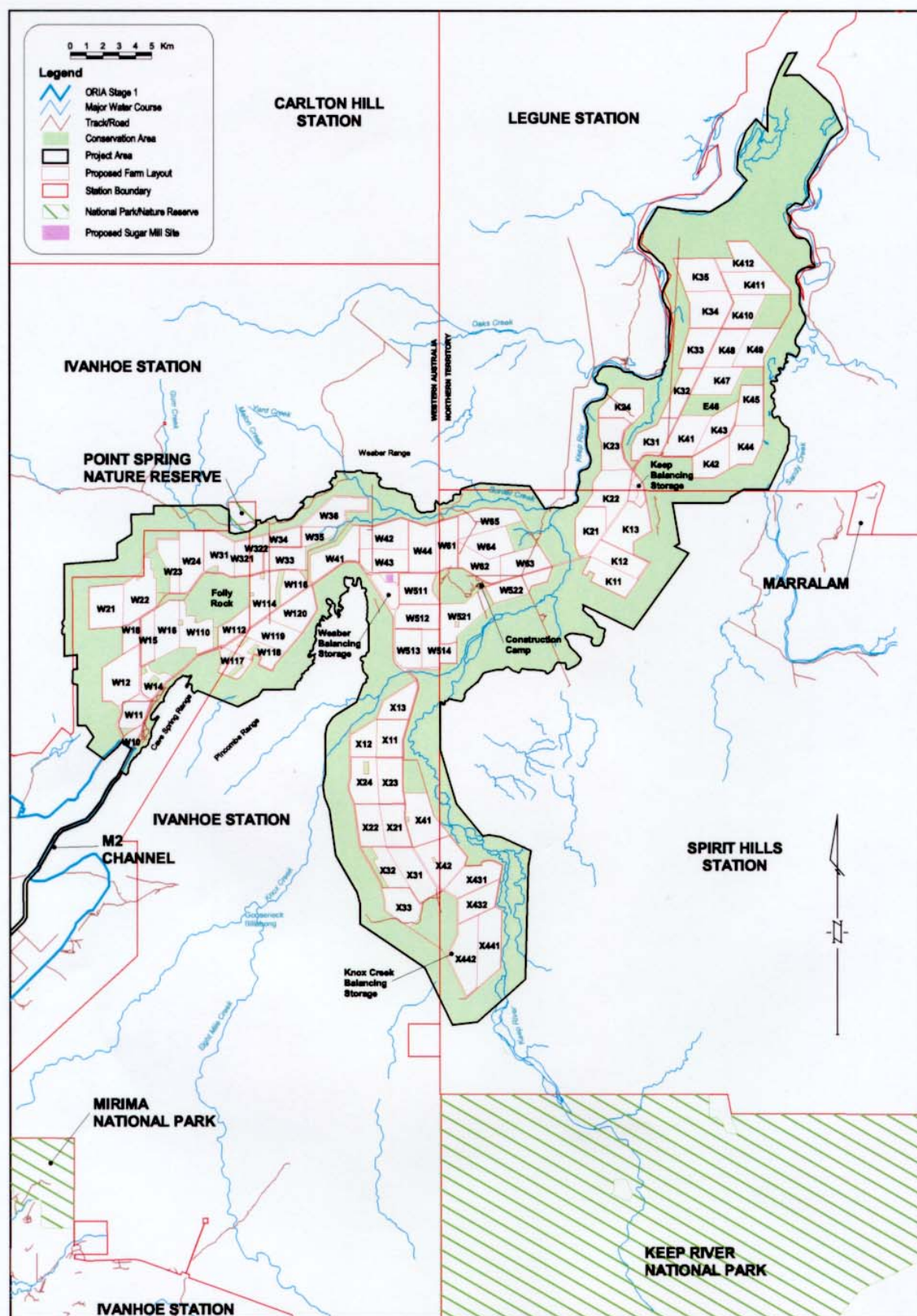
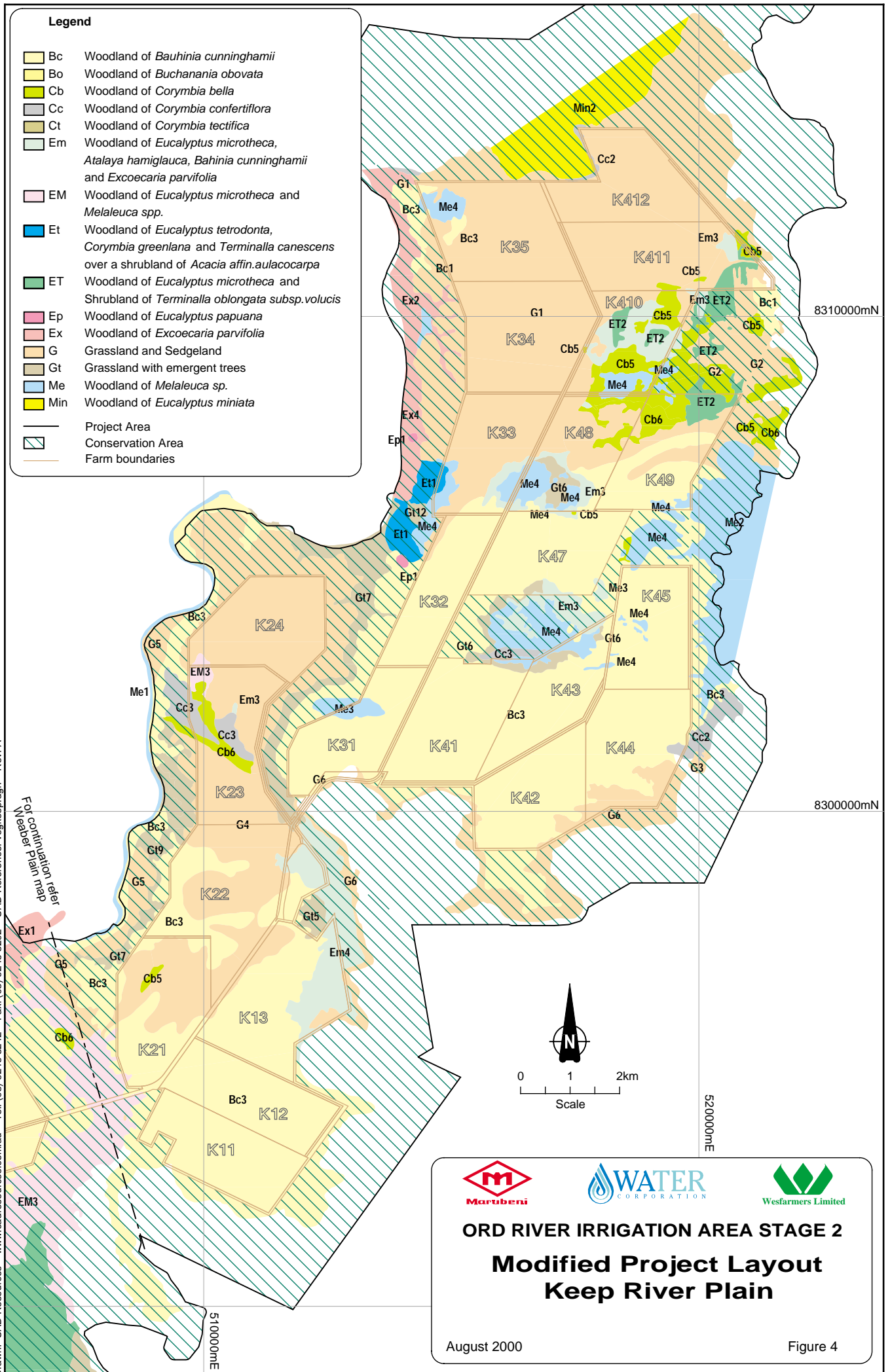


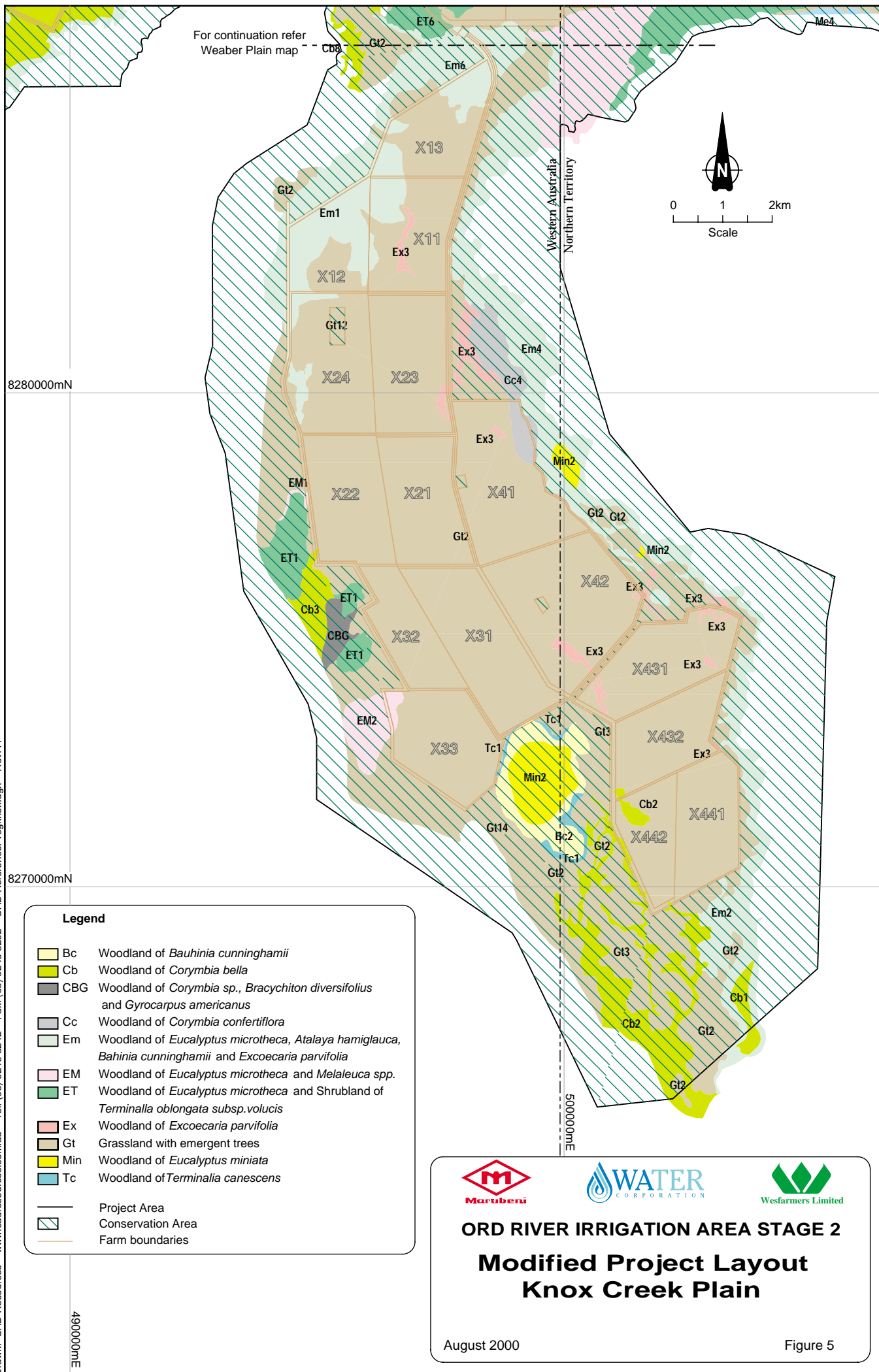
Figure 1: Overview of the Ord Region and Project Area (Kinhill Pty Ltd, 2000a)



Legend

- Bc Woodland of *Bauhinia cunninghamii*
- Bo Woodland of *Buchanania obovata*
- Cb Woodland of *Corymbia bella*
- Cc Woodland of *Corymbia confertiflora*
- Ct Woodland of *Corymbia tectifica*
- Em Woodland of *Eucalyptus microtheca*, *Atalaya hamiglauc*, *Bahinia cunninghamii* and *Excoecaria parvifolia*
- EM Woodland of *Eucalyptus microtheca* and *Melaleuca spp.*
- Et Woodland of *Eucalyptus tetrodonta*, *Corymbia greenlana* and *Terminalia canescens* over a shrubland of *Acacia affin. aulacocarpa*
- ET Woodland of *Eucalyptus microtheca* and Shrubland of *Terminalia oblongata subsp. volucis*
- Ep Woodland of *Eucalyptus papuana*
- Ex Woodland of *Excoecaria parvifolia*
- G Grassland and Sedgeland
- Gt Grassland with emergent trees
- Me Woodland of *Melaleuca sp.*
- Min Woodland of *Eucalyptus miniata*
- Project Area
- Conservation Area
- Farm boundaries





3 Environmental Impact Assessment

3.1 Introduction

The information provided in the draft EIS/ERMP has been assessed along with submissions from advisory bodies and the public, the response document to these submissions by the proponents, appeals on the two WA assessment reports, and further submissions made by the proponents to the WA EPA. This assessment determines the adequacy of the proposed design in relation to the environmental management of the project. Outcomes from the WA EPA workshop on biodiversity, and the follow-up workshop on environmental management have also been included in this assessment.

Assessment has been undertaken jointly between the DIPE and WA DEP. Recommendations made in this report generally reflect the recommendations and conditions provided in the WA assessment report to the WA Minister for Environment taking in consideration the appeals to both WA assessment reports.

It is important for interpretation purposes that the recommendations (in **bold**) are not considered in isolation, as the text identifies concerns, suggestions and undertakings associated with the project.

Subject to further decisions that permit the project to proceed, the primary recommendation of this assessment is:

Recommendation 1

The proponents shall ensure that the proposal is implemented in accordance with:

- **the environmental commitments and safeguards identified in the Ord River Irrigation Area Stage 2 draft Environmental Impact Statement as modified in the Supplement to the draft EIS; and**
- **as recommended in assessment report 34A and this report, and consolidated in Appendix B.**

3.2 Buffer Management

3.2.1 Description

The M2 project area is located within the Victoria-Bonaparte Biogeographic region and involves the clearing and development of significant areas of the Keep, Weaber and Knox plains. These floodplains are representative of the black soil floodplain ecosystems of the bioregion, which are unique in an Australian and global context.

In addressing the maintenance of regional biodiversity, the co-proponents have identified in the EIS/ERMP, areas to be set aside for protection from development. These areas include but are not limited to, the southern Keep River Plain, Folly Rock, Spirit Hills Homestead, the Keep River and riparian areas, and Milligan Lagoon.

The areas to be protected by the proponents are referred to as 'buffer areas'. These areas are not to be confused with areas proposed for conservation by the NT and WA Governments. These areas are referred to as 'conservation areas'.

Buffer areas have been designed to back onto undeveloped land where possible to minimise edge effects. To maintain ecological links to isolated buffer areas the proponents have incorporated corridors linking the buffer areas within the project to the edge of the project area.

Wherever possible natural boundaries were used for the buffer areas such as riparian zones, and transitions between floodplain and escarpment. A minimum buffer width of 1500m was also adopted to provide a reasonable tract of land for management of conservation and to absorb any chemical spray drift.

For a majority of the project boundary, the buffer area separates irrigated farmland from proposed conservation reserves. Proposed conservation reserve initiatives by the NT Office of Resource Development (NT ORD) and the WA Department of Resource Development (WA DRD) will add 3,098 km² to the conservation estate in the NT and 1,118 km² in WA. These initiatives are proposed to complement the efforts to maintain biodiversity in the region.

The reserves have been proposed by both governments to complement future Ord Stage 2 developments in relation to the conservation of biodiversity in the region.

3.2.2 Issues Raised in Submissions

A total of 66 submissions were received on the project. Key issues relating to management of the buffer area focused on:

- tenure, ownership and management of the buffer area;
- the affect on the buffer areas from farm practices (eg pesticides and altered fire regimes);
- the impact of groundwater rise on the values of the buffer area in the long-term;
- the fact that the co-proponents have proposed to manage some 40,000 ha of land as a buffer area to offset the clearing of approximately 35,000 ha of land;
- the integrity of the buffers, their use for infrastructure developments, future uses, weed incursion and management arrangements;
- traditional owners being able to have access to the buffer zone;
- the survival of the buffer areas as biodiverse areas;
- alternative proposals for the management, size and configuration of the proposed buffer areas which may arise from the Aboriginal Socio-Economic Impact Assessment (ASEIA); and
- government agency involvement in the management of the buffer areas.

3.2.3 Environmental Objectives

The following environmental objectives are taken from the EIS/ERMP guidelines and form the basis for this assessment.

- To maintain biological diversity meaning the different plants and animals and the ecosystems they form, at the levels of genetic diversity, species diversity and ecosystem diversity.
- To ensure impacts from the operation of the irrigated farmlands are contained as far as practicable within the development area.

3.2.4 Assessment

As part of the initial assessment on biodiversity (NT Assessment Report no. 34A, and WA Bulletin No. 988), changes to the project were made by the proponents to address concerns about the viability of various buffer areas, and the hydrology of Milligan Lagoon, Keep River and Border Creek.

The following modifications were made and are reflected in Figures 3, 4, and 5:

- increasing the buffer area on the Knox Creek Plain to include additional riparian vegetation by reducing the size of farm units X41, X431, X432 and X441;
- re-configuring levees to the north of farm X41, to the east of E410, east of E46 and east of farm W64 to enable natural flooding to occur;
- redesigning levee HDX1 to permit surface water ingress to Milligan Lagoon from the south west;
- developing a drainage corridor along the northern boundary of farm X432 to enable surface water flow between Milligan Lagoon and the Keep River;
- re-designing farm units W36 and W65 to reduce flow velocities and potential erosion effects along Border Creek;
- a commitment that all riparian vegetation within the Project Area will be preserved and protected within the buffer areas; and
- increasing the buffer area from 41,000 ha to 42,500 ha.

As one of the major objectives of the buffer area is to maintain biodiversity values of the region, management of the buffer area becomes an important part of the overall environmental management of the project.

The EIS/ERMP indicates that the priorities for management of the buffer area are to:

- protect listed and other significant species, including those protected under international agreements;
- preserve site or habitat-specific areas;
- sustain biological diversity in terms of species richness criteria;
- conserve genetic resources; and
- control erosion.

The long-term protection of these values will represent an ongoing and substantial commitment. This will apply regardless of a change of proponents or the crops being cultivated.

Although the EIS/ERMP suggests that sugar cane is the dominant crop in the short to medium term, and that this crop requires limited chemical input compared to other horticultural crops, there is no guarantee that sugar cane will continue to be farmed in the long term. Hence any buffer management measures will need to be robust enough to maintain buffer values through a range of differing farm uses and irrigation demands.

The major threats to the buffer area have been identified in the EIS/ERMP as:

- groundwater rise;
- salinity;
- erosion;

- weeds;
- fire; and
- chemicals.

The extent to which these require management across the project area will vary. Larger areas of buffer such as Folly Rock will be protected due to their size and nature. Narrower portions such as the linking corridors or isolated areas such as the ET4 vegetation community (refer to Assessment Report 34A) will be subject to a greater threat and will require more intensive management to survive.

Who will manage the buffer areas is an important issue. The EIS/ERMP indicates that the buffer areas will be managed by an Environmental Management Entity (EME), on behalf of the proponents. A Management Workshop in Darwin focused on this issue and the following outcomes were put forward:

- the buffer should be an asset of the co-proponents to ensure appropriate responsibility for management of the area;
- the role and purpose of the buffer area needs to be clearly defined;
- the objectives and priorities for buffer management need to be identified;
- the Buffer Management Plan should link in with the Keep River National Park Management Plan, which abuts the buffer, to ensure consistent management practices across both areas; and
- the NT Parks and Wildlife Service would be prepared to undertake the responsibilities of managing the buffer area under a contractual arrangement.

Determining the body that will manage the buffer areas is an important issue. Both the public submissions and outcomes from the Darwin workshop on Environmental Management highlight this. Ownership of the buffer is also important as this has implications for management. The NT and WA governments and the proponents are yet to resolve this issue. This will need to occur prior to development commencing and detailed design and planning being completed.

3.2.5 Recommendations

Due to the importance of the management of the buffer area in maintaining biodiversity within the region, and to ensure impacts from the operation of the irrigated farmlands are contained as far as practicable within the development area, a Buffer Management Plan should be prepared.

Recommendation 2

The proponents, prior to ground disturbing activities, should prepare a Buffer Management Plan for approval by the NT DIPE and WA DEP. This plan should cover the following issues:

- **tenure of the buffer area;**
- **the role and purpose of the buffer area;**
- **management objectives and priorities for the buffer area;**
- **management practices to apply to the buffer area;**
- **management of chemicals within or potentially affecting the buffer;**
- **the environmental values of the buffer area;**
- **methods to control human and vehicular access to environmentally sensitive portions of the buffer area;**
- **methods to minimise the impacts of construction activities;**
- **rehabilitation of disturbed portions of the buffer area; and**
- **responsibilities for the maintenance of the buffer area.**

To implement the Buffer Management Plan the issue of ownership/tenure of the buffer and the body who will undertake the Management needs to be resolved. This will need to be resolved prior to ground-disturbing activity.

Recommendation 3

The Northern Territory and Western Australian governments and the proponents should seek to resolve the issue of ownership/tenure of the buffer as a matter of urgency, and select a body to manage the buffer area according to the approved buffer management plan, prior to commencement of the project.

3.3 Water Management

3.3.1 Description

Water for the project area will be sourced from Lake Argyle via the Ord River to Lake Kununurra and then finally through a purpose built channel named the M2 Channel.

The project area is contained within the lower reaches of the Keep River and Sandy Creek catchments, which discharge into the Joseph Bonaparte Gulf. As a result there will be a transfer of water from the Ord River catchment into the Keep River catchment. No drainage from the project will re-enter the Ord River.

Underlying aquifers follow the Keep River and Sandy Creek for the length of the flood plain. These aquifers are open to the surface and hence will be influenced by the irrigation of the project area. Increased water infiltration to these aquifers will result in groundwater rise which will need to be managed.

Due to the strongly seasonal nature of the wet/dry season climate, irrigation water will only be required during the dry season as rainfalls are sufficient to maintain crop requirements in most wet seasons.

All irrigation water will be recycled within the farms to reduce water usage and to avoid discharge of potentially contaminated water offsite. This will be undertaken through a combination of:

- Providing appropriate volumes to meet crop requirements and expected evapotranspiration;
- Accession through the soil profile to groundwater; and
- Return to irrigation supply through a tailwater management system.

As irrigation will not be required in the wet season, the system will allow stormwater discharge from the development area into the waterways within the buffer area during the wet season.

The flood regime of the lower Keep, the Knox and Weaber Plains will be altered significantly by flood protection levees. This will create increased flow velocities within the lower Keep River, Sandy Creek and Border Creek and reduced flood durations due to the removal of significant areas of flood plain from the catchment. The EIS/ERMP indicates that the increased flows are not outside the normal distribution of flows for these watercourses.

Existing groundwater quality indicates varying levels of salinity as detailed in the EIS/ERMP:

- Groundwater of the Weaber Plain has a salinity range of 70mg/L to 2,600mg/L TDS.
- The salinity of groundwater of the Knox Creek Plain is generally around 1,000mg/L but can range from 60mg/L to 20,800mg/L TDS; and
- The groundwater salinity beneath the Keep River Plain varies between 100mg/L to 51,000mg/L TDS.

The supply water from Lake Kununurra is low in salinity at 160 mg/l TDS.

The catchments of the Keep River and Sandy Creek are relatively undeveloped, having been used only for pastoral purposes historically.

3.3.2 Issues Raised in Submissions

Key issues raised in submissions in relation to surface water management include:

- contaminants within the groundwater;
- discharge of groundwater into Border Creek and the Keep River;
- rising groundwater and salinity;
- environmental risks associated with elevated salinities on watercourses and related riparian ecosystems;
- lack of water quality baseline data for the Knox Creek Plain;
- the inability to design an effective monitoring programme, given the lack of baseline information available for water quality;
- management of groundwater levels and quality;
- water use and water disposal eg drainage and pumping are seen to be the primary management concerns;
- sustainability of irrigation in the long-term given the significant management requirement;
- the impact of Ord Stage 2 on water quality in the Keep River and downstream reaches in relation to nutrients, pesticides, herbicides etc;
- the example of the adverse impact of Ord Stage 1 on water quality within the Ord River;
- management of groundwater within the buffer area, especially zones 3 and 4;
- prevention of endosulphan migration to surface waters due to wet season thunderstorms;
- limited water quality data is available for the Keep River (particularly in relation to nutrients);

- the impact on ecosystems downstream from increased erosion rates and suspended solids in run-off during the monsoon;
- the effect of discharge water from groundwater dewatering bores into the receiving waters of the Keep River and Sandy Creek;
- adequacy of design criteria for drainage and flood protection under high flow conditions, eg setbacks, scouring protection, height and location of levees. How would water infrastructure cope with February 2000 flow events; and
- the EMP needs to include an early warning system for problems and a plan of action if it occurs. For example, if monitoring shows that groundwater is significantly contaminated with pesticides and nutrients and that this is damaging the environment – what action would need to be taken to rectify the situation.

3.3.3 Environmental Objectives

The following environmental objectives are taken from the EIS/ERMP guidelines and form the basis for this assessment.

- Maintain or improve the quality of surface water to ensure that existing and potential uses, including ecosystem maintenance, are protected.
- Maintain surface water so that existing and potential uses including ecosystem maintenance are protected.
- Maintain or improve the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance, are protected.
- Maintain groundwater so that existing and potential uses, including ecosystem maintenance are protected.

3.3.4 Assessment

With the development of land for irrigated agriculture, it is inevitable that surface water and groundwater qualities and quantities will be altered. Increased application on the surface will lead to rises in the water table below which can have impacts on salinity, and the infiltration capacity of the land during the wet season amongst other things. The removal of vegetation, the application of chemicals to aid agriculture, and the general operations of a farm and associated infrastructure, will have direct impacts on surface water quality and quantity. The need for active management to minimise the impacts is recognised and proposed by the proponents.

Due to the variable nature of the soils and salinity contents, active management may be required earlier in some areas than others.

The proponents have proposed the following design and active control methods for groundwater infiltration:

- the construction of irrigation channels with a clay lining to ensure the rate of infiltration is less than 2mm/day;
- locating the balancing storage dams on sites where the dominant surface soils are clays;
- designing drainage channels that are broad and shallow;
- the direct control of groundwater levels by the long term use of dewatering bores and, to a lesser extent, field drains;
- the discharge of extracted groundwater, collected by a network of buried pipelines, to the estuarine (tidal) sections of the Keep River and Sandy Creek; and

- a comprehensive monitoring programme for groundwater quality.

The issue of groundwater and surface water management was a major discussion point at the Management Workshop and the following key outcomes were put forward:

- the estuarine dynamics of the Keep River are largely unknown and hence a hydrodynamic study should be undertaken prior to final design. If the study indicates there may be a problem (eg minimal flushing) then changes should be incorporated into the design to correct it;
- arrangements for long-term maintenance of the levee bank system, in terms of legislation and how they will be managed will need to be determined;
- monitoring requirements will need to be restructured and details in relation to criteria, actions to be taken, etc will need to be negotiated as part of the EMP process; and
- monitoring should include the buffer area.

Water discharge drainage licences will be issued under the *NT Water Act* as any discharge from the project will enter waters under the control of the Northern Territory. These licences will stipulate monitoring and reporting requirements.

As the successful management of the buffer is an important aspect of the maintenance of regional biodiversity, hydrological management of the buffer should take precedence over farm hydrological management. This should be addressed appropriately in the EMP.

The proponents have committed to preparing and implementing a groundwater resources sub-plan during the operational phase of the developments. Due to the important implications of groundwater rise on not only the viability of crops, but the maintenance of the buffer area, the plan should be developed and approved prior to any ground disturbing activities. This plan will form part of the overall EMP for the project.

As mentioned above, the removal of vegetation, the application of chemicals to aid agriculture, and the general operations of a farm and associated infrastructure, will have direct impacts on surface water quality and quantity. The need for active management to minimise the impacts is recognised and proposed by the proponents. The proponents in the EIS/ERMP have indicated the following commitments in relation to surface water (see Appendix 2):

- develop a tailwater return system on all farms. The tailwater return systems would be designed in such a way as to also perform the function of first-flush stormwater collection systems, with the collected stormwater also being returned on-farm for use as irrigation water. Implementation of the tailwater system would also maximise retention of sediments on farm and reduce irrigation water runoff from the farms into the receiving aquatic environment;
- control soil erosion in the Project Area using a combination of management strategies including: controlling drainage by providing levee banks to prevent floodwaters entering the developed area; providing buffer zones on both sides of watercourses to allow riparian vegetation to continue to stabilise soils in these areas; and sizing and designing receiving drains to accommodate anticipated flow regimes;
- monitoring of erosion along all watercourses, including constructed drains would be undertaken and remedial measures would be taken on an as-needed basis;
- provide buffers between farms and water courses;
- adopt the AGWEST recommendations for on-farm management of endosulphan;

- undertake a comprehensive monitoring programme for the Keep River and Sandy Creek to include sampling for suspended solids, total dissolved salts, nutrients, insecticides, herbicides, turbidity, heavy metals, chlorophyll, dissolved oxygen, erosion and sedimentation and biological impacts;
- implement regimes of chemical and usage in terms of type, timing and method of application in accordance with the EMP;
- ensure that the quality of any water runoff from the Project Area is within national guideline values (in accordance with ANZECC guidelines) for the maintenance of aquatic ecosystems;
- apply pesticides in accordance with the annual spray calendar prepared for ORIA Stage 1;
- ban the use of endosulphan during the wet season (November-March) and at other times when the crop areas have free-standing water in either the furrows or tail drains; and
- control aquatic weeds in irrigation channels and balancing storage dams by a combination of mechanical weed removal and periodic dosing with acrolein and with treated irrigation water being retained on farm.

In relation to the expected increase in flood velocities along Border Creek, Sandy Creek and the Keep River, the proponents have recognised that this will lead to potential erosion problems at one particular point on Border Creek. The proponents have adjusted the farm boundaries proposed in the EIS/ERMP to address this. In addition a commitment has been made to further review the setbacks along watercourses during final design to reduce potential erosion problems.

The proponents have committed to preparing and implementing a surface water resources sub-plan during the operational phase of the developments. Due to the importance of surface water management throughout the construction as well as through operation, the plan should be developed and approved prior to any ground disturbing activities. This plan will form part of the overall EMP for the project.

The flood levees will play an important role in reducing flood damage to the project. The large amount of levee banks required to protect such a large project area will require extensive maintenance to ensure the levee bank system is operable. For such a length of levee banks, a systematic approach will have to be implemented, and a management plan should be detailed. The proponents should include this flood levee management plan (in terms of on-going maintenance) as part of the EMP.

3.3.5 Recommendations

Understanding the hydrodynamics of the Keep River, Border Creek and Sandy Creek is important to the overall environmental management of the site. Limited knowledge is available on the flushing characteristics of any of the watercourses to which the project will discharge. Discharge includes deliberate, accidental and incidental discharges which could all impact on these watercourses. It is important that these characteristics are known prior to any potential discharge from the project.

Recommendation 4

The proponents should prepare a Hydrodynamic Survey Plan as part of the Environmental Management Plan, prior to any drainage or intended discharge from the project area. This plan should include:

- **surveys of the flushing characteristics of the Keep River;**

- surveys of the flushing characteristics of Sandy Creek;
- surveys of the flow characteristics of Border Creek; and
- hydrodynamic investigations of the estuarine portion of the Keep River.

The proponents should commence implementation of the plan 5 months prior to any ground disturbing activities.

3.4 Environmental Management Structure and Program

3.4.1 Description

In the EIS/ERMP, the proponents have proposed that an Environmental Management Entity (EME) be established to undertake the operational aspects of ongoing environmental management on behalf of the project participants (farm owners, mill operators, etc).

Key features of the proposed EME include:

- the EME being wholly owned by the industry participants, including all three core industry participants (ie farmland owners, sugar mill owners and irrigation and drainage infrastructure owners);
- the EME managing environmental issues within the entire Project Area, on behalf of the industry participants;
- the EME being responsible for ongoing monitoring, analysis, and reporting on behalf of industry within the proposed development, however legal responsibility for environmental compliance would rest with the individual asset owners;
- the EME being the focal point for community input in relation to environmental issues in relation to the proposed development;
- the EME being resourced by the industry participants within the proposed development; and
- shareholder rights and obligations with respect to the EME being assigned to the asset, and to flow with any asset transfer.

It would be the responsibility of the EME to undertake the programs detailed in the Environmental Management Plan (EMP). This plan is to be completed by the proponents and approved by the NT DIPE and WA DEP prior to commencement of any works.

Appendix O of the EIS/ ERMP outlines a draft EMP. Within this draft EMP will be a series of sub plans which will be prepared, updated and implemented throughout the life of the project from construction to decommissioning. These sub-plans are listed in Table 1, Appendix 2 and include:

- environmental education and training
- legislation, policy and standards;
- records and information;
- Native Title;
- Cultural heritage;
- Aboriginal social impact;
- community issues;
- dust and particulates'
- mosquitoes and disease vectors;
- soil conservation;
- repair and restoration;
- soil chemical status;
- surface water resources;
- groundwater resources;
- fire;
- greenhouse gas emissions;
- native vegetation and fauna conservation;
- revegetation;
- weeds;
- plant pathogens and pest animals; and
- biodiversity and nature conservation.

Its important that the EMP is adaptable as well as subject to a thorough review process throughout the life of the project, during which time land ownership, crops and technology may change substantially.

3.4.2 Issues Raised in Submissions

Key issues raised in submissions in relation to the environmental management structure and program include:

Management Structure

- The EME has no previous experience in management of environmental issues including the buffer areas.
- The EME does not have the ability to protect conservation assets as the EME “would be wholly owned by the industry participants” and would manage the areas “on behalf of the industry participants”.
- The EME does not promote a shared responsibility for environmental management and does not allow for objectivity and impartiality.
- The constitution of the EME will change as new shareholders are included.
- The model of self-regulation is inappropriate as it does not assure compliance nor meeting commitments.
- The model of self regulation eliminates the Native Title Holders from the exercise of their spiritual duties to care for their lands under their traditional law and custom.
- The environmental management structure is not transparent, ie as landowners are the sole members of the EME there is no external accountability or review proposed.
- An independent person, community representatives and a representative of the Miriuwung and Gajerrong people should be on the Board of Directors of the EME.
- The ability of the EME to implement the EMP would be limited as the individual asset owners will have responsibility for compliance.
- Reporting of the EME needs to be a public document.
- There is a need to have an enforcement mechanism if individuals do not follow agreed practices.
- An independent body should be established with legislative powers to set limits of acceptable changes in water quality, environmental health, review the monitoring programme, and impose penalties for non-compliance.

Environmental Management Plan

- Information provided on the sugar mill is superficial.
- The results of the monitoring and revisions of the EMP should be subject to independent review.
- Aboriginal and local resident stakeholders have been excluded in the development of the EMP.
- The EMP is limited to compliance with legislative requirements rather than setting a framework to establish long-term actions to mitigate or control potential risks, and aiming for implementation of best practice environmental management.
- The outline EMP provides a good general coverage of the major issues.

3.4.3 Environmental Objectives

The following environmental objectives are taken from the EIS/ERMP guidelines and form the basis for this assessment.

Management Structure

The management of the proposal should be transparent, accountable, and credible, and responsibility for ensuring compliance with environmental conditions and commitments should be clear.

Environmental Management Plan

To ensure effective and transparent environmental management during project design and operation.

3.4.4 Assessment

It is the proponents' intention that the EME is the key structure for environmental management. This raises issues of accountability when the EME itself will not hold any legal environmental responsibility for the assets of the project whilst acting as the agent for the asset owners. This would become more complex when farms are down sold at a later date.

The preferred management structure arising as an outcome from the Management Workshop, is for a 'new' legal entity to be established with the EME becoming the service arm of that entity. This entity is envisaged to:

- collectively control all the assets on behalf of the owners;
- be legally responsible for the environmental management of the whole project; and
- hold the licences and environmental conditions for the sugar mill, farmers, buffer zone, and water infrastructure and development.

In addition to the above, workshop participants also considered that:

- the EME could undertake reporting to regulators on behalf of the new legal entity (as controller of the project assets);
- there should be independent members on the EME; and
- the EME needs to be transparent in its considerations and undertakings.

The proponents have indicated that the creation of such a legal entity may create legal and commercial impediments. While there may be difficulties with any structure, it is important that commercial arrangements do not detract from the effective delivery of management obligations and ensures compliance. Management structures should be explored further to achieve an acceptable framework, which provides clarity, transparency and responsibility for environmental management, as well as meeting reasonable commercial expectations.

The EMP will be fundamental in achieving best practice management across the whole of the Project Area and for the life of the project. The sub-plans proposed by the proponents cover a majority of the issues with the project, however the following additional sub-plans should be included:

- sugar mill and associated facilities;
- sodic soil management;
- chemical management;
- infrastructure maintenance.

The sodic soil management plan should include a constrained soils map to indicate where problem areas are likely to appear and where management may need to be directed at an earlier stage.

The EMP document should specify:

- environmental management measures, criteria and standards to be used to measure performance;
- remedial action to be undertaken;
- arrangements to ensure appropriate monitoring and minimal duplicate reporting;
- annual reporting of monitoring results to relevant agencies;
- annual reports to be publicly available;
- triennial reporting of monitoring results, interpretation of the results, remedial action and management implications; and
- triennial reporting to be peer reviewed and publicly available.

Another issue raised in the Management Workshop discussed the possibility of a financial performance guarantee being provided by the proponents. This guarantee would be designed to provide assurance of funds to meet management obligations should the proponents fail to do so through financial collapse.

Such a proposal would be subject to an Agreement Act and the Ord River Development Area Act. This Act will continue beyond the grant of freehold and would be an appropriate mechanism to require such a performance guarantee. The NT and WA governments should give consideration to this.

3.4.5 Recommendations

In order to manage the environmental impacts of the proposed project, and to fulfil the requirements of this report and the commitments made in the EIS/ERMP, the proponents will need to demonstrate that a suitable environmental management system is in place.

Recommendation 5

Prior to ground disturbing activities, the proponents should demonstrate to the satisfaction of the NT DIPE and WA DEP that there is in place an environmental management system which includes the following elements:

- **an environmental policy and corporate commitment to it;**
- **mechanisms and processes to ensure :**
 - **planning to meet environmental requirements;**
 - **implementation and operation of actions to meet environmental requirements;**
 - **measurement and evaluation of environmental performance.**
- **review and improvement of environmental outcomes; and**
- **nominate environmental management responsibilities.**

In combination with the environmental management system, an Environmental Management Plan will be required. This plan should include sub-plans as listed in Table 1, Appendix 2 and as listed below:

- sugar Mill and associated facilities;
- sodic soil management;
- chemical management;
- infrastructure maintenance.

The plans should specify:

- environmental management measures, criteria and standards to be used to measure performance;
- remedial action to be undertaken;
- arrangements to ensure appropriate monitoring and minimal duplicate reporting;
- annual reporting of monitoring results to relevant agencies;
- annual reports to be publicly available;
- triennial reporting of monitoring results, interpretation of the results, remedial action and management implications; and
- triennial reporting to be peer reviewed and publicly available.

Recommendation 6

The proponents should prepare an Environmental Management Plan to the satisfaction of the NT DIPE and WA DEP.

3.5 Chemical and Fertiliser Management.

3.5.1 Description

The Buffer area as described above has a dual purpose. It acts as a conservation zone for maintenance of biodiversity as well as a buffer for on farm chemical application to reduce spray drift out of the project area.

To minimise the potential for spray drift and possible deleterious effects on the buffer areas, the proponents have made the following commitments to the incorporation of chemical and fertiliser usage into the EMP. These restrictions would include:

- pesticide application in accordance with the annual spray calendar prepared for the ORIA;
- the use only of chemicals that are approved by the NT and WA Governments;
- the successful completion of training for farm staff required to spray chemicals;
- commercial spray operators being required to be fully accredited under a national standard;
- a ban on the use of endosulphan during the wet season (November to March) and at other times when the crop areas have free-standing water in either the furrows or tail drains system;
- application of any endosulphan to comply with recommendations from the National Registration Authority's Review of Endosulphan (1998);
- interim restrictions would require each application of endosulphan to receive prior approval from the EME, as well as monitoring of farm drains, tailwater return systems and drainage flows
- the minimisation of the use of aerial spraying, by using tractor-drawn boom sprays wherever possible;
- utilising technology that results in relatively large spray droplets being released close to the ground; and
- ongoing monitoring and reporting of the use of herbicides and pesticides.

The sub-plans for soil chemical status, surface water resources and groundwater resources also include reference to chemical and fertiliser regimes. These sub-plans will incorporate:

- the adoption of best management practices;
- data bases to document the application of chemicals;
- monitoring of any release into the surrounding environment, for example the buffer; and
- identification of management practices to minimise impacts resulting from contamination.

3.5.2 Issues Raised in Submissions

Key issues raised in submissions in relation to the environmental management structure and program include:

- There is a need for careful management and control of the use of herbicides and pesticides within the Project Area.
- Pesticide use for sugar cane is expected to be low.
- There will be a risk to aquatic ecosystems as a result of chemical applications to farmland.
- Endosulphan should be prevented from entering adjacent watercourses.
- The buffer width should be increased between the northern boundary of the Weaber Plain and Border Creek to provide additional protection to watercourses.
- The buffer area will be affected by chemical spray drift.

3.5.3 Environmental Objectives

The following environmental objective was taken from the EIS/ERMP guidelines and forms the basis for this assessment.

- Ensure that chemicals used in the Project Area do not adversely impact health, welfare and amenity of surrounding land users and the environment by meeting statutory requirements and acceptable standards.

3.5.4 Assessment

Given the importance of chemical management to the environmental management of the project, all aspects of chemical management should be brought together in a single plan under the Environmental Management Plan as well as within the sub plans as listed above. This may be seen as duplicating management practices, but it will facilitate clarity of management obligations and practices in relation to the environment.

The plan should also incorporate a chemical pathway analysis to provide an understanding of the fate of chemicals applied within the Project Area and their residues.

3.6 Dust and Particulate Management

3.6.1 Description

Ambient dust and particulate levels are likely to vary considerably with seasonal changes. Low levels would be expected during the wet season, while high levels of dust and smoke in particular would be prevalent towards the end of the dry season as wind strength increases and the landscape dries out.

The characteristics of the landscape will change dramatically under the proposal. Existing fire regimes will no longer be applicable for much of the project area. Instead the sporadic seasonal fires will be replaced with a periodic cropping and cane burning regime for those areas under cane production.

In relation to dust and particulate issues with the proposal, the following points have been taken into consideration:

- most of the construction works associated with the Project will be undertaken at least 30km from residential areas in and around Kununurra;
- in the first year of construction, works associated with the development of the M2 Channel will be required within 300m of Kununurra residences;
- localised sources of dust would result from vehicle movement on unsealed roads and stock movements;
- raw sugar and molasses would be transported from the mill to the port of Wyndham during the processing season via the existing sealed Kununurra-Wyndham Road;
- approximately 30 vehicle movements per day are anticipated for product transport from the Project Area to Wyndham;
- the main product storage facilities would be developed adjacent to the Wyndham wharf requiring reclamation of a portion of unvegetated mud flat; and
- a conveyor system would be developed to move raw sugar from the storage shed to the existing shiploader and a pressurised pipe would take molasses from the storage tank to the wharf.

3.6.2 Issues Raised in Submissions

Key issues raised in submissions in relation to the environmental management structure and program include:

- What dust reduction measures will be employed when the wind direction is such that residences are downwind of the construction area?
- The burning of cane has a detrimental effect on the environment.
- The sugar mill will require a works approval and/or licence under Part V of the *WA Environmental Protection Act*.

3.6.3 Environmental Objectives

The following environmental objective was taken from the EIS/ERMP guidelines and forms the basis for this assessment.

- Ensure that the dust levels generated by the proposal do not adversely affect welfare and amenity of surrounding land users or cause health problems by meeting statutory requirements and acceptable standards.

3.6.4 Assessment

Cane cropping and burning in ORIA Stage 1 has previously created complaints from Kununurra residents about smoke and cane ash fallout. The proposed ORIA Stage 2 site is further away from Kununurra and the EIS/ERMP indicates that prevailing winds will disperse smoke and ash away from the population areas for most of the harvesting period. However, the construction camp is proposed to be used long term as a township that will service the project area. Smoke and ash will become an issue for this township and will need to be managed.

Cane burning as a greenhouse issue has been addressed below.

The proponents have made the following commitments in relation to dust and particulate management:

- implement a dust monitoring programme as part of the EMP;
- minimise the effects of airborne dust on water quality in receiving waters;
- restrict construction activities to daylight hours; and
- notify local residents as to the nature and predicted duration of the activities.

3.6.5 Recommendations

It is considered that dust and particulate management has been sufficiently addressed in the EIS/ERMP. If the commitments made within the EIS/ERMP and consolidated within this report are adopted, dust and particulates generated by the proposal should not adversely affect welfare and amenity of surrounding land users or cause health problems.

3.7 Greenhouse Gas Emissions

3.7.1 Description

Carbon dioxide, methane and nitrous oxide are the 3 major greenhouse gases that will be emitted from the project. This will occur through the burning of cane crops, biological processes (decay etc.), and the operation of machinery requiring fossil fuels.

The EIS/ERMP indicates that the proposed development will release a significant amount of carbon dioxide, but as a whole claims that the project will be a net decrease in Australian greenhouse gas emissions. This is achieved through the carbon uptake in sugar cane growth.

An estimated carbon balance has been put forward in the EIS/ERMP and is included below.

Source/sink	Description	Greenhouse gases as carbon dioxide equivalent carbon* (t/a)			
		Carbon dioxide	Nitrous oxide	Methane	Total
Farmland	Destocking (removal of cattle)**			-300	-300
	Biological processes in crop and soil	128,000	40,800		169,600
	Crop burning	173,200	102,200	6,600	282,000
	Crop growth	-1,193,400			-1,193,400
	Assimilation of organic carbon in soils	-32,000			-32,000
Sugar mill	Bagasse and fuel oil	603,700			603,700
Machinery	On-farm (cultivation)	2,400			2,400
	Harvest	2,500			2,500
	Cane transport	1,000			1,000
	Sugar and molasses transport	1,600			1,600
Total		-312,200	143,000	6,300	-162,900

* Using a global warming potential of carbon dioxide = 1; nitrous oxide = 310, methane = 21.

** Shown as methane but actually a mixture of all gases, with global warming potential used by the data source for this item of carbon dioxide = 1; nitrous oxide = 270, methane = 11.

The EIS/ERMP indicates that the minimum carbon stored in the Project Area would increase following development of 35,000 ha of land, from about 19,500 tonnes to about 670,000 tonnes (CO₂ equivalent carbon) at full development. Most of the increase would be from the growth of sugarcane (including roots, trash and tops) during the dry season following progressive harvesting of the crop.

The estimate indicates that the magnitude of the reduction on an ongoing basis would be approximately 160,000 tonnes per annum of carbon dioxide equivalent carbon under full production.

3.7.2 Issues Raised in Submissions

Key issues raised in submissions in relation to the environmental management structure and program include:

- The ERMP fails to adequately address the source of greenhouse emissions resulting from the additional burning of bagasse produced as a result of the sugar mill.
- The existing sugar mill has difficulties in relation to its present bagasse load.
- Will burnt bagasse be recycled?
- Tree crops should be planted to reduce greenhouse gas emissions.
- The reasons given by the co-proponents in terms of why cane on the Ord will be burnt are unsatisfactory in view of greenhouse emissions and impact on air quality.

- The case for rejection of green harvesting and trash blanketing of sugar cane crops is not well made.
- The claim that the project will store carbon from the atmosphere through the farming of sugar is false.

3.7.3 Environmental Objectives

The following environmental objectives were taken from the EIS/ERMP guidelines and form the basis for this assessment.

- To minimise greenhouse gas emissions in absolute terms for the project and reduce emissions per unit product as low as reasonably practicable.
- To mitigate greenhouse gases emissions in accordance with the Framework Convention on Climate Change 1992, and in accordance with established Commonwealth and State policies.

3.7.4 Assessment

The Greenhouse gas emissions balance presented above looks only at the project specific emissions and does not include project establishment releases through land clearing and construction activities. The EIS/ERMP estimates that 19,500 tonnes of carbon will be released due to land clearing.

A majority of the carbon will be bound within the sugar created. This becomes an export of carbon from the project system, however on a global scale this will be released when the sugar is used. Hence at a project level the greenhouse gas emission balance will be negative, while on a global lifecycle the greenhouse gas emissions balance is more likely to be positive.

Concerns have been expressed in submissions in relation to the burning of cane instead of green harvesting. The proponents have indicated that the main reason for cane burning as the preferred method of cane harvesting is that the additional trash generated by the harvesting would clog irrigation channels unless it is burnt. In addition the proponents have indicated that although 60% of Queensland cane-growers used green harvesting techniques in 1997, less than 5% of cane crop in the Burdekin district of Queensland was green harvested. The Burdekin is irrigated as opposed to coastal crops, which rely on rainfall.

In their response to submissions the co-proponents also indicate that given the vigorous growth of sugarcane in the Ord Region and in many parts of Queensland and the implications of trash on irrigation practices, the burning of cane prior to harvest is essential.

Processing of sugar cane to produce raw sugar would utilise the bagasse by-product as the primary source of fuel. This will generate an estimated 604,000 tonnes per annum of carbon dioxide.

3.7.5 Recommendations

Based on the above, it is considered important that a Greenhouse Gas Emissions Management Plan be prepared and implemented as part of the EMP, to ensure that greenhouse gas emissions from the project are adequately identified and addressed. This management plan should include:

- calculation of the greenhouse gas emissions associated with the proposal, as indicated in “Minimising Greenhouse Gas Emissions, Guidance for the Assessment of Environmental Factors, No. 12” published by the WA EPA;
- specific measures to minimise the total net greenhouse gas emissions and/or the greenhouse gas emissions per unit of product associated with the proposal;
- monitoring of greenhouse gas emissions;
- estimation of the greenhouse gas efficiency of the project (per unit of product and/or other agreed performance indicators) and comparison with the efficiencies of other comparable projects producing a similar product;
- an analysis of the extent to which the proposal meets the requirements of the National Greenhouse Strategy;
- demonstrate the target of 25% reduction of greenhouse gas emissions from 1990 baselines consistent with the 1997 Kyoto Protocol; and
- a target set by the proponents for the reduction of total net greenhouse gas emissions and/or greenhouse gas emissions per unit of product over time, and annual reporting of progress made in achieving this target.

Further studies into the possibility of green harvesting of irrigated sugar cane should be undertaken and the possibility addressed in the EMP as an alternative to cane burning.

Recommendation 7

A Greenhouse Gas Emissions Management Plan should be prepared and implemented as part of the Environmental Management Plan.

3.8 Social Impacts

3.8.1 Description

The Project Area and land encompassing the Keep River catchment is of traditional and cultural significance to the Miriung and Gajerrong people, and is used for recreation purposes by residents and visitors.

The Project Area is subject to native title and land rights claims in the NT and WA (Kinchill, 2000, Figure 12.3). In November 1998, the Federal Court of Australia determined that the Miriung and Gajerrong people hold a range of native title rights to a portion of their traditional land covering approximately 7900 km², and included part of the township of Kununurra, Lake Argyle and Lake Kununurra, part of the Ord River Irrigation Area (including approximately 100km² of the Project Area) and the Argyle Diamond Mine.

This decision was appealed to the Full Court which upheld the trial judge’s findings of fact in relation to the connection of the present Miriung and Gajerrong community with the land claimed, and their connection with the Aboriginal people in occupation of the claim area at the time of sovereignty.

Aspects of the Full Court’s decision are currently being heard before the High Court.

A separate study of the social, cultural and economic impact of developments related to this project on Miriung and Gajerrong people is being conducted by the Aboriginal Representative

Bodies, with the support of the proponents in parallel to the EIS/ERMP. This study is yet to be completed.

To ensure that there is the opportunity for consideration of relevant Aboriginal issues by the public and assessors in a timely manner, the EIS guidelines stated that information from this study and other reports should be referred to in the draft EIS/ERMP. Additional relevant information should be published prior to the DIPE and the WA EPA reporting to their respective Ministers.

The Keep River also plays an important recreational role for Aboriginal and non-Aboriginal people. The Keep River is a popular destination for anglers, although access is limited at times due to the weather and pastoral activities. Given the importance of the Keep River for recreational and lifestyle purposes, the maintenance of access to the waterways is an important social impact issue. This is particularly true for the local Aboriginal community for whom access to the riverbanks and the water is of socio-cultural importance (Kinhill Pty Ltd, 2000).

The proponents have indicated in the EIS/ERMP that:

- access to locations on the Keep River within the buffer area would remain open with designated recreation sites for fishing and picnicking;
- access to the remainder of the buffer areas would be restricted to control erosion and weeds as well as to protect the regeneration of flora and fauna habitats; and
- recreational areas would be managed by the Environmental Management Entity.

Recreational visitation in and adjacent to the Project Area is currently focused on activities such as fishing and accessible locations, including the lower Keep River and Point Springs Nature Reserve. Access to these localities will be maintained and improved. This will lead to requirements for increased management of visitor sites.

3.8.2 Issues Raised in Submissions

Key issues raised in submissions in relation to the environmental management structure and program have focused on:

- the impact of Stage 2 on eco-tourism and recreational fisheries;
- access to the land for recreation;
- Stage 2 increasing the need for better sporting and recreational facilities;
- the superficial treatment of Aboriginal issues within the ERMP / draft EIS;
- the ERMP/ draft EIS failing to include indigenous interests;
- the need for the completion of the ASEIA as a pre-requisite for the assessment of the project and its consideration for approval;
- the ERMP/ draft EIS containing little information on socio-economic impacts of the project on Aboriginal people;
- the fact that there have been virtually no archaeological surveys of the WA portion of the project;
- the adverse affect on the cultural heritage values of the development area and adverse impact on the Miriuwung and Gajerrong people;
- the importance of the Keep River to the Native Title holders in religious and spiritual terms;
- the management of cultural heritage within the Project Area; and
- the importance of an Indigenous Land Use Agreement (ILUA) between the Miriuwung and Gajerrong people and the co-proponents.

Added to these submissions, the WA EPA met several times with representatives of the Miriung and Gajerrong people to assist the WA EPA in understanding what was important to them in terms of values, traditional use of the project area, perception of landscape and attitudes to the project.

In these discussions, the Miriung and Gajerrong people expressed the view to the WA EPA that:

- the M2 project will significantly change their country and this will effect the Miriung and Gajerrong people;
- for the M2 project to proceed, developers and government must consider and understand the significance and attachment of the land to the Miriung and Gajerrong people;
- the development must not affect sacred sites and ongoing traditional or cultural practices that are linked to the land;
- Ord Stage 2 will have similar affects to that of Ord Stage 1 in terms of reduced water quality, weed infestation, loss of access etc;
- environmental problems created by Ord Stage 1 must be dealt with before Ord Stage 2 can go ahead;
- the M2 project will have a bad affect on the Keep River;
- the Keep River is important for hunting and fishing;
- the Ord Stage 2 development will affect bush tucker resources, through clearing of land and the use of chemicals;
- more people in their country will push the Miriung and Gajerrong people out even further, and will prevent them from using their country the way they always have; and
- the development may cause problems for their people and their culture that have not been considered.

The Miriung and Gajerrong people also requested that they be given the opportunity by government to properly explain the significance to their people of the land in the Project Area and that they be given such an opportunity before a decision as to whether the project may be implemented is taken.

3.8.3 Environmental Objectives

The following environmental objectives were taken from the EIS/ERMP guidelines and form the basis for this assessment.

- Maintain or enhance recreational usage of the Project Area, consistent with plans developed by planning agencies.
- Ensure that changes to the biological and physical environment resulting from the project do not adversely affect cultural associations with the area.

3.8.4 Assessment

It is considered important that the Miriung and Gajerrong people's concerns and views are heard and that the results of the ASEIA and other related studies are incorporated in any environmental approvals given.

In relation to Ethnographic and archaeological surveys, it is noted that:

- There still has been no comprehensive ethnographic or archaeological assessment of the WA portion of the Project Area, encompassing the Weaber Plain and the Knox Creek Plain; and
- site-specific assessments have been undertaken by the Aboriginal Areas Protection Authority (AAPA) and the Heritage Conservation Branch of the DIPE (Gregory and Sutton, 1997) for the NT portion of the proposed footprint of the irrigable land contained within the Keep River Plain and Knox Creek Plain.

Based on the work undertaken by Gregory and Sutton the proponents have undertaken predictive modelling for the project area covering the WA portion of the project. Information from this modelling was combined with known archaeological and ethnographic sites, and the project layout adjusted accordingly. Added to this however, the proponents have made a commitment to undertake an archaeological and ethnographic assessment of the Project Area before construction to ensure protection of cultural heritage sites

In addition, the proponents have committed to develop and implement a Cultural Heritage Management Plan (CHMP) to the satisfaction of the Miriung and Gajerrong people and the findings of the combined cultural heritage assessments will define how the cultural heritage values within the Project Area will be protected and managed for the life of the Project.

Unfortunately, the ASEIA remains to be undertaken and that the terms of reference for the ASEIA have yet to be negotiated and agreed between the proponents and the Aboriginal Representative Bodies.

The EIS/ERMP provides insufficient information about the cultural significance and use of the terrestrial vegetation and habitats of the area to indigenous people.

Measures to maintain the recreational values within the Project Area have been detailed in the draft outline of the EMP (Appendix O of the EIS/ERMP). As part of this EMP, the proponents will establish a Recreation and Tourism Management Plan as a sub-plan to the Community Issues Management Plan to minimise disruptions to traffic, recreation and tourism and, where practicable, to allow for enhanced recreation and tourism of the Project Area.

Based on the above, it is considered that recreation can be managed in accordance with the proponents' commitments.

3.8.5 Recommendations

Based on the information available, it is considered that the Ord Stage 2 proposal, through development of the black soil plains for irrigable agriculture, is likely to result in:

- loss of access to traditional lands for cultural purposes;
- loss of the integrity of the cultural landscape;
- possible damage to sites of significance; and
- loss of biodiversity on traditional lands, bush tucker habitats and food species.

To minimise these factors, the outcomes of the ASEIA will need to be incorporated in final planning for the project.

Recommendation 8

Relevant outcomes from the ASEIA should be incorporated in the final project design prior to construction. The design, with appropriate amendments, should be forwarded to the NT DIPE and WA DEP for approval prior to construction.

4 Conclusion

It is considered that the environmental issues associated with the project have been adequately identified. Some of the issues have been resolved through this assessment process, while the remainder will be addressed through the Environmental Management Plan and the Aboriginal Socio-Economic Impact Assessment (ASEIA).

Initially, the commitments made in the EIS/ERMP and recommendations detailed in this Assessment Report and Assessment Report 34A will form the basis for the proponents management and monitoring commitments. The Environmental Management Plan will be a working document for the operation of the area and will require continual review and updating in the light of operational experience and changed circumstances.

In addition, the project will require licensing under the NT *Water Act*, and the WA *Environmental Protection Act* 1986. The project will be required to comply with any licence conditions as well as regulations set down by these acts.

Provided that the environmental commitments and safeguards detailed in the EIS/ERMP are implemented, the recommendations in this Assessment Report and Assessment Report 34A are adopted and periodic reviews and reporting are undertaken as required, long term environmental impacts should be minimised.

5 References

ANZECC (1992) *Australian Water Quality Guidelines for Fresh and Marine Waters*, Australian and New Zealand Environment and Conservation Council.

Barber and Palmer, 1996. Native Title Claim to the Keep River National Park, Anthropologist's report on behalf of the Native Title Claimants. Northern Land Council.

Beckwith & Associates (1997) *Ord River Irrigation Area Stage 2 Expansion Social Impact Assessment*, prepared for Sinclair Knight Merz, Perth, Western Australia.

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Department of Resources Development (WA) and The Northern Territory Office of Resource Development (February 2000) *Ord River Irrigation Area Stage 2, Proposed Regional Biodiversity Conservation Initiatives*, Submission to the Environmental Protection Authority of Western Australia.

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Kinhill Pty Ltd (2000a) *Environmental Review and Management Programme / Draft Environmental Impact Statement, Ord River Irrigation Area Stage 2, Proposed Development of the M2 Area, Main Report*, prepared for Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and Water Corporation of Western Australia, Perth, WA.

Kinhill Pty Ltd (2000b) *Responses to Public Submissions*, prepared for Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and Water Corporation of Western Australia, Perth, WA.

Parks and Wildlife Commission of the Northern Territory (undated) *Northern, Territory Parks Masterplan "Towards a Secure Future"*, Darwin, NT.

Wesfarmers Sugar Pty Ltd, Marubeni Corporation and Water Corporation of Western Australia (August 2000) *Responses to Public Submissions, Supplementary Commitments, Supplement to the Draft Environmental Impact Statement*, Perth, Western Australia.

Appendix A

Summary of WA EPA Workshop on Biodiversity

29 July 2000

In view of the significant biodiversity implications of the M2 project, the WA EPA convened a one-day workshop comprising technical experts, government agencies and the proponents' representatives.

The workshop was held on 29 July and an outcome statement arising from the workshop was generated. A wide range of views and opinions were expressed by attendees, however, a clear understanding and appreciation of the workshop discussion could only be obtained by being present.

Questions addressed as part of the Outcome Statement of the Workshop were based on the WA EPA's guidelines, and Table 4 provides a summation of conclusions arising from discussions.

Table 4: Summary of Conclusions arising from the Biodiversity Workshop

Question	Workshop Response
Will biodiversity be unacceptably impacted?	<ul style="list-style-type: none"> • There were no specific risks of species extinction. • The level of survey was not adequate to identify all possible risks to extinction with certainty, particularly in relation to species in areas subject to inundation and watercourses.
Does the proponent need to change the proposal?	<ul style="list-style-type: none"> • Black soil reservation was a critical issue. • Concern expressed in relation to the small amount of black soil proposed to be held in reserved areas. • Concern expressed in relation to edge effects resulting from the long linear boundary between the farmland and the buffer area around the development.
If there is a change to the proposal, are there any additional impacts?	<ul style="list-style-type: none"> • There were no specific changes to the proposal put forward at the workshop and no changes to the proposal were recommended as an outcome of the workshop. • Black soil areas could be increased by allocating one or more production blocks (farm units) to conservation purposes. The engineering design of the M2 area would not need to be altered to achieve this.
Is there any additional information or survey work required?	<ul style="list-style-type: none"> • Additional survey work is required including: <ul style="list-style-type: none"> • a survey to determine that lizard and frog species which occur within the project area also occur elsewhere; • identification of down-stream impacts on migratory bird species that are the subject of international treaties. This would include identifying impacts from the proposal on Keep River outflows and tidal coastal areas; and • the possible effects of drainage and rising water table on aquatic flora and fauna species. • On-farm retention of water would minimise impacts, but in the absence of exhaustive surveys of aquatic species, there is the possibility of adverse impact.
Are the proposed Government's regional biodiversity conservation initiatives adequate?	<ul style="list-style-type: none"> • The adequacy of proposed regional biodiversity conservation initiatives is an issue for government to resolve. • Setting aside areas for conservation reserves and national parks is a lengthy and involved process. • It would be desirable to set aside a larger discrete area of black soil. • The project would not preclude the establishment of a comprehensive adequate and representative reserve for the region.
Under what conditions should the project proceed?	<ul style="list-style-type: none"> • Management arrangements by the Environmental Management Entity and ongoing auditing are vital. • These arrangements would need to be addressed in any conditions of approval placed on the project. • Concern expressed as to whether the buffer area around the farm units gave adequate protection of biodiversity of black soil areas. This could be improved and additional reservation of black soil areas would improve biodiversity.

Not all attendees to the workshop agreed with all of these conclusions. However, the WA EPA found the discussion very constructive and assisted it in the formulation of its view on the proposal.

Appendix B
Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and Water
Corporation of Western Australia
Environmental Management Commitments

March 2001

Summary of key commitments relating to environmental management

No.	Relevant ERMP/EIS Section	Commitment	Timing	Responsibility	Objective	Action	Further consultation	Compliance Criteria
Environmental Management System								
1	Appendix O	An environmental management system (EMS) conforming to the requirements of the AS/NZ ISO 14000 series of standards would be developed for the project. The EMS would have the following key components: <ul style="list-style-type: none"> organisational commitment; environmental policy; environmental aspects and impacts register; regulatory and legal compliance register; objectives and performance indicators; environmental management program documentation (ie EMP); operational and emergency procedures; responsibility and reporting structure; training and awareness program; environmental performance reviews, audits, monitoring and measurement. 	Before construction, construction and operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Develop a framework for environmental management.	As committed.	DEP and DIPE.	Requirements of AS/NZ ISO 14000 series of standards.
2	3.2.4, Appendix O	An Environmental Management Plan (EMP) would be prepared for the Project. The EMP would consist of a series of sub-plans as indicated in Table 1. The sub-plans would be prepared, updated, approved and implemented in a progressive basis as required for the various stages of Project development in accordance with Table 1. The EMP will contain provisions to review monitoring data and to modify management measures as appropriate.	Before construction, construction and operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Provide management plan to guide environmental management.	As committed.	Public scoping of EMP in consultation with DEP and DIPE.	To satisfaction of DEP and DIPE
Native Title								
3	12.5.8	Best endeavours would be made to resolve native title issues by way of a negotiated settlement, preferably an Indigenous Land Use Agreement.	Before construction.	Wesfarmers–Marubeni, the Water Corporation.	Ensure protection where possible of any Native Title rights.	As committed.	Aboriginal Representative Bodies, the Miriuwung and Gajerrong people and relevant Government agencies.	In accordance with the Native Title Act 1993.

	Cultural Heritage							
4	12.5.3	Archaeological and ethnographic assessments of the Project Area would be undertaken.	Before construction.	Wesfarmers-Marubeni and the Water Corporation	Ensure protection of cultural heritage sites.	As committed.	Aboriginal Representative Bodies, the Miriung and Gajerrong people, AAPA, the HCB and the AAD.	In accordance with the <i>Aboriginal Heritage Act 1972</i> , the <i>Northern Territory Sacred Sites Act 1995</i> , the <i>Heritage Conservation Act 1996</i> , and the <i>Aboriginal and Torres Strait Islander Protection Act 1984</i> .
5	12.5.3	Cultural Heritage Protection Procedures would be established and implemented.	Before construction, construction and operation.	Wesfarmers-Marubeni and the Water Corporation	Ensure protection of cultural heritage sites.	By providing the procedures to all contractors.	Aboriginal Representative Bodies, the Miriung and Gajerrong people, AAPA, HCB and AAD.	To satisfaction of the Miriung and Gajerrong people, the AAPA, the HCB and the AAD.
6	12.5.3	A Cultural Heritage Management Plan would be developed and implemented.	Before construction, construction and operation.	Wesfarmers-Marubeni, the Water Corporation and Environmental Management Entity.	Ensure protection of cultural heritage sites.	By involving the Aboriginal Representative Bodies and Miriung and Gajerrong people.	Aboriginal Representative Bodies, the Miriung and Gajerrong people, AAPA, the HCB and the AAD.	To satisfaction of the Miriung and Gajerrong people, the AAPA, the HCB and the AAD.

	Aboriginal Social Impact							
7	12.3	Regular meetings would be held with Miriuwung and Gajerrong people.	Before construction, during construction and operation.	Wesfarmers-Marubeni, the Water Corporation and Environmental Management Entity.	Ensure people are informed about the Project and to provide a venue for feedback.	By regular meetings.	Aboriginal Representative Bodies and the Miriuwung and Gajerrong people.	To satisfaction of the Miriuwung and Gajerrong people, the EPA and DIPE.
8	12.6.2	An Aboriginal Socio-Economic Impact Assessment would be completed.	Before construction.	Wesfarmers-Marubeni and the Water Corporation	To ensure that the Miriuwung and Gajerrong view of the Project is understood and reflected in the final Project design.	By involving the Miriuwung and Gajerrong and Aboriginal representative Bodies.	Aboriginal Representative Bodies and the Miriuwung and Gajerrong people.	To satisfaction of the Miriuwung and Gajerrong people, the EPA and DIPE.
	Community Issues							
9	14.1.3	Management action would be taken in conjunction with the proposed development to reduce the risk of increased infection with arboviruses. These actions would concentrate upon the following activities: <ul style="list-style-type: none"> designing and operating the Project so as to reduce the potential for increased mosquito-breeding activity; implementing education programmes for the Project's construction and operational workforce on measures that could be taken to reduce their personal risk of infection; extending the existing monitoring programmes to cover the Project Area. 	Before construction, construction and operation.	Wesfarmers–Marubeni and the Water Corporation (to end of construction), Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation (thereafter).	Reduce risk of infection through lower mosquito numbers and public awareness.	As committed.	Health Departments (WA) and (NT).	–
10	13.3.2	Burning of cleared vegetation would be managed to occur at times when prevailing winds would direct smoke and ash away from residential areas.	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Avoid nuisance from smoke and ash fallout.	By including requirements into construction contracts and monitor.	CALM and PWS.	–
11	13.6	Construction activities would be restricted to daylight hours for all activities within 500 m of an existing residence. All occupiers of residences within 1 km of construction activities would be advised of the nature and duration of the activities planned, and well in advance of construction commencing.	Construction.	Wesfarmers-Marubeni and the Water Corporation.	Avoid nuisance to existing residents.	By incorporating requirements into construction contracts and monitoring.	Occupiers of residences within 1 km of construction works.	Noise abatement regulations.

12	13.2	A dust monitoring programme would be established as part of the EMP and administered throughout the construction and operational phases of the Project, using dust deposit gauges that comply with <i>AS 3580.10.1—1991</i> . Periodic dust monitoring would also be undertaken using portable monitors.	Construction and Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Provide data for management.	As committed.	DEP and DIPE.	–
13	11.5.1	Signs would be erected at strategic locations throughout the Project Area to advise travellers that access to pastoral leases is restricted.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Avoid unwanted visitors to pastoral leases.	By erection of signs.	Local pastoralists.	–

	Soil conservation, Repair and restoration							
14	3.10	Borrow pits would be selected in accordance with Aboriginal cultural and heritage considerations of the land and operated as far as practicable with a view to minimising erosion, damage to surrounding vegetation and visual impact. Once construction is completed, areas no longer required would be rehabilitated by a combination of contouring, slope stabilisation, topsoil spreading and seeding.	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Achieve appropriate rehabilitation.	By including requirement in construction contracts and monitoring.	Miriuwung and Gajerrong people, CALM, DIPE and the Shire of Wyndham — East Kimberley.	To satisfaction of CALM and DIPE.
15	4.5.2, 10.5.2	Soil erosion in the Project Area would be controlled by a combination of the following management strategies: <ul style="list-style-type: none"> • staging vegetation clearance so that areas are cleared only as required; • controlling drainage by providing levee banks to prevent floodwaters entering the developed area; • grading of land on farms so as to minimise stormwater runoff velocities; • sizing and designing receiving drains to accommodate anticipated flow regimes; • providing buffer zones on both sides of watercourses to allow riparian vegetation to continue to stabilise soils in these areas; • rehabilitating disturbed areas as soon as possible following disturbance during construction; • formulating and implementing appropriate rehabilitation plans and programmes including topsoil stripping and stockpiling, land preparation, and reseeded with local native species to facilitate regeneration of disturbed areas. 	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Minimise soil erosion.	By including rehabilitation requirements and plans in construction contracts and monitoring.	Commissioner of Soil and Land Conservation (WA) and DIPE.	To satisfaction of Commissioner of Soil and Land Conservation (WA) and DIPE.
16	10.5.6	Rehabilitation of any sites disturbed during development would be undertaken progressively using topsoil and seed species collected from the Project Area. Monitoring of the success of rehabilitation would be undertaken.	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Effective rehabilitation of disturbed sites.	By including requirements in construction contracts and monitoring.	Miriuwung Gajerrong people, CALM and DIPE.	To satisfaction of Miriuwung Gajerrong people, CALM and DIPE.
17	10.5.7	A seed collection programme would be undertaken before vegetation is cleared. Only seeds of plant species endemic to the Project Area would be used in revegetation projects.	Construction.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Effective rehabilitation of disturbed sites.	Seed collection and use in rehabilitation projects.	Miriuwung Gajerrong people, CALM and DIPE.	To satisfaction of Miriuwung Gajerrong people, CALM and DIPE.

	Soil Chemical Status							
18	4.5.4	Long-term monitoring would be undertaken to ascertain any changes to surface and subsoil salinity and soil chemical status, including sodicity.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni and independent farmers.	Avoid significant increases in subsoil salinity and sodicity levels.	Monitor sodium adsorption ratio, ESP, and electrical conductivity levels. Advise farmers of optimal watering strategies.	AGWEST.	Target sub-soil ESP of 15.
	Surface Water Resources							
19	5.3.1, 5.4.1	Complete further analysis of predicted water velocity regime and stability of soils along the lower 20km of Border Creek	Before construction	Wesfarmers Marubeni and the Water Corporation	To ensure erosion effects in and around Border Creek are not significant	By implementing appropriate design	WRC and DIPE	To satisfaction of WRC and DIPE
20	5.4.1	Appropriate erosion protection measures such as stone pitching and bridge abutments would be developed in localised areas of high water velocity and implemented.	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Minimise erosion of watercourses.	By implementing protective measures at watercourse crossings.	–	To satisfaction of Commissioner of Soil and Land Conservation (WA) and DIPE.
21	5.5.1	Sedimentation effects would be managed by: <ul style="list-style-type: none"> • wherever practicable, restricting ground-disturbing operations to the dry season; • restricting ground-disturbing operations to the minimum area required to facilitate construction; • collecting and storing for future use any topsoil from areas to be disturbed; • installing and maintaining temporary sediment traps downstream of any areas to be disturbed; • progressive clearing, developing and rehabilitating, wherever possible using locally won topsoil, of any areas that are no longer going to be disturbed. 	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Minimise sediment load to receiving waters.	By incorporating requirements into construction contracts and monitoring.	Commissioner of Soil and Land Conservation (WA) and DIPE.	To satisfaction of Commissioner of Soil, Land Conservation (WA) and DIPE.

22	3.3.2, 4.5.3	All farms in the Project Area would be developed with irrigation tailwater management systems. The volume of tailwater dams in these systems would be optimised during detailed design with the objective being to minimise discharges of irrigation tailwater during the dry season. As a minimum, the tailwater dam capacity would be sufficient to provide first-flush stormwater retention capacity of 12 mm of rainfall runoff for sugarcane farms, and 25 mm of rainfall runoff from other farms. Farm maintenance would include regular desilting of these drains and return of the collected material to the cropped area.	Construction and Operation.	Wesfarmers–Marubeni and independent farmers.	Minimise water pollution.	By constructing, operating and maintaining the tailwater return system.	–	Quality (suspended solids) of drainage waters to be in natural range of Keep River.
23	3.4.2, 5.6.1	Regimes of chemical and fertiliser usage, in terms of type, timing and method of application would be incorporated into the EMP to be developed for the Project Area. These restrictions would as a minimum include: <ul style="list-style-type: none"> • pesticide application in accordance with the annual spray calendar prepared for the ORIA; • the use only of chemicals that are approved by the Governments of Western Australia and the Northern Territory; • the successful completion of training for farm staff required to spray chemicals; • commercial spray operators being required to be fully accredited under a national standards system; • a ban on the use of endosulphan during the wet season (November to March) and at other times when the crop areas have free-standing water in either the furrows or tail drains; • application of any endosulphan to comply with NRA review recommendations. • interim restrictions would require each application of endosulphan to receive prior approval from the Environmental Management Entity, as well as monitoring of farm drains, tailwater return systems and drainage flows. 	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Minimise use of pesticides. Manage endosulphan levels in receiving waters to below guideline levels.	By incorporating into EMP and implementing.	AGWEST.	NRA recommendations and National Standards.
24	5.4.1	Monitoring of erosion along all watercourses, including constructed drains, would be undertaken and remedial measures would be undertaken on an as-needed basis.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Minimise erosion of water courses.	By monitoring and implementing remedial measures as needed.		

25	5.1005.1	Fertilisers or chemicals would not be applied to cropped areas when the first-flush basin capacity is not available.	Operation.	Wesfarmers–Marubeni and independent farmers.	Minimise water pollution.	Only apply fertilisers and pesticides when first flush basin capacity available.		Nutrients within natural range for receiving waters. Pesticides within national guidelines to maintain aquatic ecosystems in receiving waters.
26	5.5.2	Effects of any spray drift would be minimised by: <ul style="list-style-type: none"> • minimisation of the use of aerial spraying, by using tractor-based spraying to the maximum extent possible; • avoidance of unsuitable weather conditions such as surface temperature inversions and unstable conditions during aerial spraying whenever possible; • utilisation of a larger droplet size settings for spray equipment during aerial spraying; 	Operation.	Wesfarmers–Marubeni and independent farmers.	Minimise pesticide levels in receiving waters.	By incorporating requirements into EMP and implementing.	AGWEST.	National guideline values for pesticides for maintenance of aquatic ecosystems.
27	5.5.2	Effects of airborne dust on water quality in receiving waters would be minimised by: <ul style="list-style-type: none"> • provision of dedicated on-farm access tracks that would not have agricultural chemicals applied directly to them; • wherever possible, adoption of ‘minimum tillage’ farming practices. 	Operation.	Wesfarmers–Marubeni and independent farmers.	Minimise spread of pesticides by minimising dust.	As committed.	AGWEST.	National guideline values for pesticides for maintenance of aquatic ecosystems.

28	5.5.4	<p>Aquatic weeds in the irrigation channels and balancing storage dams would be controlled by a combination of mechanical weed removal and periodic dosing with a chemical such as acrolein. Chemical dosing would be in accordance with best-practice procedures as outlined below:</p> <ul style="list-style-type: none"> emptying the channel, locking offtakes, erecting warning signage and notifying farmers prior to injection of the chemical; releasing a known flow of water to obtain a water depth of approximately 0.5 m into the channel and releasing the chemical from a controllable release point to maintain an initial concentration (15 ppm in the case of acrolein); releasing a marker dye to denote the chemical front; shutting flow to the channel and holding the chemical in the channel for a minimum of forty-eight hours before diluting by release of additional water and use of the water for irrigation; monitoring the watercourses downstream of the Project Area for acrolein and if detected, review the above procedure in conjunction with the Water and Rivers Commission and the DIPE. 	Operation.	Water Corporation.	Manage chemical use and minimise discharges to receiving waters.	By incorporating requirements into EMP and implementing.	WRC and DIPE.	National guideline values for maintenance of aquatic ecosystems.
29	14.2.4	Rapid assessment of the placement deposit patterns in the field following spray operations would be implemented by the proposed Environmental Management Entity to monitor spraying operations within the Project Area.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Provide data for management.	By incorporating requirements into EMP and implementing.	DEP and DIPE.	–
	Groundwater Resources							
30	2.4.2	Engineering design standards for all irrigation channels and regulating storage's intended to convey or store water for prolonged periods would be adopted to restrict seepage to a maximum of 2mm/d.	Before construction.	Water Corporation.	Minimise accessions.	By implementing appropriate design, material selection and construction method and monitor.	–	Maximum seepage rate of 2 mm/d.

31	3.5.2	Incorporate wider, shallower drains than were built in ORIA Stage 1. Where deeper drains are required, the excavated surface of the drain would be compacted to minimise seepage.	Construction.	Water Corporation.	Minimise groundwater accessions.	By implementing design and construction standards and monitoring.	–	–
32	6.5.5	Groundwater delineation drilling across the interpreted position of the palaeochannel aquifers would be implemented in order to define the position of aquifers beneath the irrigation area. An extensive network of groundwater monitoring bores would be installed within and adjacent to the irrigation area prior to the commencement of irrigation. This network would include bore transects aligned perpendicular to the Keep River and Sandy Creek to acquire additional data in relation to the river–groundwater interactions, as well as the establishment of monitoring bores adjacent to Milligan Lagoon. Groundwater samples would be collected during the delineation drilling to quantify the vertical and horizontal water quality distribution.	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Confirm parameters adopted for groundwater modelling.	Conduct further groundwater monitoring.	WRC and DIPE.	To satisfaction of WRC and DIPE.
33	2.4.2	Groundwater levels would be controlled via the utilisation of bores and subsoil drains if necessary.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Minimise impacts on proposed land use.	By use of bores and subsoil drains.	WRC and DIPE.	–
34	2.4.2	A comprehensive monitoring programme for groundwater levels and quality, and use of the collected data to modify management practices would be practiced.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Monitor groundwater levels.	By regular monitoring of observation wells.	WRC and DIPE.	WRC and DIPE.

35	6.5.5	Test dewatering bores would be installed to confirm aquifer yields and the response of the aquifers to pumping. The data collected from the groundwater monitoring programme would be used to continually update the groundwater model and to optimise the extent and timing of installation of the groundwater management system.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Optimise groundwater management.	Install and operate test bores.	WRC and DIPE.	To satisfaction of WRC and DIPE.
36	14.2.4	Groundwater would be tested on a regular basis for all chemicals used in the Project Area to ensure compliance with national drinking water quality guidelines.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Ensure safe drinking water supplies.	As committed.	WRC and DIPE.	National guidelines for drinking water.
37	6.5.5	The quality of groundwater adjacent to watercourses would be monitored. The groundwater pumping strategy would include provision for the capture of additional groundwater adjacent to the watercourses if considered necessary.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Maintain health of riparian vegetation.	Monitor groundwater adjacent to watercourse and implement control measures of needed.	WRC and DIPE.	To satisfaction of WRC and DIPE.
Fire								
38	10.5.2	A fire control strategy and plan would be developed for the farms and for the proposed conservation areas. This would include monitoring areas to determine the need for burning.	Before construction.	Wesfarmers–Marubeni and the Water Corporation.	Develop appropriate fire management practices	Be developing a fire control strategy and plan and including it in the EMP.	CALM and PWS.	To satisfaction of CALM and PWS.
Native Vegetation and Fauna Conservation								
39	10.5.2	To limit any potential for over clearing, all areas designated for construction works would be clearly marked on development maps and on the ground prior to commencement of works.	Before construction.	Wesfarmers–Marubeni and the Water Corporation.	Limit any potential for over clearing and improve environmental awareness.	As committed.	–	–

40	10.5.1	Permanent monitoring sites for flora, fauna and biodiversity would be established in conservation areas, along ecological corridors and in selected sites in the Project Area. Monitoring would be undertaken on a regular basis with the monitoring parameters clearly defined following consultation with the staff of CALM and the PWS.	Before construction and operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Monitor flora, fauna and biodiversity.	By incorporating requirements into the EMP and implementing.	CALM and PWS.	To satisfaction of CALM and PWS
41	3.10	In areas where reserve widths are significantly greater than those required for construction, only the sections necessary for construction and future maintenance purposes would be cleared.	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Avoid excessive clearing.	By including requirement in construction contracts and monitoring.	–	–
Weeds, Plant pathogens and pest animals								
42	10.5.3	All construction machinery would be cleaned of soil and other organic debris prior to being transported to the Project Area. If borrow is required, it would be obtained from surveyed weed-free sites.	Construction.	Wesfarmers–Marubeni and the Water Corporation.	Minimise potential for introduction of weeds to Project Area.	As committed.	AGWEST, CALM and DIPE.	To satisfaction of AGWEST and DIPE.s
43	10.5.5	People would be discouraged from taking dogs and cats into the conservation areas.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Minimise potential for feral pests.	By erection of signs.	–	–
44	11.4.4	Access to the Keep River within the Conservation Area, for recreational purposes, would remain open at designated recreation sites. Access to the remainder of the conservation area would be restricted.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Control erosion and weeds.	By providing designated recreation sites and control access.	Miriuwung Gajerrong people and local recreation groups.	To satisfaction of Miriuwung Gajerrong people and local recreation groups.

	Biodiversity and Nature Conservation							
45	10.2.2	All undeveloped land in the Project Area would be managed for conservation.	Before construction, construction and operation	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Management of a world-class broad-scale agricultural development, with integral conservation areas, in accordance with Australia's ESD and biodiversity policies.	Establish conservation areas and manage in accordance with the EMP.	CALM and PWS	-
46	10.3.5	Redesign Farms W511, W65, K31, X442, W36, W41, X41, X431, X432, X441, W11, W12, W14, W110, K41 and the M2N irrigation channel	Before construction	Wesfarmers Marubeni and the Water Corporation	To ensure adequate conservation of vegetation associations ET4, Ct1, Me3, Cc1, Gt3, Em8, Em7, Gt2, ET5, Ct2, Cb9, Bc3, Gt6 and Gt8.	By implementing appropriate design	-	To the satisfaction of the DEP
47	2.4.2, 10.3.5	Reconfigure the design of the Keep River balancing storage	Before construction	Water Corporation	To ensure adequate conservation of vegetation association Gt5	By implementing appropriate design	-	-
48	10.3.5	Confirm the location of vegetation associations G1 and G4 outside of the Project Area	Before construction	Wesfarmers Marubeni and the Water Corporation	To ensure adequate conservation of vegetation associations G1 and G4	By implementing appropriate survey work	-	-
49	10.3.5	Redesign Farms W11, W12, W14, W36 and the M2N irrigation channel; and confirm the location of vegetation association Em9 outside of the Project Area	Before construction	Wesfarmers Marubeni and the Water Corporation	To ensure adequate conservation of vegetation association Em9	By implementing appropriate design and survey work	-	-

50	5.5.2, 10.3.3	Redesign boundaries to Farms X41, X431, X432, and X441	Before construction	Wesfarmers Marubeni and the Water Corporation	To ensure conservation of all riparian vegetation, and adequate setback of the developed area from natural watercourses	By implementing appropriate design	-	-
51	10.3	Redesign flood protection levees east of Farm X23, east of Farm W64, and east of conservation areas E46 and E410	Before construction	Wesfarmers Marubeni and the Water Corporation	To ensure the inundation of the conservation areas by natural flooding, and associated drainage	By implementing appropriate design	-	-
52	5.3.1, 6.5.3	Redesign flood protection HDX1 and design a drainage corridor through Farm X432	Before construction	Water Corporation	To ensure minimal hydrological impact on Milligan Lagoon	By implementing appropriate design	WRC and DIPE	To satisfaction of WRC and DIPE
53	9	Complete an additional biological survey of the Keep River in the vicinity of the Project Area	Before construction	Wesfarmers Marubeni and the Water Corporation	To confirm current predictive models, and provide additional baseline data for inclusion in the EMP	By implementing survey work	DEP and DIPE.	To the satisfaction of DEP and DIPE.
54	10.5.2	All contractors and consultants would be required to participate in a formal environmental and cultural heritage induction programme on the importance of the natural and social environment.	Construction	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Improve environmental awareness	Incorporate into site induction.	–	–

	Other							
55	16.4.2	An entity would be established to shoulder the operational aspects of ongoing environmental management in relation to the proposed development on behalf of the industry participants. The proposed entity, or Environmental Management Entity (EME), would be owned by the industry participants, and would provide environmental management services to the owners. The EME would be formed prior to the commencement of any development works associated with the proposed development.	Before construction.	Wesfarmers–Marubeni and the Water Corporation.	Establish an entity to provide environmental services to the owners.	As committed.	–	–
56	3.7.3	Emissions from the boiler would be passed through a scrubber to achieve a maximum particulate discharge of 32 kg/h from the 40 m high chimney. Bagasse firing would be a complete combustion process with excess oxygen available at all times.	Operation.	Wesfarmers–Marubeni.	Avoid air and water pollution.	By implementing design and construction standards and monitoring.	DEP.	National standards for emissions from stationary sources.
57	16.6	The results and interpretation of the monitoring implemented by the EME would be reported on an annual basis on behalf of the industry participants. The annual report would detail actual environmental performance against the environmental performance targets detailed in the EMP, and would be made readily available to the industry participants. The annual report would also be made available to relevant government agencies and possibly other organisations and community interest groups.	Operation.	Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation.	Provide ready identification of compliance by the industry with the EMP.	Prepare annual reports and make available to industry participants and relevant government agencies.	EPA, and DIPE.	–

Table 1 **Scope of EMP (as outlined in Appendix O of ERMP/draft EIS) and timing of sub-plans**

EMP Sub-plan	Timing of implementation		
	Before Construction (design)	Construction	Operation
Environmental education and training		√	√
Legislation, policy and standards	√	√	√
Records and information	√	√	√
Native title	√	√	√
Cultural Heritage	√	√	√
Aboriginal social impact	√	√	√
Community issues		√	√
Dust and particulates		√	√
Mosquito and disease vectors *	√	√	√
Soil conservation, repair and restoration		√	
Soil chemical status			√
Surface water resources		√	
Groundwater resources			√
Fire			√
Greenhouse gas emissions*			√
Native vegetation and fauna conservation	√	√	√
Revegetation		√	√
Weeds, plant pathogens and pest animals		√	√
Biodiversity and nature conservation	√	√	√

* *Additional to sub-plans in Appendix O of the ERMP/draft EIS.*

Appendix C

List of Respondents to the draft EIS/ERMP

State/Territory/Local Government

- Agriculture Western Australia
- CSIRO Land and Water
- Western Australian Department of Conservation and Land Management
- Western Australian Department of Environmental Protection – Air Quality Management Branch
- Western Australian Department of Environmental Protection – Licensing Branch
- Western Australian Department of Environmental Protection – Conservation Branch
- Western Australian Department of Primary Industry and Fisheries
- Western Australian Department of Resources Development
- Environment Australia
- Main Roads, Western Australia
- Northern Territory Government
- Shire of Wyndham-East Kimberley
- Western Australian Water and Rivers Commission
- Western Australian Museum

Organisations

- Aboriginal Legal Service of Western Australia (Inc.)
- Australian Cotton Cooperative Research Centre
- Bardena Farms Pty Ltd
- Care of the Ord Valley Environment (COVE)
- Conservation Council of Western Australia Inc
- Ecological Society of Australia Inc
- Kununurra Chamber of Commerce
- Miriuwung & Gajerrong Families Heritage & Land Council
- Northern and Kimberley Land Councils
- Ord River District Co-Operative
- The Environment Centre NT Inc
- Whelans Survey and Mapping Group

Individuals

- Mark and Sharon Albers
- Josephine Bedetti
- R B Dessert III
- Spike and Kae Dessert
- Barbara Dickey
- Stewart Dobson

- Dr Michael Douglas
- Robyn Ellison
- Bruce Ellison
- Warren Ford
- Richard Foster
- Dr H. G. Gardiner
- Jane and Greg Harman
- Jim and Judy Hughes
- Lindsay and Ann Innes
- Geoff Johns
- Barbara Johnson
- Rob Kelly
- Stuart and Libuse Lauder
- Jim and Julie Leach
- Grant Lodge
- Peter McCosker
- K. G McNair
- Patricia Muirson
- Ruth O'Connor
- Chris Robinson
- Frank Rodriguez
- Michael Smith
- Darryl Smith
- Paul and Elisabeth Stewart
- Kirsten Stoldt
- Andrew Trezona
- C Turner
- K Turner
- Dr N Uren
- Bruce Vandersee
- Allan Wedderburn

Plus two confidential submissions