Oaklands Ethanol Production Facility Environmental Assessment Report

Final Report

for Agri Energy Limited

June 2007

0056132

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Approved by:	*Fiona van der Hoeven*
Position:	Project Manager
Signed:	
Date:	*27 June, 2007*
Approved by:	*Andrew Cook*
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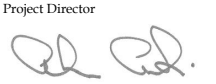
Signed:	
Date:	*27 June, 2007*

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FINAL REPORT

Agri Energy Limited

Oaklands Ethanol Production Facility

Environmental Assessment Report

June 2007

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SUBMISSION OF ENVIRONMENTAL ASSESSMENT

prepared under Part 3A of the Environmental Planning and Assessment Act 1979

EA PREPARED BY

Names:	***Fiona van der Hoeven***	***Andrew Cook***
Qualifications:	***Bachelor of Arts (Hons)*** ***Masters of Town Planning***	
Address:	*Building C, 33 Saunders Street* *Pyrmont* *NSW 2009*	

PROJECT PLAN APPLICATION

Applicant name:	*Agri Energy Limited*
Applicant address:	*Como Office Tower, Level 9, 644 Chapel Street* *South Yarra 3141* *Victoria*
Land to be developed:	*Property description of land to be developed is contained in the EA.*
Proposed development:	*Project approval is sought for the development of an ethanol production facility at Oaklands New South Wales. The ethanol production facility will be capable of producing 200 megalitres (Ml) annually and will include several holding dams, an effluent treatment facility and an irrigation area.*

ENVIRONMENTAL ASSESSMENT

☑ *An EA is attached which addresses all matters listed under Part 3A of the Environmental Planning and Assessment Act 1979.*

CERTIFICATE

I certify that I have prepared the contents of this EA and to the best of my knowledge:

- *it contains all available information that is relevant to the environmental assessment of the development to which the EA relates; and*
- *it is true in all material particulars and does not, by its presentation or omission of information, materially mislead.*

Signature:

Name:	*Fiona van der Hoeven*	*Andrew Cook*
Date:	*27 June 2007*	*27 June 2007*

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EXECUTIVE SUMMARY

PROPOSAL AND INTRODUCTION

Agri Energy Limited (AEL) seeks project approval for the development of an ethanol production facility at Oaklands, New South Wales (NSW), under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). The proposal will have a development cost in excess of $30 million and is therefore a 'major project' to which Part 3A of the EP&A Act applies. As such, it will be determined by the Minister for Planning.

The ethanol production facility will be capable of producing 200 megalitres (Ml) annually and will include several holding dams, grain storage bunkers, a wastewater treatment facility and an irrigation area which will be irrigated with process wastewater as part of a wastewater recycling scheme. The plant will operate 24 hours per day, seven days a week. It will be capable of processing a range of locally grown cereal grains, including wheat, corn, sorghum and barley. The ethanol to be produced by the plant will be a fuel blend stock which is planned to help meet market demands for ethanol blended fuel in Melbourne. The co-products of the ethanol production process are wet distillers grain and solubles (WDGS) and dried distillers grain with solubles (DDGS) which are sold as stockfeed and are in high demand in feedlots, dairies and piggeries. The facility can be serviced by offtakes from existing utilities (electricity, telecommunications and potable town water supply) and plant raw water needs will be met by pumping from the Murray River via the nearby O'Dwyer Main Channel.

The project aims to realise the environmental, economic and performance benefits of ethanol blended fuel and take advantage of the cereal grain resource within the Murray region of NSW. It has been based on an extensive assessment of the environmental context of the site as well as market considerations relating to the availability of source crops, the ethanol product and the co-products of WDGS and DDGS. The forecasted increase in demand for ethanol blended fuel and growth of the ethanol industry in general indicates that there is likely to be a strong market for the product. Direct and indirect employment and industry contributions will be beneficial to the Oaklands and greater Murray Region.

Environmental Resources Management Australia Pty Ltd has been engaged by AEL to undertake an Environmental Assessment for the construction and operation of the ethanol production facility. This document is the main Environmental Assessment Report and has been prepared in accordance with the requirements of the EP&A Act, the Environmental Planning and Assessment Regulation 2000 and the requirements of the Director-General of the Department of Planning issued 5 October 2006. It describes the proposal, the environmental implications associated with the key issues of the proposed development and identifies subsequent management or mitigation measures. Technical reports that were prepared as part of the Environmental Assessment are submitted with the project application as supporting documents.

SITE SETTING

The site of the proposed ethanol production facility is accessed from Coreen Street at a point approximately 350 metres (m) north-east of Oaklands and 615 kilometres (km) south-west of Sydney, in the Murray region of NSW. The site is within a relatively flat, rural area and comprises agricultural cropping land with sparse scattered stands of native trees along the eastern and western property boundaries. Land dedicated for the disused Oaklands – The Rock Railway line runs through the site. An irrigation channel, O'Dwyer Main Channel is located approximately 2.2km west of the site and Nowranie Creek is approximately 700m to the north. There are scattered rural residences in the area and Oaklands township is adjacent to the south-western site boundary. The location of the site in a rural setting in proximity to water supply, infrastructure, major transportation corridors and grain supply is well suited to development of an ethanol production facility.

The site is within the Rural 1(a) zone in the Urana Local Environmental Plan 1990. The proposed development is permissible in the Rural 1(a) zone.

KEY ENVIRONMENTAL ISSUES

Assessment Approach

The assessment of the project has involved input from a range of disciplines including engineering, heritage, water, acoustics, planning, risk, air, traffic, ecology and socio-economics. It addressed issues identified during the consultation process. Technical reports were prepared which investigated the environmental implications of the project and provided mitigation and management measures.

Construction

Construction works are predicted to last for 14 to 16 months. Potential impacts of construction activities predominately relate to nuisance-related dust generation, erosion and movement of sediment laden runoff from excavated or disturbed areas, potentially contaminating fuel or chemical spills, minor noise level criteria exceedences at the two nearby residences, Oaklands Central School and a recreational oval on some days of construction, construction-related traffic and the visual impact of construction equipment and materials. These impacts will be short term in nature and can be managed by adherence to a Construction Environmental Management Plan developed for the project. Potential construction impacts upon ecology are discussed below.

Surface Water Management

Site raw water needs will be met by extraction of an average 6.567Ml of water from the Murray River per day via O'Dwyer Main Channel under a 'high security' water licence sought from the Department of Natural Resources. It will be pumped via a new pump station and subsurface pipeline to one of two 200Ml raw water dams. Sizing of the two raw water dams provides a contingency supply of approximately 60 days at full production which will cater for water supply between May and August when O'Dwyer Main Channel is closed for maintenance and repair. An additional 1.54Ml of water per day will be provided to the plant by the recycling of process wastewater. Water for use in the ethanol production facility will not impact on other local water users as it will be drawn from O'Dwyer Main Channel in association with licence conditions. Provision of potable water (approximately 3.8 kilolitres per day on average) via a connection to the main Oaklands reticulated water supply is not expected to place significant demands on Oakland's water supply.

The proposed water management system has been designed to maximise recycling and beneficial use of site water. All water used within the ethanol production process will be either recycled for further use within the plant following treatment, pumped to an effluent dam for use for irrigation, or diverted to a salt evaporation system. The effluent dam will be sized to limit the allowable frequency of uncontrolled discharge (which would inevitably occur as a result of prolonged rainfall events) to i in 4 years i.e. the 75th percentile rainfall event, in accordance with NSW Department of Environment and Conservation (DEC) (2004b) Environmental Guidelines: Use of Effluent by Irrigation. Modelling indicates that no leaching or soil accumulation of nutrients is predicted to occur from irrigation. To avoid potential impacts and ensure sustainable use of the wastewater, a detailed irrigation plan will be developed prior to commencement of irrigation and following a full analysis soil infiltration rates and hydraulic conductivity of the irrigation area.

The proposed wastewater management system ensures no discharges of plant wastewater or stormwater from the site up to the 75th percentile rainfall event. Hence no adverse impacts to receiving waters and associated flora and fauna are expected to result from discharges of wastewater or potentially contaminated runoff.

The site is not expected to be subject to flooding and the development is not expected to impact flood behaviour in areas surrounding the site.

Air Quality and Odour

Air quality dispersion modelling results found predicted ground level concentrations at sensitive receptors and where applicable, at the site boundary, to be well below the relevant NSW DEC criteria for toxicity based pollutants, odorous pollutants and carbon monoxide, sulphur dioxide, nitrogen dioxide, total suspended particulate and particulate matter less than 10 micron. Predicted ground level concentrations for odour at these locations are below the nominated NSW DEC criteria of 3.0 odour units. Preliminary calculations of contaminant concentrations at the proposed emission points were all below the design criteria given in the Protection of the Environment Operations (Clean Air) Regulation 2002. Pollution control equipment is included in the plant design to minimise emissions and mitigation measures will be implemented to control particulate and odour emissions.

Greenhouse Gas Assessment

A number of studies indicate that the production and use of ethanol as a fuel reduces overall greenhouse emissions when compared to the use of petroleum based fuels. A Life Cycle Assessment for greenhouse gas emissions associated with the proposal has been undertaken and includes assessment of Scope 1 direct emissions and Scope 2 and Scope 3 indirect emissions in accordance with the Australian Greenhouse Office Workbook. It accounts for emissions at all stages from on-farm grain production to the processing of raw materials to tailpipe emissions associated with the end product. After allocation of emissions to co-products (DDGS), emissions for the plant were calculated to be in the order of 294kt CO_2 equivalent emissions per annum (1.5kg/L), equivalent to 0.087% of the total CO_2 emissions in Australia for 2002.

AEL have developed a Greenhouse Gas Abatement Plan, which targets a reduction in greenhouse gas emissions to at least 10% (29,000 tonnes CO_2 emissions) below the estimated 2009 level by 2013.

Noise

The only identified exceedence of DEC's noise criteria for operation of the facility under calm weather conditions was an exceedence of up to two decibels during the day-time and night-time at two nearby residences, one of which is abandoned. Noise levels under strong inversion conditions and adverse wind conditions are predicted to exceed the relevant criteria at four nearby residences by between one and seven decibels. The criteria exceedences are primarily due to noise from the two hammermills, trucks and front end loaders. The trucks and front end loaders will not operate from 10pm to 6am and so noise levels drop during the night. Mitigation of noise from the highest contributing noise sources will ensure operational noise complies with DEC criteria of 35dB(A)$L_{eq,\ 15min}$ at all times during the night-time 10pm to 6am period and does not exceed 35-41dB(A)$L_{eq,\ 15min}$ during the day and 6am to 7am night-time shoulder period at all residences. No sleep disturbance due to the operation of the proposed facility is expected. Traffic noise levels will increase on Daysdale Street, however will remain below relevant DEC criteria.

Traffic and Transport

During peak times, the facility is predicted to generate 426 trips per day (213 vehicles), 346 of which will be heavy vehicles. The increase in traffic would occur along roads currently utilised by heavy vehicle traffic. The predicted additional traffic volumes will not cause any affected road to exceed its potential daily traffic capacity of 3,000 to 5,000 vehicles per day as defined by Austroads (1988). All heavy vehicles associated with the facility will use approved B-Double routes, including the designated routes through Oaklands to ensure any impacts are minimised.

Operation of the plant will not pose a road safety issue to the external network when taking into consideration sight distances at the access point, existing traffic volumes, the capacity of key intersections and haulage routes. It will be necessary to upgrade the site access intersection, Daysdale Street/MR323 Saffron Oaklands Road intersection and the Answerth Drive/Urana Oaklands Road intersection to cater for turning heavy vehicles.

The proposed site circulation and parking layout allows for the efficient and safe movement of operational traffic around the facility.

Waste Management

The proposed facility will incorporate waste reduction strategies in accordance with the NSW Waste Management Hierarchy: avoid, re-use, recycle/reprocess, dispose. As discussed above, all wastewater from the ethanol production process will be either recycled for further use within the plant or used for irrigation. Co-products of the ethanol production process (WDGS and DDGS) will be disposed of under an off-take arrangement with an international feed marketing firm, James & Sons, who will on-sell it to intensive agriculture facilities. Sewage and wastewater will be treated and disposed of by an on-site septic tank system or connection to the Oaklands reticulated sewage network. Plant chemical containers and routine maintenance consumables such as oil and grease will be stored in a bunded area and collected by a licensed waste contractor as required. The small amount of 'inert', general domestic waste generated within the site office, will be collected in appropriate bins and recycling containers for disposal by Council.

Flora and Fauna

The site is highly disturbed by agricultural practices and the majority of the site comprises ploughed pasture of exotic grasses. No threatened flora or fauna species or endangered ecological communities were recorded on-site or along the proposed pipeline route during the desktop assessment or field investigation. A Grey-crowned Babbler (Pomatostomus temporalis temporalis) which is listed as threatened under the Threatened Species Conservation (TSC) Act was heard calling within the vicinity of the site. However, there is no suitable habitat for the Grey-crowned Babbler on-site.

There was a small, isolated patch of approximately 20 mature Callitris sp. in the east of the site which will be removed as part of the proposal. These trees were identified to be in poor health and do not provide significant habitat for native fauna.

Habitat identified for native fauna was largely limited to scattered off-site stands of trees adjacent to the eastern and northern site boundaries that may provide nesting/ shelter and foraging habitat for native birds. Mitigation measures are included in the draft statement of commitments to address the potential for construction and operational noise, dust and lighting to deter birds from utilising the native trees surrounding the site.

Visual Amenity

There are few visual receptors and none have elevated views of the site. Viewpoints from the neighbouring occupied residences, Oaklands Central School and the railway station are obscured by screening vegetation. The proposed silos, grain storage bunkers and water dams will be similar to those on the adjoining properties and common throughout the Murray Region. Subject to implementation of recommended mitigation measures, operation of the plant, including lighting and the introduction of built form elements is not expected to adversely affect the visual amenity of the surrounding area.

Aboriginal Heritage

No Aboriginal heritage sites or values associated with the site were identified during the archaeological inspection, desktop assessment or consultation with the Cummeragunja Local Aboriginal Land Council. The proposal will have no impact on known Aboriginal heritage sites or values and no further archaeological work, such as excavation, collection or monitoring, is required.

Hazards and Risks

The project is considered to be "potentially hazardous", in accordance with the definition given in State Environmental Planning Policy No. 33 – Hazardous and Offensive Development. The preliminary hazard analysis undertaken for the project identified hazardous substances handled at the site to include liquefied natural gas, ethanol, petrol, sulphuric acid, sodium hydroxide, nitric acid, aqueous ammonia, urea, grain and high pressure steam. In accordance with Department of Infrastructure, Planning and Natural Resources (DIPNR) (1992a) Hazardous Industry Planning Advisory Paper (HIPAP) No 6 – Guidelines for Hazard Analysis and DIPNR (1997) Multi Level Risk Assessment, hazardous incident scenarios with the potential for off-site impact, that is ethanol, petrol and Liquefied Natural Gas fires, were assessed. It was found that the development does not have the potential for off-site impact (fatality, injury or off-site escalation) and therefore would not affect places beyond the site boundary, including nearby residences, recreational areas or Oaklands Central School. Further studies will be prepared during the detailed design, construction and operational phases of the project.

Design of all systems with respect to design of fire/ emergency measures and procedures will be in compliance with the appropriate Australian Standard.

Social Implications

The existing population, employment and occupation profile suggests that there is unemployment in the Urana Local Government Area (LGA) and that the existing occupation and skill base is dominated by the agriculture sector. This profile complements the needs of the AEL ethanol production facility. AEL will directly employ approximately 32 people for operation of the proposed facility and approximately 120 people during its construction, the majority of which will be from the Murray region. Accordingly, it is unlikely that there would be a significant impact on service demand for housing, schools, hospitals and health care facilities and other community infrastructure in Urana LGA and the broader Murray region of NSW. AEL will work with the community to upgrade its skill base by provision of in-house and external qualifications training and skills development for staff.

The proposed AEL ethanol production facility at Oaklands will provide the Urana LGA with the opportunity to diversify its economic base by establishing a rural industry that adds value to local product. It will constitute an investment of over $30 million in the region. It will directly support local farmers by sourcing surplus cereal grains grown in the Murray region and provide opportunities in the fields of manufacturing and administration.

The proposed facility will also provide indirect benefits to local industry and employment by increasing demand on local contractors, maintenance and service providers and businesses that support agriculture, such as equipment, seed and chemical manufacturers and wholesalers, and by attracting other agricultural businesses such as intensive livestock industries.

1 INTRODUCTION

1.1 GENERAL

Agri Energy Limited (AEL) seeks project approval for the development of an ethanol production facility at Oaklands, New South Wales (NSW), under Part 3A of the *Environmental Planning and Assessment Act 1979 (*EP&A Act). The ethanol production facility will be capable of producing 200 megalitres (Ml) annually and will include several holding dams, a wastewater treatment facility and an irrigation area. The irrigation area will be irrigated with process wastewater as part of a wastewater recycling scheme. The proposal will have a development cost in excess of $30 million and is therefore a 'major project' to which Part 3A of the EP&A Act applies. As such, it will be determined by the Minister for Planning.

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by AEL to undertake an Environmental Assessment (EA) for the construction and operation of the ethanol production facility. This Environmental Assessment Report (EAR) has been prepared in accordance with the requirements of the EP&A Act, the *Environmental Planning and Assessment Regulation 2000* and the requirements of the Director-General of the Department of Planning (DoP) issued 5 October 2006 (refer to Annex A: *The Director - General's Requirements*). It describes the proposal, the environmental implications associated with the key issues of the proposed development and identifies subsequent management or mitigation measures.

1.2 AGRI ENERGY LIMITED (AEL)

AEL (previously named Australian Ethanol Limited) is a public company listed on the Australian Stock Exchange (ASX code: AAE). AEL is a global company with a focus on the production and distribution of consistent, high quality biofuels to mature markets and expansion of the business based on operational best practice in the rapidly growing renewable fuels industry.

In April 2004, AEL acquired the company Australian Biofuels Pty Ltd to hold the Australian assets of AEL. As part of the Australian strategic plan, Australian Biofuels Pty Ltd is currently pursuing a number of biofuels opportunities in Australia. On 28 September 2004, AEL, through Australian Biofuels Pty Ltd, received development approval for its first ethanol production facility. Construction commenced in September 2006. This facility is located at Woorinen South near Swan Hill in north-western Victoria and is approved to produce 100Ml of ethanol per year. AEL is pursuing biofuel opportunities in NSW, South East Queensland and Southern and North Western Australia.

AEL's United States (US) assets are held by its wholly owned subsidiary company, US Canadian Biofuels. In 2006, AEL acquired Beatrice Biodiesel LLC and Beatrice Ethanol LLC through US Canadian Biofuels. The Beatrice biofuels complex being developed in Beatrice, 50 kilometres (km) south of Lincoln Nebraska, USA, will be the first integrated ethanol and biodiesel facility to be constructed internationally. The Beatrice Biodiesel Project is the largest biodiesel production facility to be announced in the USA to date. The proposed ethanol plant will have a capacity of 50 million gallons per year. An oil seed crusher is also planned to be developed at the Beatrice biofuels complex over the next three to five years.

In December 2006, AEL entered into a conditional agreement to acquire Central European Biofuels Pty Ltd (CEB), subject to CEB meeting agreed milestones over the next few months. CEB is planned as a wholly owned subsidiary to hold AEL's European assets and thereby provide access to the major biofuel markets of Europe, which are characterised by broad consumer acceptance and strong government support. It will initially have 20 per cent (%) ownership in the Ennsdorf Biodiesel Project being developed near Vienna, Austria. The Ennsdorf biodiesel facility will have a capacity of 95,000 tonnes per annum and the flexibility to use a range of feedstock depending on price and availability to maximise its profitability. The project is fully permitted and construction is due to commence in the first half of 2007.

CEB is also planning to develop an oil seed crushing facility in Hungary. This facility will provide high quality, cost effective feedstock to Ennsdorf and into the rapidly expanding Western European biodiesel industry.

AEL's mission is to create a profitable and sustainable ethanol business in Australia and overseas. The global strategy focuses on achievement of an effective and operating presence in major biofuel markets, in order to gain maximum leverage in agricultural feedstock supply, technology and fuel marketing, together with regional presence across critical global capital markets. AEL intends to be an established producer and distributor of ethanol by 2008 and in a position where it can participate in the anticipated growth of market demand for ethanol.

AEL's business model is to develop ethanol plants in conjunction with local organisations such as cooperatives, local agricultural service groups and grain aggregators. This model supports local rural communities and increases the security of grain supply for the company's planned ethanol plants.

1.3 NEED FOR THE PROJECT

Ethanol has been used as a fuel, solvent and drinking alcohol for hundreds of years. The need for the project is driven by the forecasted increase in demand for ethanol blended fuels in the fuel and motor spirit market. This is expected to create growth of the fuel ethanol industry in Australia from 2008 onwards, and on a global level.

Market drivers for ethanol blended fuel include increases in oil prices and fuel demand, declining domestic production, compliance with emissions and vehicle efficiency legislation and policy, energy security, and the inherent environmental, economic and performance benefits of using ethanol blended fuel, including:

- improved environmental performance via lowering of toxic tail pipe emissions (ethanol is an oxygen enhancer when blended with petrol which results in a cleaner burning fuel and it can displace benzene and other octane enhancers which are known toxic gasoline components and carcinogens);
- renewable nature of the ethanol resource which is produced principally from natural 'renewable' grain or sugar (thereby extending the available fuel supply as fossil fuels are depleted);
- reduction in the 'at the bowser' cost of fuel;
- use of a high octane liquid fuel which improves combustion efficiency; and
- maintenance of cleaner engine parts as it is a cleaner burning fuel.

The more stringent Australian fuel standards anticipated post 2006 and government plans to pursue a long-term sustainable renewable energy strategy are also major driving forces behind the predicted increased demand for ethanol blend fuels. Government policy, programs and legislation in place which support growth of the fuel ethanol industry include:

- Federal Cleaner Transport Fuels Policy announced in 2001, which directs the Australian fuel industry to improve the environmental characteristics of fuel, and promotes the development of biofuels production capacity in Australia. It has a target to develop up to 350Ml annual fuel ethanol production capacity in Australia by 2008. The proposal would potentially realize 57% of this target;
- ethanol and biodiesel production grants as of 18 September 2002 which extend until 30 June 2011;

- incentives to refiners and importers through the *Energy Grants (Cleaner Fuels) Scheme Act 2004*, including an excise (tax) relief package which allows an excise free period on fuel ethanol until 30 June 2011, after which ethanol excise compares favourably to that placed on unleaded fuel;

- Ethanol Distribution Program announced on 14 August 2006, which offers capital grant incentives for retail service stations to convert tanks to E10 (10% ethanol and 90% petrol), with the aims of increasing the number of service stations selling E10 and the volume of E10 sold and encouraging the sale of E10 at a lower price than regular unleaded petrol;

- Greenhouse Challenge Program which enables Australian companies to form working partnerships with the Australian Government to improve energy efficiency and reduce greenhouse gas emissions; and

- formation of a NSW E10 Taskforce to start investigations into mandating 10% ethanol in petrol in NSW.

Mandating a fuel ethanol blend is believed to be inevitable in Australia to meet octane requirements (the only commercial, environmentally acceptable source of external octane is ethanol) and cleaner fuel requirements. This will also address future requirements for lower sulphur levels in fuel under the *Fuel Quality Standards Act 2000*.

There is considered to be significant growth potential in the Australian fuel ethanol market, given that E10 is the maximum blend of ethanol currently permitted in Australia, while the USA, Brazil and Sweden have E85 available (85% ethanol and 15% petrol).

Ethanol from the Oaklands facility is planned to help meet market demands in Melbourne.

1.4 METHODOLOGY

The assessment of the project has involved input from a range of disciplines including engineering, heritage, water, acoustics, planning, risk, air, traffic, ecology and socio-economics. It addressed issues identified during the consultation process described in *Chapter 6* and the requirements of the Director-General of the DoP (refer *Annex A*). Technical reports were prepared which investigated the environmental implications of the project and provided mitigation and management measures. These reports are submitted with the development application as supporting documents and are referenced as follows:

- *Oaklands Ethanol Production Facility – Air Quality Impact Assessment Report (ERM, 2007a);*
- *Oaklands Ethanol Production Facility – Water Resources Assessment Report (ERM, 2007b);*
- *Oaklands Ethanol Production Facility – Noise Assessment Report (ERM, 2007c);*
- *Oaklands Ethanol Production Facility – Traffic Impact Assessment Report (ERM, 2007d);*
- *Oaklands Ethanol Production Facility – Ecological Impact Assessment Report (ERM, 2007e);*
- *Oaklands Ethanol Production Facility – Aboriginal Heritage Assessment Report (ERM, 2007f);*
- *Oaklands Ethanol Site – Preliminary Geotechnical Investigation (Geotechnical Testing Services, 2006);*
- *Proposed Ethanol Production Facilities - Preliminary Hazard Analysis – Oaklands Site (Sherpa Consulting, 2007); and*
- *Lifecycle Assessment of Greenhouse Gas Emissions (Agri Energy Limited, 2007)*.

1.5 STRUCTURE OF THE ENVIRONMENTAL ASSESSMENT REPORT

The structure of this EA is outlined below.

The *Executive Summary* provides a brief overview of the project, key environmental issues and assessment results, and an outline of proposed environmental management procedures.

Chapter 1 Introduction introduces the current proposal, identifies the need for the project and outlines the purpose of this report.

Chapter 2 The Locality and Site provides a description of the site and surrounding area.

Chapter 3 Proposal Description provides a detailed description of the proposal, including considered project alternatives.

Chapter 4 Justification for the Project justifies the project with regard to environmental impacts, site suitability and benefits.

Chapter 5 Statutory Context details approvals required and the statutory context in which the proposal must be considered.

Chapter 6 Stakeholder Consultation sets out the stakeholders engaged in the EA process, the methodology for stakeholder consultation and outlines issues identified by this process.

Chapter 7 Key Issues provides an assessment of potential impacts on air quality, surface and groundwater, waste, noise, traffic, flora and fauna, visual amenity, Aboriginal heritage and social-economic considerations. A description of measures that will be implemented to avoid, minimise, mitigate, offset, manage and/ or monitor the impacts of the project is also provided.

Chapter 8 Preliminary Hazard and Risk Assessment identifies the hazards and risks that may be associated with the proposal, provides an assessment of these against criteria detailed in State Environmental Planning Policy No. 33 – Hazardous and Offensive Development, and outlines mitigation measures and further studies required.

Chapter 9 Statement of Commitments details environmental management, mitigation and monitoring measures to be employed.

Chapter 10 Conclusion provides a conclusion to this EAR.

2 THE LOCALITY AND SITE

This Chapter provides a description of the site and surrounding area.

2.1 SITE DESCRIPTION

The site of the proposed ethanol production facility is wholly within the local government area of Urana. It is accessed from Coreen Street at a point approximately 350m north-east of Oaklands. Oaklands is situated in the Murray region of NSW, approximately 615km south-west of Sydney and 105km north-west of Albury, as shown in *Figure 2.1*.

The site is approximately 130 hectares (ha) and comprises one land parcel, identified as Lot 2 of Deposited Plan (DP) 861032. It is currently under the ownership of Patrick Day. The site is used for agricultural cropping (barley) and has sparse scattered trees along the eastern and western site boundaries. Topography is generally flat, as is typical of the surrounding landscape. Existing site infrastructure comprises farm fences and a Telstra cable in the west of the site. Land dedicated for the disused Oaklands-The Rock railway line runs across the site in a generally north-easterly direction. There is also a shallow farm dam positioned near to the northern boundary of the site. A typical view of the site is presented in *Photograph 2.1*.

In addition, there will be an off-site pump station, water storage and subsurface pipeline which will occupy a portion of Lots 64 and 68 of DP 756402, adjacent to O'Dwyer Main Channel. The pipeline is proposed to run in an east-west direction from the off-site water storage, across Lots 61 and 62 of DP 818505 and pass under the Urana / Oaklands Road and the disused Oaklands – The Rock railway track, before entering the site. The proposed pipeline route is through predominantly flat, cleared agricultural land.

2.2 LOCALITY DESCRIPTION

The site is bounded by Daysdale Street, Coreen Street, Urana Road and the Ray Brooks & Co. bulk grain storage and terminal to the west and by agricultural land to the north, east and south. Coreen Street and Daysdale Street are the major north south roads through Oaklands and Urana Road is the major road to Urana to the north. An aerial photograph of the site and surrounding area is presented in *Figure 2.2*.

The land adjacent to site boundaries accommodates cleared agricultural cropping and sheep grazing land. Two unoccupied rural dwellings and associated sheds are respectively located approximately 170m north and 1.1km east of the site. Two occupied rural dwellings and associated sheds are located 715m south-west and 170m north-west of the site, respectively. Land on the western side of Daysdale Street, opposite the south-west portion of the site, is occupied by a small area of dense vegetation and a recreational sporting oval, that is at the northern extent of the Oaklands township.

Other features of the locality include:

- Nowranie Creek which flows in a westerly direction, approximately 700m north of the site, and converges with Billabong Creek approximately 18km north of the site;
- Oaklands sewage treatment plant and settling ponds positioned approximately 300m to the east;
- Saffron-Oaklands Road approximately 570m to the south, which is the major road extending east from Oaklands;
- Oaklands township located approximately 350m south-west of the proposed site access;
- Oaklands Railway Station located approximately 350m to the west, from which Benalla – Oaklands Railway Line extends to Melbourne.
- AWB Grain Storage Centre approximately 2.3km to the south-west;
- Murray River approximately 55km to the south is the major waterbody in the Murray region;
- Pentarch Magazine Area, a large facility owned by the Department of Defence, situated approximately 100m to the west; and
- O'Dwyer Main Channel which is an irrigation channel, approximately 2.2km to the west.

In general, the region constitutes a relatively flat landscape dominated by rural land uses, specifically cropping and sheep and beef cattle grazing, dairying and scattered rural dwellings. Cropping within a 100km radius of Oaklands is predominately wheat, followed by barley and canola, and to a lesser extent oats, grain legumes, rice and grain sorghum (Neil Clark and Associates, 2006).

Photograph 2.1 Site Viewed to the South from centre of site

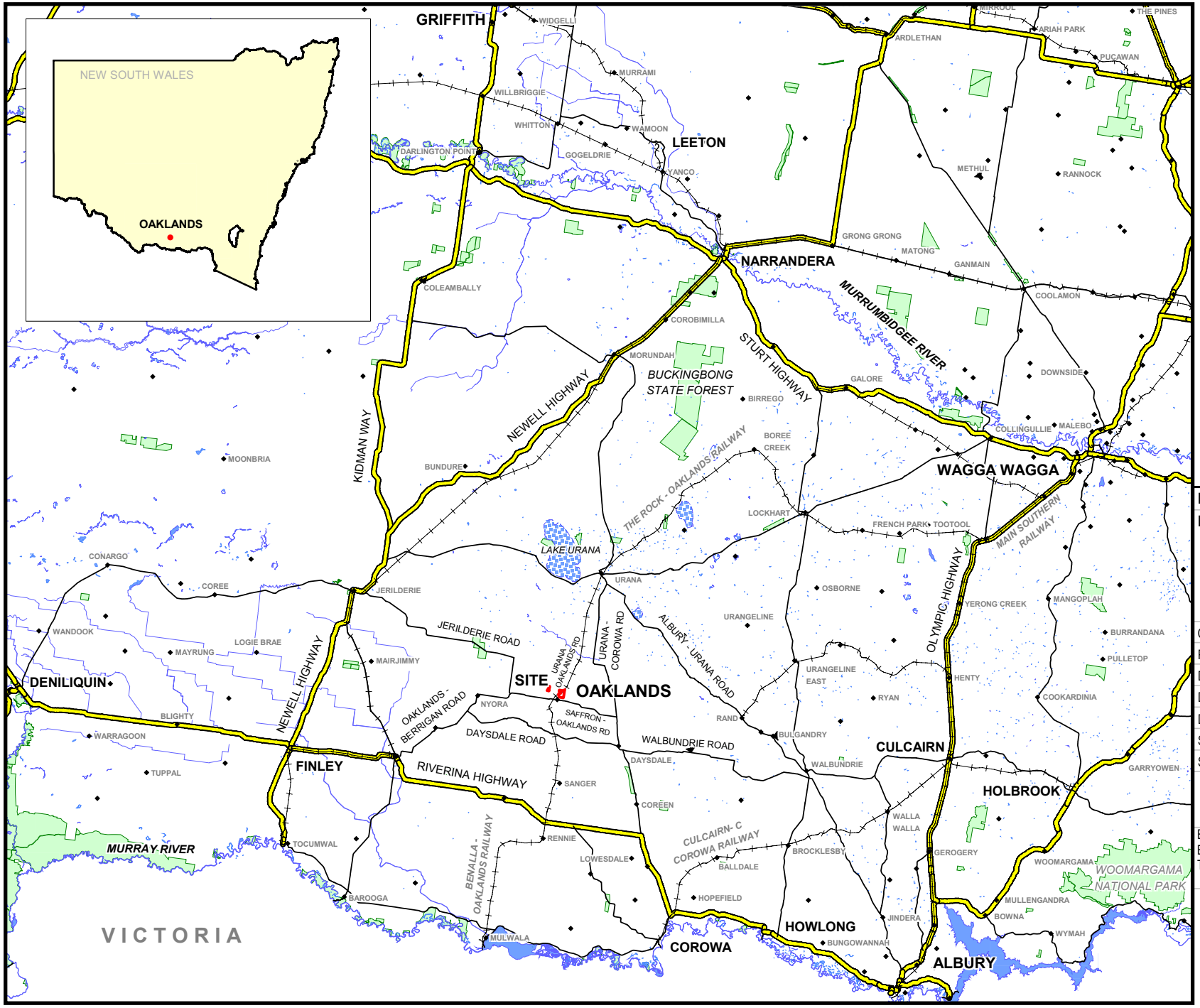

Figure 2.1

Regional Location of Site

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_EAR_GIS09	
Date:	20.02.2007	Drawing Size: A4
Drawn By:	DH	Reviewed By: -
Source:	MapInfo StreetPro	
Scale:	Refer to Scale Bar	

N

0 10 20 30km

Environmental Resources Management Australia Pty Ltd
Building C, 33 Saunders St, Pyrmont, NSW 2009
Telephone +61 2 8584 8888

ERM

Legend

Site Boundary

Figure 2.2

Aerial photograph of Site and Surrounding Area

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_OA_EG_05	
Date:	08.02.2007	Drawing Size: A4
Drawn By:	ML	Reviewed By: -
Source:	-	
Scale:	Refer to Scale Bar	

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0 400 800m

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3 THE PROPOSAL

Details of the proposal, including alternatives considered during the project design phase are provided in this Chapter.

3.1 INTRODUCTION

The project aims to realise the environmental, economic and performance benefits of ethanol blended fuel and take advantage of the cereal grain resource within the Murray region, NSW. It has been based on an extensive assessment of the environmental context of the site as well as market considerations relating to the availability of source crops, the ethanol product and the co-products of wet distillers grain and solubles (WDGS) and dried distillers grain with solubles (DDGS). This chapter details the project alternatives, the plant and its operation and the ethanol production process.

3.2 PROJECT ALTERNATIVES CONSIDERED

3.2.1 Design and Operation Options

In formulating the site layout and operations, AEL and its consultants explored alternatives in response to the findings of the technical investigations. These are discussed below.

Co-products

Three alternatives for the co-products of the ethanol production process were considered.

The first option involved production of 100% WDGS. However, WDGS contains up to 70% water which means it is not economically viable to transport it further than 200km from the production facility. Furthermore, it has a useful shelf life of less than a week. Accordingly, WDGS must be dispatched quickly to a local market. There was considered to be a risk that if there were a reduction in local demand for WDGS, AEL may have surplus WDGS which would require alternative less desirable disposal strategies such as disposal in landfill.

The second option involved production of 100% DDGS. DDGS is 90% solids and only 10% water, so can be economically transported further, thereby accessing a wider market. It has a useful shelf life of over 12 months. However, the cost of Liquefied Natural Gas (LNG) required for drying makes this option uneconomical at present.

The third option considered was to produce 50% WDGS and 50% DDGS. This option minimises the risks/ costs associated with each of the other two options and accordingly is considered the preferred option.

Irrigation Area

Two planting alternatives for an area of vegetation to be irrigated with process wastewater from the facility were considered.

The first option involved establishment of a 40ha timber plantation, using hybrid hardwood species suited to the site. However, water uptake from a plantation of this size would be insufficient to adequately utilise all plant wastewater. Furthermore, the plantation would be harvested within 100 years which would fail to realise the longer term potential benefits associated with creation of a carbon sink via carbon sequestration.

The second option involved establishment of approximately 55ha of cropland to provide the adequate uptake of irrigation water. This is consistent with historic landuse of the site and is considered the preferred option.

3.2.2 The 'Do Nothing Option'

The 'do nothing' option would potentially fail to realise the environmental, economic and performance benefits of ethanol blended fuel and fail to take advantage of the cereal grain resource within the Murray region of NSW. It would not take up an opportunity to realise 57% of the Federal Government target of 350Ml annual fuel ethanol production (included in the Federal Cleaner Transport Fuels Policy) or the broader economic and environmental benefits associated with the growth of the ethanol industry. If construction and operation of the ethanol production facility does not proceed at Oaklands, the associated boost to industry, employment opportunities and grain contracts within Oaklands and the wider Murray region would not be possible. Similarly, a failure to continue with the proposal would not take advantage of AEL's initial investment and unique opportunity to position itself to participate in the anticipated growth of the fuel ethanol industry and would not realize the potential economic benefits of the proposal.

3.3 APPROVAL REQUEST

3.3.1 Plant Components

The proposed site layout is presented in *Figure 3.1*. The ethanol production plant will be positioned in the central portion of the site. The plant layout is shown in *Figure 3.2* and will have a footprint of approximately 300m x 300m, including:

- a bunded storage building where all chemicals and products (other than grain and ethanol) stored on the site will be kept;
- a maintenance workshop and store which also includes a crop services facility;
- two 7000 tonne grain storage silos with a maximum height of 35m (these will be the tallest buildings on the site);
- a 1300 tonne shift silo;
- a milling section including two hammermills;
- a fermentation structure;
- a liquefaction and saccharification area;
- a distillation structure and tower;
- a boiler building;
- a cooling tower;
- LNG storage;
- a two storey building which houses the ring dryer for drying WDGS to produce DDGS;
- a bunded ethanol storage area which houses two anhydrous ethanol storage tanks, an off-spec storage tank and a gasoline storage tank; and
- a bunded storage building where WDGS and DDGS are stored.

A grain storage area comprising six grain bunkers will be located adjacent to the main buildings. These bunkers will be circumnavigated by a sealed one-way road that is surfaced with a prepared road base foundation.

Site access off Coreen Street will be upgraded and internal roads will be sealed and sufficiently wide to accommodate passing vehicles. There will be a weigh bridge, a light vehicle parking area with 40 spaces and a truck standing area. An office/ administration area will be constructed adjacent to the weighbridge and will comprise a reception area, offices, meeting rooms, bathroom facilities and a first aid room. Once the plant is operational the option of rail transportation of ethanol to the Victorian market may be investigated.

Legend

- 200Ml Raw Water Dam
- 2Ml Stormwater Dam
- 40Ml Effluent Dam
- Irrigation Area
- Water Pump Station and Pipeline
- Site Boundary
- Internal Access Road

Figure 3.1

Proposed Site Layout

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_OA_EG_06	
Date:	08.02.2007	Drawing Size: A4
Drawn By:	ML	Reviewed By: -
Source:	-	
Scale:	Refer to Scale Bar	

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0 200 400m

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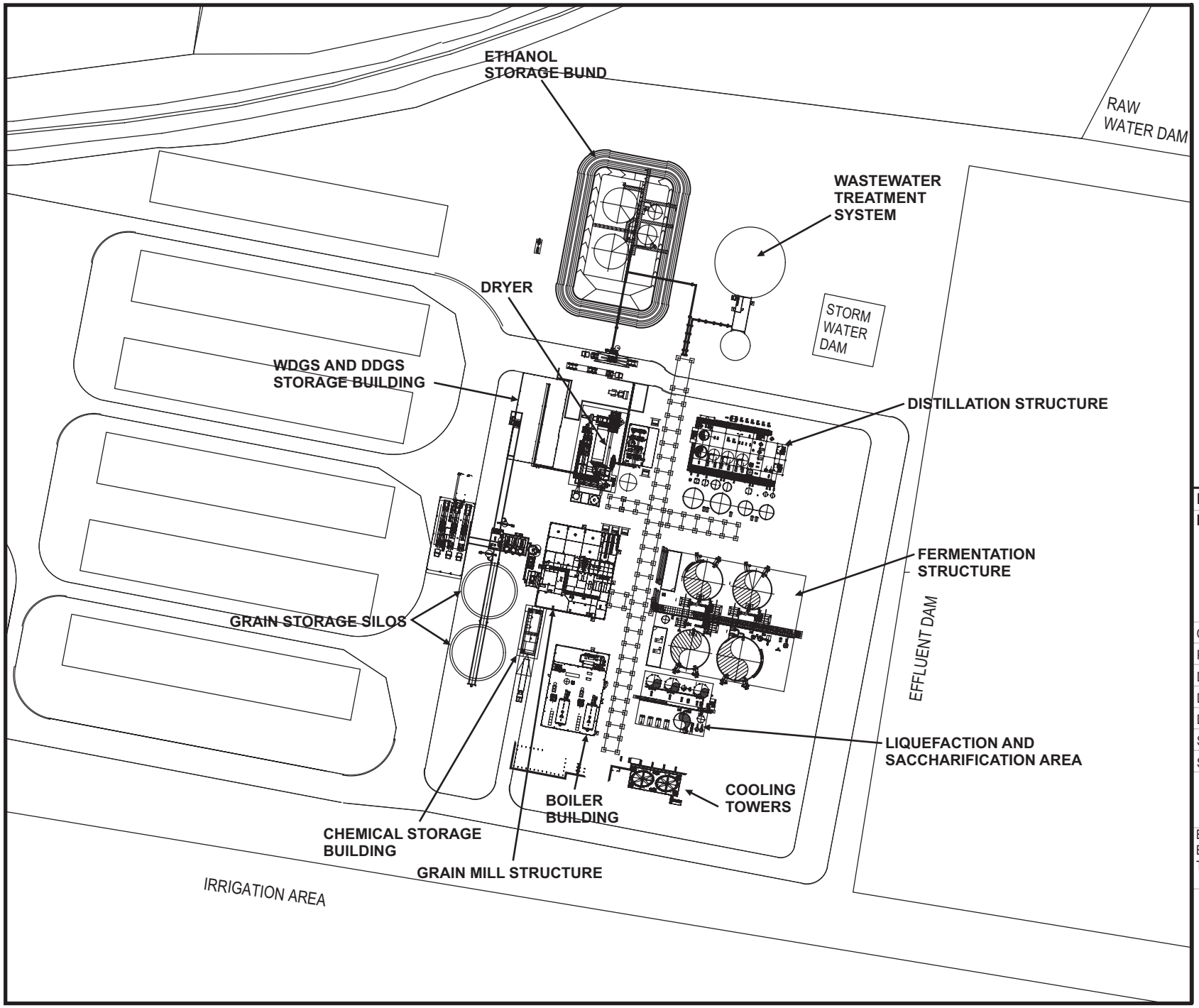

Figure 3.2

Proposed Plant Layout

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_OA_EG_07	
Date:	15.02.2007	Drawing Size: A4
Drawn By:	ML	Reviewed By: -
Source:	Plant Design: PDF DWG No: M06075-0321	
Scale:	Refer to Scale Bar	

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0 40 80m

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Three dams will be constructed on site as follows:

- *2Ml stormwater dam* – located adjacent to the production buildings to hold and evaporate runoff from the buildings and hard surface areas. This water will also be available for irrigation or to supplement the raw water supply;

- *40Ml effluent dam* - located east of the production buildings to store process wastewater from the facility, for pumping to the irrigation area; and

- *200Ml raw water dam* – located north-east of the production buildings to store water pumped from O'Dwyer Main Channel and supply all plant raw water needs, as described below.

A salt evaporation system will be located adjacent to the ethanol plant and effluent dam to manage process wastewater with a high salt content that is discharged from the facility.

A pumping station and an additional 200Ml raw water dam will be constructed adjacent to O'Dwyer Main Channel. This dam will be used to supply the facility with water during the winter months when the channel is closed for maintenance. A subsurface pipeline will be constructed from the dam site to the on-site raw water dam. Water from the raw water dam will be pumped to a treatment facility where it will undergo a filtration, softening and de-mineralisation process. The treated water will then be pumped to the plant.

3.3.2 Utilities and Services

The site will be connected to the existing electricity supply network. The site will be connected to the local telecommunications network. Potable water needs will be met via a piped offtake from Oakland's existing reticulated water supply.

A high security water licence will be sought for the plant from the Department of Natural Resources (DNR). This will ensure an adequate supply of water for the production process.

There is potential for connection to the Oaklands reticulated sewerage system, which passes in close proximity to the southern boundary of the site. Otherwise, a septic system will be constructed on-site for treatment of sewerage.

3.3.3 Workforce and Hours of Operation

The plant will operate 24 hours per day, seven days a week. It is anticipated that the on-site workforce will comprise 32 people, inclusive of six to eight administration staff who will be present during standard working hours. There will typically be three shifts, each staffed with eight persons. Shifts will nominally be 7am to 3pm, 3pm to 11pm and 11pm to 7am.

3.3.4 Ethanol Production Process

Introduction

The ethanol production facilities will be capable of processing a range of locally grown cereal grains, including wheat, corn, sorghum and barley. These grains must be transported to the site and stored prior to being input into the production process. The production of ethanol involves the milling of the grain to flour followed by a cooking, fermentation and distillation process. This process converts starch, which comprises up to 75% of the grain seed, to sugar and subsequently to ethanol.

The ethanol to be produced by the plant will be a fuel blend stock. This product is dehydrated (water removed), stored and at the time of dispatch to market is mixed with a small percentage of petrol ('denatured'). The co-products of the ethanol production process are WDGS and DDGS which are sold as stockfeed.

A detailed description of the ethanol production process is provided in the following sections.

Grain Receival and Storage

At full capacity the ethanol production facility will process approximately 600,000 tonnes of cereal grains (such as wheat, corn, sorghum and barley) per annum. These will be preferentially sourced from the Murray region of NSW.

Grain will be hauled to the site principally via semi-trailers and B-double trucks. Trucks will enter the site and drive onto a weighbridge, where the gross weight will be recorded and grain samples will be taken for quality control purposes. The vehicle will then proceed to one of two unloading areas where the grain will be stored prior to processing. The two unloading areas are as follows:

- a grain receival platform where the grain will be discharged into a collection hopper and conveyed to one of two 7000 tonne storage silos; and

- a grain storage area, which will consist of six separate grain bunkers, each approximately 30m wide, 200m long and up to 20m high, with a capacity of 20,000 tonnes. Once a bunker is formed, it will be covered with plastic tarpaulin to protect the grain from parasites, birds, rain and wind.

A Grain Receiving Dust Collector collects the dust from the grain unloading operation and returns it to the process ahead of the hammermill.

After unloading, the vehicle will return to the weighbridge and then exit the site to Coreen Street.

The ethanol production process requires a constant supply of grain. At full production of 200Ml of ethanol per year, the plant will require approximately 1600 tonnes of grain per day or 67 tonnes per hour. This grain will be fed to the plant from a small 'shift silo' with a 1300 tonne capacity. Grain is to be transported to the shift silo via two ways, dependent on whether the grain is being sourced from the grain storage silos or from the bunker storage area.

For retrieval from the storage silos, a screw feeder and elevator at the bottom of the source silo will be used to convey grain to the shift silo. This system will include dust extraction and filtering facilities to eliminate dust emissions.

For retrieval from the bunker storage area, grain will be picked up by a front-end loader and fed into a mobile dump hopper positioned over a belt conveyor. The belt conveyor will feed the grain to the main feed conveyor and on to a screening station which will include a dust collecting and filtering system to eliminate dust emissions. The grain will then be elevated to the shift silo.

Milling and Slurry Preparation

As part of the production process the grain needs to be milled and then mixed into slurry via the following process:

1) grain from the shift silo will be gravity fed to the hammermill where it is milled;

2) the hammermill dust collectors extract dust by vacuum from appropriate points in the milling system circuit and direct it to a bag filter, which will collect the dust and return it to the mill discharge conveyor;

3) a monitored weight of milled grain flour will be mechanically conveyed to a pug mixer, where a 'slops mix', comprising recycled process water from the distillation and evaporation operations will be added to form a slurry of appropriate density;

4) from the pug mixer, the slurry mix will be directed to a mixing tank where additional slops or process water can be added to make up the correct slurry density and percent solids; and

5) the mixed slurry preparation (mash) will be pumped from the mixing tank to the pre-liquefaction tank via one of two discharge pumps (operating and spare) for liquefaction.

Chemical Preparation

A specific area in the enclosed liquefaction and saccharification building has been designed to receive and prepare a range of chemicals used as part of the ethanol production process. The chemical preparation area consists of a series of small mixing tanks fitted with access platforms, mixing agitators (where required), dosing delivery pumps and pipe work. Packaged chemicals will be fed by forklift or manually from the bag or container into the respective mixing tank. Once prepared, the chemical mix is to be piped to the required process stage.

Liquefaction Stage

Liquefaction is the process of converting insoluble starch in the mash to a soluble starch mix by enzyme reaction at an elevated temperature. An enzyme mix prepared in the chemical preparation area is metered as a liquid into the pug mixer and the pre-liquefaction tank.

The mash is strained and heated, and then pumped to the liquefaction tank in the preparation building for processing of the insoluble starch. The liquefaction tank is sealed, insulated and agitated and the reaction takes up to four hours depending upon grain type.

From the liquefaction tank the mash is pumped to the pre-saccharification tank via mash coolers, which flash cool the mash with non-contact cooling water and lower its temperature to approximately 60 degrees Celsius.

Saccharification Stage

Saccharification is the enzymatic conversion of the soluble starch to glucose. The reaction occurs in the pre-saccharification tank which is also sealed, insulated and agitated, and continues in the pre-fermentor and the fermentor tanks. The reaction requires the addition of another enzyme mix, which is metered as a liquid into the pre-saccharification tank.

From the pre-saccharification tank the mash is pumped to a pre–fermentor tank via coolers which again flash cool with non-contact cooling water. Vented emissions are collected and sent to the process vent scrubber, where they are scrubbed, using chilled water. Emissions from the scrubber are discharged to the atmosphere, and the water is returned to the beer well for distillation of the dissolved alcohol.

Fermentation Stage

Fermentation is the conversion of glucose to ethanol and carbon dioxide by the action of yeast. Propagated yeast and other chemicals that promote and sustain the reaction are added to the pre–fermentor tank. The mash containing yeast and nutrient is then pumped to one of three stainless steel fermentor tanks. Once a tank is filled, it is allowed to react for the required time to achieve maximum conversion of sugars to ethanol (around 45 to 55 hours). This process produces a fermented mash called beer which is emptied to a beer well. The empty tank is then cleaned by the addition of cold caustic soda solution. Once cleaned the tank is filled again for the next cycle. Fermentation is a batch process that occurs continuously by using all three fermentor tanks in series.

The carbon dioxide produced by the fermentation reaction is vented to a fermentation vent scrubber where water is used to scrub residual amounts of ethanol from the carbon dioxide. The cleaned, scrubbed carbon dioxide gas is emitted to atmosphere while the scrubber water is pumped into the beer well.

The beer contains about ten per cent ethanol in addition to non-fermentable grain solids. The beer well acts as a buffer tank to receive the reacted ethanol and mash mix for feed to the distillation stage.

Distillation, Evaporation and Dehydration Stage

For distillation, beer is pumped from the beer well in the fermentation area to the stainless steel mash distillation column, which will contain a number of heating trays. The column operates under a vacuum at a temperature of up to 125 degrees Celsius and is approximately 12m high. Distillation occurs in this column and involves boiling off the ethanol from the beer with steam to produce a hydrous ethanol product containing 95% ethanol and five per cent water. The steam is produced from three boilers which are fuelled by liquefied natural gas.

The hydrous ethanol is then dehydrated to a fuel ethanol grade by superheating vapour and liquid from the top of the rectifier distillation column and transferring it to molecular sieve vessels, which remove any water from the ethanol product. Product ethanol is then cooled, filtered and transferred to the ethanol storage area.

Vapours from the distillation area condenser systems flow to the process vent scrubber where chilled water is used to scrub residual amounts of ethanol from the air before it is discharged from the scrubber stack to the atmosphere. The water from the scrubber is pumped to the beer well.

The by-product of distillation is slurry containing all unfermentable products, principally water and distiller's grain. This slurry is transferred from the base of the mash distillation column to a centrifuge, which removes the majority of water. The wet distiller's grain can then be extracted from the centrifuge as a wet cake.

The liquid by-product is transferred to a slops tank where approximately 60% is returned to liquefaction for addition to the milled grain flour at the start of the process. The remaining 40% is evaporated in a continuous evaporator to reduce the water content and thicken the product to a more concentrated form (syrup), which is pumped to a syrup collection tank. The water stream from the evaporator system is used as process water at the mixer or flows to the secondary treatment plant.

The wet cake (extracted from the centrifuge) is then combined with the syrup in a paddle mixer to form a product containing approximately 30% solids and 70% moisture, called WDGS. Half of this product will be sold in this form. The remaining half will be transferred to a flash dryer where it is dried by steam to produce DDGS which has approximately ten per cent moisture content. The dryer exhaust passes through a Thermal Oxidizer which incinerates the emissions from the dryer and then discharges to the atmosphere. The DDGS is cooled and conveyed to the storage and loadout area.

Distillers Grain Storage and Dispatch

WDGS and DDGS will be stored in a dual-purpose shed, which has a concrete bunded bunker for WDGS storage and open-fronted concrete bins for DDGS storage. WDGS will be pumped into B-doubles or semi trailers for trucking to market. A front end loader will be used to pick up DDGS from the bins and load B-doubles or semi trailers for trucking to market. Dust generated during the DDGS loading process is to be collected by the DDGS Loadout Dust Collector.

Ethanol Storage and Dispatch

The cooled ethanol will flow to one of two shift storage ethanol receiver tanks in the storage area. After passing relevant quality tests it will be transferred to the product storage tanks. The product storage tanks are sized to provide between six and seven days of total ethanol storage at full flow rate (200Ml/yr). Occasionally, problems with the plant may result in production of off-spec product. If this occurs, the product will be diverted to an Off-Spec Storage Tank.

All storage tanks are vented through a vent pipe fitted with an in-line flame arrester and a breather vent valve. All vapors from the gasoline unloading and ethanol loading are collected in vapour recovery lines and sent to the road tanker or the source tank, respectively.

For the production of fuel grade ethanol, denaturant from the denaturant storage tank is to be metered continuously into the pure ethanol stream during transfer from the product storage tank to the road tanker. This will yield a finished product containing five per cent denaturant. The denaturant tank is sized to hold sufficient denaturant to cover ten days ethanol production.

Ethanol product will be transported to market via B-double trucks.

3.3.5 Water Supply, Recycling and Reuse

Plant water needs will be met by a combination of raw water pumped from the Murray River via O'Dwyer Main Channel (via the raw water dam) and process wastewater that is treated and recycled back into the plant.

The plant will require approximately 5.642Ml of raw water per day. Accounting for backwash from the raw water treatment facility and evaporation losses from the storage dam, 6.567Ml per day on average of raw water will need to be pumped from O'Dwyer Main Channel to meet this requirement.

A significant component of the proposal is the reuse of the majority of wastewater generated by the facility. The plant will generate an estimated 2.77Ml/ day of wastewater. This will include approximately 1.896Ml/day of process wastewater from the ethanol production process which will undergo secondary treatment via an anaerobic digestion process included within the plant. Approximately 80% of the treated process wastewater (1.540Ml/day) will then be recycled back into the ethanol production process. The remaining 20% (1.55Ml/day) will be discharged to the effluent dam, from where it is to be pumped to the irrigation area. An estimated additional 0.7Ml of wastewater will be generated from the back wash of raw water during treatment, and blowdown from the cooling tower and boiler. This wastewater will be pumped to the effluent dam for re-use on the irrigation area. Details of the proposed wastewater irrigation scheme, including site suitability, water quality and potential impacts and mitigation measures are included in *Section 7.3*.

A small amount of wastewater generated from the water softener unit and membrane treatment of the plant will have a high concentration of salts (EC 30,000-35,000 µS/cm) and will be diverted to a salt evaporation system adjacent to the ethanol plant and effluent dam. Conceptually, the evaporation system will be segmented into six cells, have a dimension of 190m x 130m, and require an undercover storage area for salt produced.

3.3.6 Irrigation Area

AEL proposes to establish approximately 55ha of cropping (refer *Figure 3.1*), which will be irrigated with plant wastewater. The irrigation area will provide a future crop resource and its irrigation will facilitate reuse of any plant wastewater not recycled back into the process or diverted to the salt evaporation beds. The suitability of the site for irrigation with process wastewater is discussed in *Section 7.3*.

3.4 PROJECT TIMING

Pending project approval for the proposed ethanol facility, it is anticipated that plant construction will commence in late 2007, and continue for a period of 14-16 months. Plant operations would be expected to commence in mid 2009.

4 PROJECT JUSTIFICATION

This Chapter provides justification for the project, taking into consideration the site suitability, environmental considerations, product markets and employment and industry contributions of the proposal to the Murray region.

4.1 SUITABILITY OF THE SITE

Location

The location of the site in a rural setting in proximity to water supply, infrastructure, major transportation corridors and grain supply is well suited to the development of an ethanol plant. The site can be serviced by offtakes from existing utilities (electricity, telecommunications and potable town water supply) and has links to major B-double approved roads and State Highways, including:

- Urana-Oaklands Road which extends north from Coreen Street and provides connection to Urana;
- Oaklands-Berrigan Road which provides road connection from Oaklands to the west (to Berrigan and Jerilderie);
- Saffron-Oaklands Road which provides road connection from Oaklands to the east (to Daysdale, Saffron and the Urana-Corowa Road);
- Urana-Corowa Road which is located 10 to 12km east of Oaklands and provides connection south to Corowa and the Riverina Highway and north to Urana, Narrandera and the Newell Highway;
- Albury-Urana Road, which is a direct link between Albury in the south and Urana in the north;
- Riverina Highway which extends east-west between Albury and Deniliquin and is located 35 to 40km to the south of Oaklands; and
- Newell Highway which is accessed via Urana/Morundah to the north and Jerilderie/Berrigan/Finley to the west and provides a major north-south road link to areas of NSW and Victoria.

The site is located in proximity to rail transport, which operates from Oaklands to the south, via the Benalla - Oaklands Line. The proximity of the rail line offers the opportunity for the use of rail freight transport in the future.

The site is well located in proximity to O'Dwyer Main Channel and has sufficient area to create dam storage to provide for continued water supply to service the plant operation during scheduled winter-time closure of O'Dwyer Main Channel for repair and maintenance.

A supply and demand analysis conducted by Neil Clark and Associates (2006) found that between 1998 and 2006, the estimated average annual grain production within a 150km radius of the Oaklands township was 2.6 million tonnes. Between 1998 and 2004, the estimated annual livestock grain consumption for the same area was 1.5 million tonnes. There are flour mills and stock feed and supplement suppliers in the region which also use grain and were not included in this investigation. Further research would be required to quantify the amount of locally produced grain being used by these facilities however this study found that the estimated annual grain surplus for the region averaged just over one million tonnes.

At full capacity the ethanol production process requires approximately 600,000 tonnes of grain per annum. Accordingly, this study indicated that by making use of the surplus grain produced locally, there would be sufficient grain to meet demands of the ethanol production facility.

The risk of grain shortage is minimised by the site's location adjacent to an irrigation region where grain production is significantly more reliable than on the dry farming land. Furthermore, on site grain storage facilities will have a capacity of up to 200,000 tonnes. In the unlikely scenario that there is a shortage of regional grain supply in the future, AEL may need to import grain from interstate or overseas.

The site is within the Rural 1(a) zone in the Urana Local Environmental Plan 1990. The proposed development is permissible in the Rural 1(a) zone.

Environmental Considerations

Comprehensive planning of the site and operation has been based on technical investigations to ensure that the proposal does not adversely impact the environmental features of the site and surrounds.

The site is in a rural area on the outskirts of Oaklands township and is highly disturbed by agricultural practices. This assessment found no Aboriginal heritage sites or values associated with the site and indicated that it had low potential for archaeological significance. The site has only limited ecological values.

The plant has been located in the central portion of the site to provide separation from potentially sensitive receptors, being the few rural residences and the residences and public areas within Oaklands township. The plant is at least 850m from the closest residence and 680m from the nearest recreational area. This is to reduce potential impacts of the proposal on air quality, noise and visual amenity at these locations.

The plant siting provides sufficient setback from site boundaries to ensure potential hazardous incidents associated with storage and handling of hazardous materials will not have offsite impacts. Safeguards and systems in place in the plant will minimize the risk of hazards on-site.

Consideration was given to the existing visual landscape to assess the suitability of the environment to accommodate the proposed built form with minimal impacts on the visual amenity experienced by adjoining residents and persons at the AWB grain storage facility. The proposed silos, grain storage bunkers and water dams are similar to those on the adjoining properties and common throughout the Murray region. External lighting is to be located and directed to provide safety and efficiency for night-time operations but not cause a direct light spill into adjoining areas. Views from the neighbouring residences and areas in the Oaklands township are obscured by distance and screening vegetation.

An assessment of the impact on air quality indicated that predicted ground level concentrations of toxicity based pollutants, odorous pollutants, carbon monoxide, sulphur dioxide, nitrogen dioxide, total suspended particulate and particulate matter less than 10 micron would be well below the relevant NSW Department of Environment and Conservation (DEC) criteria at nearby residences and where applicable, the site boundary. The design and operations incorporate a range of management and mitigation measures to minimise odour and particulate matter emissions.

A noise impact assessment indicated that the only exceedence of DEC noise criteria for facility operations under calm weather conditions was an exceedence of up to two decibels at two nearby residences. Noise attenuation measures to be employed will reduce noise levels experienced at nearby residences and ensure they comply with relevant criteria during the night-time period between 10pm and 6am. Predicted noise levels and the continuous nature of noise sources associated with the plant means that no sleep disturbance due to the operation of the proposed facility is expected. Traffic noise levels generated from Daysdale Street will be below relevant DEC criteria at adjacent residences.

The increase in heavy vehicle traffic associated with the facility would occur along approved B-Double routes. These roads are currently subject to low traffic volumes and so the predicted additional traffic volumes will not cause any affected road to exceed its potential daily traffic capacity as defined by Austroads (1988).

An assessment of traffic generation and road capacity suggests that the operation of the plant facility will not pose a road safety issue to the external network. A proposed upgrade of the site access, Answerth Drive/Urana-Oaklands Road T-intersection and Daysdale Street/ Saffron-Oaklands Road intersections will allow for safe B-double movements. The proposed site circulation and parking network has been designed to allow for the efficient and safe movement of operational traffic around the facility.

The proposed water management system has been designed to maximise recycling and beneficial use of site water. All water used within the ethanol production process will be either recycled for further use within the plant following treatment, diverted to a salt evaporation system or used for irrigation. This will minimise raw water demands.

The site is not flood prone. The proposed wastewater and stormwater management systems will ensure no deliberate discharges of plant wastewater or stormwater from the site. Hence no adverse impacts to receiving waters and associated flora and fauna are expected to result from discharges of wastewater or potentially contaminated runoff. Development of a detailed irrigation plan will avoid potential impacts from the irrigation with wastewater and ensure sustainable use of the wastewater.

A series of waste management measures are proposed to be adopted in the operation of the ethanol plant to avoid, re-use, recycle/reprocess and dispose of waste.

The environmental considerations are further discussed in the following chapters of this report.

4.2 PRODUCT AND CO-PRODUCT MARKET CONSIDERATIONS

4.2.1 Ethanol Market

The forecasted increase in demand for ethanol blended fuel and growth of the ethanol industry in general indicates that there is likely to be a strong market for the product. Market drivers behind this anticipated growth and some of the inherent environmental, economic and performance benefits of ethanol blended fuel are outlined in *Section 1.3*. AEL is in discussions with all of the major fuel companies regarding ethanol off-take. Ethanol from the Oaklands facility is planned to help meet market demands for ethanol blended fuel in Melbourne.

4.2.2 Distillers Grain Market

The co-products of the ethanol production process (WDGS and DDGS) are sold as stockfeed and are in high demand in feedlots, dairies and piggeries.

AEL has an off-take arrangement with an international feed marketing firm, James & Sons, who will remove WDGS and DDGS from the site and on-sell it to intensive agriculture facilities, preferentially located within the Murray Region of NSW.

Drying half of the WDGS to produce DDGS will minimise the potential for production of WDGS in excess of market demands. In the future, if there is a reduction in the local demand for WDGS, other options for its disposal may be investigated. These options are outlined in *Section 7.7*.

4.3 CONTRIBUTION OF AEL TO THE MURRAY REGION

Employment Contribution

AEL will directly employ approximately 32 people for operation of the proposed ethanol production facility at Oaklands. Approximately 120 people will be directly employed during construction of the facility. AEL plans to employ the majority of staff from the Murray region, with some specialists sourced from outside the area. Staff will receive in-house and external training and skills development.

Indirect employment benefits of the proposed facility will be generated via support services such as truck deliveries and dispatch, maintenance of the facility and employment in the agricultural sector.

Industry Contribution

The plant will provide a major value adding rural industry in close proximity to Oaklands and thereby strengthen and diversify the economic base of the Urana Shire. It will also support the generation of new jobs and initiatives based on the region's resources and geographical assets.

AEL's proposed ethanol production facility will directly support local farmers by sourcing surplus cereal grains grown in the Murray region (such as wheat, corn, sorghum and barley). It will increase the demand for locally grown grain, provide a new market for farmers and provide financial support to the agricultural industry within the Murray region.

The proposed facility will also provide indirect benefits to local industry by increasing demand on local contractors, maintenance and service providers and businesses that support agriculture, such as equipment, seed and chemical manufacturers and wholesalers. It will drive potential new development of intensive livestock industries in the area (by provision of a ready feedstock supply through its co-products of WDGS and DDGS).

5 STATUTORY CONTEXT

This Chapter details permits, licences and approvals required and the statutory context in which the proposal must be considered.

5.1 COMMONWEALTH LEGISLATION

5.1.1 Environment Protection and Biodiversity Conservation Act 1999

(EPBC Act) requires the approval of the Commonwealth Minister for the Environment for actions that may have a significant impact on matters of national environmental significance. The EPBC Act also requires Commonwealth approval for certain actions on Commonwealth land. Matters of national environmental significance under the Act include:

- World Heritage properties;
- Natural heritage places;
- Ramsar wetlands of international importance;
- Threatened species or ecological communities listed in the EPBC Act;
- Migratory species listed in the EPBC Act;
- Commonwealth marine environments; and
- Nuclear actions.

A search of the Department of Environment and Heritage (DEH) Protected Matters database confirmed that the site is not a world heritage property or a natural heritage place, does not comprise a Ramsar wetland of international importance or a Commonwealth marine environment and does not include nuclear actions. An assessment of the potential impact of the proposed facility on listed threatened species, ecological communities and migratory species with potential to occur in the locality concluded that no significant impact is likely (refer to *Section 7.8)*. A referral to the federal Minister for Environment and Heritage is therefore not required for the proposal.

5.2 STATE ENVIRONMENTAL PLANNING INSTRUMENTS

5.2.1 *Environmental Planning and Assessment Act 1979*

The proposed development will be assessed in accordance with the EP&A Act and the *Environmental Planning and Assessment Regulation 2000.*

The EP&A Act was amended in 2006 to include Part 3A which provides a streamlined assessment and approval process for development that is defined as a Major Project. Clause 75(b), Part 3A of the EP&A Act states that:

'(1) This Part applies to the carrying out of development that is declared under this section to be a project to which this Part applies:

(1)(a) by a State Environmental Planning Policy…'

The proposal is referred to as a Major Project in State Environmental Planning Policy (Major Projects) 2005 (SEPP MP). The requirements of a 'Major Project' under Part 3A therefore apply to the site. The application of this SEPP is discussed later in this section.

Under Part 3A environmental planning instruments (EPIs) (other than State environmental planning policies) do not apply to a 'Major Project' as delineated in section 75(R). A discussion of the State Environmental Planning Policies (SEPPs) applicable to the proposed development follows.

Pursuant to section 75U of the EP&A Act an approved Part 3A project does not require authorisations under:

- *Part 4, or an excavation permit under section 139, of the Heritage Act 1977,*
- *Section 87 or section 90 National Parks and Wildlife Act 1974,*
- *Section 12 of the Native Vegetation Act 2003,*
- *Part 3A of the Rivers and Foreshore Improvement Act 1948,*
- *Section 100B of the Rural Fires Act 1997,* or
- *Sections 89, 90 or 91 of the Water Management Act 2000.*

Payment of a monetary contribution under section 94 of the EP&A Act may be required as a condition of project approval, to be put towards public amenities and public services. The proposed project is not likely to require significant extension or augmentation of these services and funding for the proposed road upgrade works will be facilitated by AEL.

5.2.2 *State Environmental Planning Policy (Major Projects) 2005*

SEPP MP identifies development to which the project assessment and approval process of Part 3A of the EP&A Act applies. Under clause 6 of SEPP MP, Part 3A of the EP&A Act applies to projects listed in Schedule 1 of SEPP MP, which includes:

'10 Chemical, manufacturing and related industries:

(1) Development that employs 100 or more people or with a capital investment value of more than $20 million for the purpose of the manufacture or reprocessing of the following (excluding labelling or packaging):…

(f) oils, fuels, gas, petrochemicals or precursors…'

As the proposed ethanol production facility at Oaklands will have a capital investment value of in excess of $30 million, the project satisfies the relevant criteria set out in SEPP MP and Part 3A of the Act applies.

This EAR supports the project application to be lodged under Part 3A for project approval pursuant to clause 75E of the Act. The policy establishes the Minister for Planning as the determining authority for any development classified as a 'Major Project'.

5.2.3 *State Environmental Planning Policy No. 11 – Traffic Generating Developments*

State Environmental Planning Policy No. 11 – Traffic Generating Developments (SEPP 11) aims to ensure that the Roads and Traffic Authority of NSW (RTA) is made aware of and given the opportunity to make representations in respect of developments such as 'liquid fuel depots', defined as "*a depot or place used for the bulk storage for wholesale distribution of petrol, oil, petroleum or other inflammable liquid and at which no retail trade is conducted*".

Under Clause 7 of SEPP 11 the Minister is required to forward a copy of the application to the RTA and cannot determine the application until it has received representation or the RTA has informed the Minister that it does not wish to make any representation or 21 days has lapsed.

5.2.4 *State Environmental Planning Policy No 33-Hazardous and Offensive Development*

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) requires development consent for hazardous or offensive development proposed and to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account.

SEPP 33 defines a 'potentially offensive industry' as "*a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment.*"

The proposed ethanol production facility may be considered a 'potentially offensive industry' under SEPP 33. The potential impact of the proposed facility on the surrounding area has been assessed in *Chapter 7*, while mitigation measures to reduce this impact have been identified and consolidated in the draft statement of commitments in *Section 9.2*.

SEPP 33 defines a 'potentially hazardous industry' as "*a development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:*

(a) to human health, life or property, or

(b) to the biophysical environment,

and includes a hazardous industry and a hazardous storage establishment."

Clause 12 of SEPP 33 requires a preliminary hazard analysis to be prepared for proposals which may be considered a potentially hazardous industry. A preliminary hazard analysis has been prepared for the proposed facility by Sherpa Consulting (2007) and is included as a supporting technical report. The outcomes of the preliminary hazard analysis are discussed in *Chapter 8*.

5.2.5 *Protection of the Environment Operations Act 1997*

The *Protection of the Environment Operations Act 1997* (POEO Act) provides an integrated system of licensing for polluting industries. Schedule 1 of the POEO Act identifies types of development that require an environment protection licence (EPL).

Schedule 1 of the POEO Act includes activities involving "*agricultural produce (including dairy products, seeds, fruit, vegetables or other plant material) and that crush, juice, grind, gin, mill or separate more than 30,000 tonnes of produce per year*" and "*that store or package chemical substances in containers, bulk storage facilities, stockpiles or dumps with a total storage capacity exceeding: (3) 2,000 tonnes of any chemical substances.*"

As the proposed facility will mill more than 600,000 tonnes of grain per year an EPL will be sought from the DEC.

5.2.6 *Water Act 1912*

The *Water Act 1912* is administered by the DNR and under this Act a licence is required if water is extracted from a creek or if any waterways are proposed to be realigned.

On average, the proposal will require the extraction of approximately 6.567Ml of water per day from the Murray River via the O'Dwyer Main Channel, approximately 2.2km west of the site. Water will be extracted from the channel via the construction of a pumping station and piped east to the site via a constructed pipeline. A 'high security' water access licence under the *Water Act 1912* is required for this activity.

During the winter months, between mid-May to mid-August, the O'Dwyer Main Channel is closed for maintenance and repair. Construction of a second large storage dam will therefore be required to store water for the production process during this period. The dam will be located adjacent to the pumping station and have a storage capacity of 200Ml. Options over land on which the storage dam is to be constructed have been taken out and an easement for the pipeline will be created with the consent of the landowner to the west of the site.

5.2.7 *Water Management Act 2000*

The *Water Management Act 2000* (WM Act) incorporates the provisions of various acts relating to the management of surface and ground water in NSW, and provides a single statute for the regulation of water use and works that affect surface and ground water, both marine and fresh.

Parts of the WM Act commenced on 1 January 2001, however provisions relating to the new water access licensing and water approvals systems were delayed until water sharing plans and public registers for licences and approvals where developed. Since 1 July 2004 the new licensing and approval system has been in effect in the areas of NSW covered by 31 operational water sharing plans.

The area takes water from the Murray River at Corowa through the Corurgan Irrigation Scheme, and therefore falls under the *Water Sharing Plan for the Murray and Lower Darling Regulated Rivers Water Sources 2003,* made under Section 50 of the WM Act.

The *Water Sharing Plan for the River Murray and Lower Darling Regulated River Water Source 2003* applies to all the regulated reaches of the Lower-Darling Regulated River Water Source, from the upper limit of the Lake Wetherell water storage downstream to the upstream limit of the Wentworth Weir Pool water storage.

The vision for this Plan '*is to achieve a healthy River Murray and Lower Darling system, sustaining communities and preserving unique values*'.

The proposed licensed extraction of 6.567Ml per day (average) from the Murray River (via O'Dwyer Main Channel) for the facility is comparable with existing high security access licences authorised to extract water from this water source.

5.2.8 Roads Act 1993

Under section 138 of the *Roads Act 1993* consent from the RTA is required to erect a structure or carry out a work, in, on or over a public road or connect a road (whether public or private) to a classified road. Consent may not be given with respect to a classified road except with the concurrence of the RTA.

The entrance to the site from Coreen Street will require upgrading to a standard that can accommodate truck turning movements and works will be required to locate the pipeline under the road. Minor works will also be required to the Daysdale Street and Coreen Street intersection and the Daysdale Street and Saffron Road intersection. As these streets are not 'classified roads' and are under the care and control of Council, concurrence from the RTA would not be required for any work carried out on these roads.

5.2.9 Planning for Bush Fire Protection 2006

The NSW *Planning for Bush Fire Protection 2006* revises the previous guidelines to include performance based outcomes as well as prescriptive requirements and establishes bush fire planning objectives for industrial development.

Planning for Bush Fire Protection applies to all development applications on land classified as bush fire prone, defined as "an area mapped for a local government area that identifies the vegetation types and associated buffer zones." A very small portion of the Oaklands site and water pipeline route has been identified on Council's maps as being within a 100m buffer area to bushfire prone land within the Oaklands township. The site's bush fire risk, however, is considered to be low due to surrounding agricultural land and the low level of risk associated with grassland fires.

The guidelines note that the Building Code of Australia does not provide for any bush fire specific performance requirements for industrial developments and that general fire safety construction provisions are taken as acceptable solutions. The guidelines suggest that new applications should satisfy the aims and objectives of the document. The ways in which the proposed facility satisfies these are outlined as follows:

- the proposed buildings will be built to the relevant Australian Standards to afford occupants of buildings adequate protection from exposure to a bush fire;
- large areas of defendable space will be maintained around all buildings via:
    - a separation of more than 400m from the proposed facility to the mapped bush fire hazard;
    - a lack of vegetation on the site;
    - the provision of internal perimeter roads; and
- the proposed site utilities, infrastructure and access is adequate for firefighters and will be able to accommodate bush fire fighting vehicles.

The preliminary hazard analysis undertaken for the proposed facility (Sherpa, 2007) demonstrated that there is sufficient separation distance to ensure the protection of onsite protected places and adjoining land from the potential combustion of flammable liquids stored at the plant. However, a number of bush fire protection measures will be implemented for the facility, including:

- site fire protection, emergency management, fire exposure protection and emergency planning and management in accordance with AS1940:2004;
- fire extinguishers located in accordance with AS2444;
- classification of hazardous areas in accordance with AS60079.10 and AS2430.3;
- provision of fire fighting water in the raw water dam; and
- storage of fuel and chemical storages away from available fuels.

An emergency plan which includes evacuation procedures in accordance with HIPAP 1 will be completed for the facility at the detailed design stage to further negate the low fire risk.

5.3 LOCAL ENVIRONMENTAL PLANNING INSTRUMENTS

5.3.1 Urana Local Environmental Plan 1990

Pursuant to Section 75J(3) of the EP&A Act the Minister cannot approve the carrying out of a project that would be wholly prohibited under an environmental planning instrument. Under the Urana Local Environmental Plan 1990 (LEP 1990), the site and its surrounds are zoned Rural 1(a).

LEP 1990 adopts the Environmental Planning and Assessment Model Provisions 1980 (as repealed by Standard Instrument – Principal Local Environmental Plan). The Standard Instrument defines the proposed project as an 'agricultural produce industry', being a *"rural industry involving the handling, treating, processing or packing of produce from agriculture (including dairy products, seeds, fruit, vegetables or other plant material), and includes flour mills, cotton seed oil plants, cotton gins, feed mills, cheese and butter factories, and juicing or canning plants".*

The general aims of LEP 1990 are to encourage the proper management, development and conservation of natural and manmade resources within the Urana Shire. The relevant objectives of the Rural 1 (a) zone are:

'(a) to allow development for purposes that are:

(i) appropriate in a rural location, and

(ii) sympathetic with the environmental characteristics of the land and the costs of providing public services and amenities,

(b) to promote the efficient and effective use of agricultural land within its capability.…..…

….(d) to conserve good agricultural land by ensuring that it is not unnecessarily converted to non-agricultural purposes,

(e) to protect, enhance and conserve:

(i) soil stability by controlling and locating development in accordance with soil capability,

(ii) forests of existing and potential commercial value for timber production.…..…

….(v) water resources for use in the public interest.…..…

…(vii) heritage items, including the protection of Aboriginal relics and places, and

(viii) the operational efficiency of main and arterial roads, and

(f) to minimise the cost to the community of:

(i) fragmented and isolated development of rural land…'

The proposed project is consistent with the objectives of the Rural 1(a) zone. The proposed ethanol facility will enable a large portion of the property to continue to be used for agricultural purposes. The proposed storage dams and balance ponds have been designed so as not to adversely impact the area's water or soil resources. The proposed facility is approximately 350m to the north-east of the Oaklands township and will utilise the existing irrigation channel, transport routes and electricity supply available, reducing the need to provide additional services to the site.

5.4 SUMMARY OF APPROVALS, PERMITS AND REFERRALS

The following permits, licences and approvals will be sought for the proposed construction and operation of the Ethanol Facility:

- project approval under Part 3A of the EP&A Act from the Minister for Planning;
- an Environment Protection Licence from the DEC under the POEO Act; and
- a 'high security' water licence from DNR under the *Water Act 1912*.

6 STAKEHOLDER CONSULTATION

This Chapter provides details of consultation that was undertaken with government authorities and the local community during the EA process.

6.1 INTRODUCTION

The stakeholder consultation approach adopted throughout the EA process was structured to provide open and transparent communication with the local community and key stakeholders. It provided a mechanism for dissemination of information about the project to these groups. Early stakeholder engagement enabled concerns raised by the community and government agencies to be identified early and addressed as part of the EA process.

6.2 GOVERNMENT CONSULTATION

6.2.1 General

Relevant government authorities consulted during the preparation of the EA were:

- Department of Planning;
- Department of Environment and Conservation;
- NSW Roads and Traffic Authority;
- Department of Natural Resources;
- Department of Primary Industries (DPI);
- NSW Fire Brigade;
- Rural Fire Service (RFS); and
- Urana Shire Council (Council).

Ongoing consultation and information sharing was undertaken with all the government authorities listed above during the EA process and preparation of the technical reports. This included face-to-face meetings, telephone conversations and written correspondence as well as formal consultation, to ensure that the EA, technical reports and project design met key agency requirements. Formal consultation was conducted via the Planning Focus Meeting (PFM) detailed in *Section 6.2.2*.

A meeting was held with Council representatives and the property owner on 18 July 2006. Overall Council expressed support for the proposal with regards to the economic benefit to the region. The key issues raised at this meeting related to the potential for traffic generation and the source and housing of employees required for the facility. Council did not identify any other specific areas of concern at this initial stage.

Investigations of the availability and capacity of existing services and utilities for the site were conducted during the site identification process.

6.2.2 Planning Focus Meeting

On 7 October 2006, subsequent to lodgement of the draft preliminary assessment, the PFM for the project was held at the Country Women's Association. It was attended by representatives from the ERM project team, AEL, property owner, DoP, DEC, DNR, RTA and Urana Shire Council. The PFM was an essential component of the EA process, facilitating information exchange between relevant government agencies and the proponent and enabling these agencies to provide informed input into preparation of the Director-General's requirements (DGRs).

A copy of the draft preliminary assessment report was distributed to all participants prior to the meeting. The report provided an overview of the project, the planning framework, consultation strategy and potential environmental issues associated with the proposal. The PFM included a series of presentations followed by a period of open discussion and a tour of the site.

Key issues raised during the PFM related to air quality, noise, hazards, social (including provision of housing), traffic and transport, surface water including flooding from Billabong Creek, groundwater and contingencies to address seasonal closure of the Murray River. These issues are addressed in *Chapters 7* and *8* of this report.

Following the PFM, the final preliminary assessment report and application was lodged with the DoP to gain the DGRs for preparation of the EA. At this point, the DoP requested that agencies outline the issues and matters that they wanted to see addressed in the EA. These individual agency requirements formed the basis of the DGRs. A summary of the DGRs and where each issue is addressed in the EAR is provided in *Annex A*. The individual agency requirements attached to the DGRs were also considered as part of the EA process.

6.3 COMMUNITY CONSULTATION

6.3.1 Approach

The community consultation approach aimed to ensure that:

- the community was fully aware of all aspects of the proposal and the EA process;
- there were multiple mechanisms for community participation and for ongoing communication and feedback;
- opportunities were provided for any queries to be addressed directly by the project team to minimise the effects of incorrect information being passed through the community;
- community issues and concerns in relation to the proposal were identified at an early stage of the EA process;
- issues raised by the community were pro-actively assessed and managed throughout the project; and
- appropriate solutions and mitigation strategies were developed to minimise the negative impacts associated with the proposal.

6.3.2 Overview of Consultation Undertaken

A community newsletter was distributed by mail on 13 October 2006 to approximately 100 key community groups and local residents in the vicinity of the proposed ethanol production facility site. It provided information about the proposal, the ethanol industry, a snapshot of the current stage in the approval process, details of the upcoming community information session and invited residents to make comment or enquiries via a 1800 community hotline number. A copy of the newsletter is included in *Annex B*. Following receipt of the newsletter, two residents contacted ERM on the 1800 hotline to make general enquiries about the project and consultation strategy. The only concern raised via these phone calls related to potential difficulties AEL may have sourcing grain during drought.

An open community information session was held at Oaklands RSL Club from 4pm to 7pm on 26 October 2006. The date, time and location of this session were advertised in the Corowa Free Press on 18 October 2006 and in the October edition of the Urana Shire Council Newsletter. The information session was attended by 113 members of the community and representatives from AEL and ERM. It included a display of information posters, a PowerPoint presentation delivered by the Chief Executive Officer of AEL and a question and answer session. The PowerPoint presentation provided details about the proposal and its regional benefits, the Australian ethanol industry, AEL and other AEL projects and the approval process. The outcomes of this session are summarised in *Section 6.3.3*.

In addition, investigations into the availability and capacity of water supply for the site included consultation with West Corurgan. Subsequently, a letter received from the Manager Mr Peter Wallis, confirmed their ability to supply water via O'Dwyer Main Channel during the normal irrigation season (refer to *Annex C*).

6.3.3 Community Information Session Outcomes

Key issues raised during the community information session related to curiosity about the ethanol fuel production process and grain requirements, the staging and timing of the proposal, opportunities for employment and training of the local workforce and direct contracting with local growers, water extraction and use, potential hazards and risks, vehicle movements, operating hours, carbon dioxide (CO_2) generation and odour.

Overall, the community response to the project was extremely positive, particularly in relation to benefits for the rural economy of Oaklands. The majority of community members were supportive of the proposed development. Questions asked were mostly of general interest rather than concern for any particular issue. The matters raised by the community are addressed in *Chapters 3, 7* and *8* of this report.

6.3.4 Consultation with Aboriginal Stakeholders

Consultation in accordance with DEC (2004a) *National Parks & Wildlife Act 1974: Part 6 Approvals – Interim Community Consultation Requirements for Applicants* guidelines was conducted as part of the Aboriginal heritage assessment for the proposed development, as detailed in the ERM (2007f) supporting technical report. This included consultation with the Cummeragunja Local Aboriginal Land Council.

7 KEY ISSUES

This Chapter provides an assessment of key environmental issues identified as arising from construction and operation of the proposed ethanol production plant and sets out measures to avoid, minimise, mitigate, offset and manage the impacts.

7.1 INTRODUCTION

Key environmental considerations identified in the preliminary assessment for the proposed facility are surface and groundwater quality, traffic and transport, noise and air quality impacts and Aboriginal heritage. Additional issues considered include waste, ecological, visual amenity, social-economic considerations and hazards and risks. The preliminary assessment process identified that European heritage was not an issue, and consequently European heritage has not been addressed in this assessment.

The siting and design of the facility and associated activities has evolved in response to environmental (including socio-economic) investigations and recommended mitigation measures included in the supporting documents submitted as part of this EA.

7.2 AIR QUALITY AND ODOUR

A Level 2 air quality impact assessment was undertaken for the proposal in accordance with the:

- DEC (2005) Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales;
- DEC (2006a) Technical Framework– Assessment and Management of Odour from Stationary Sources in NSW; and
- DEC (2006b) Technical Notes - Assessment and Management of Odour from Stationary Sources in NSW.

A desktop assessment and air dispersion modelling undertaken with AUSPLUME v6.0 software. The focus of the air quality assessment was to assess predicted air quality impacts against the DEC impact assessment criteria. The following sections set out the key findings of the assessment. The full assessment, including a description of methodology and criteria employed is presented in the ERM (2007a) supporting technical report.

7.2.1 Existing Air Quality and Key Contaminants

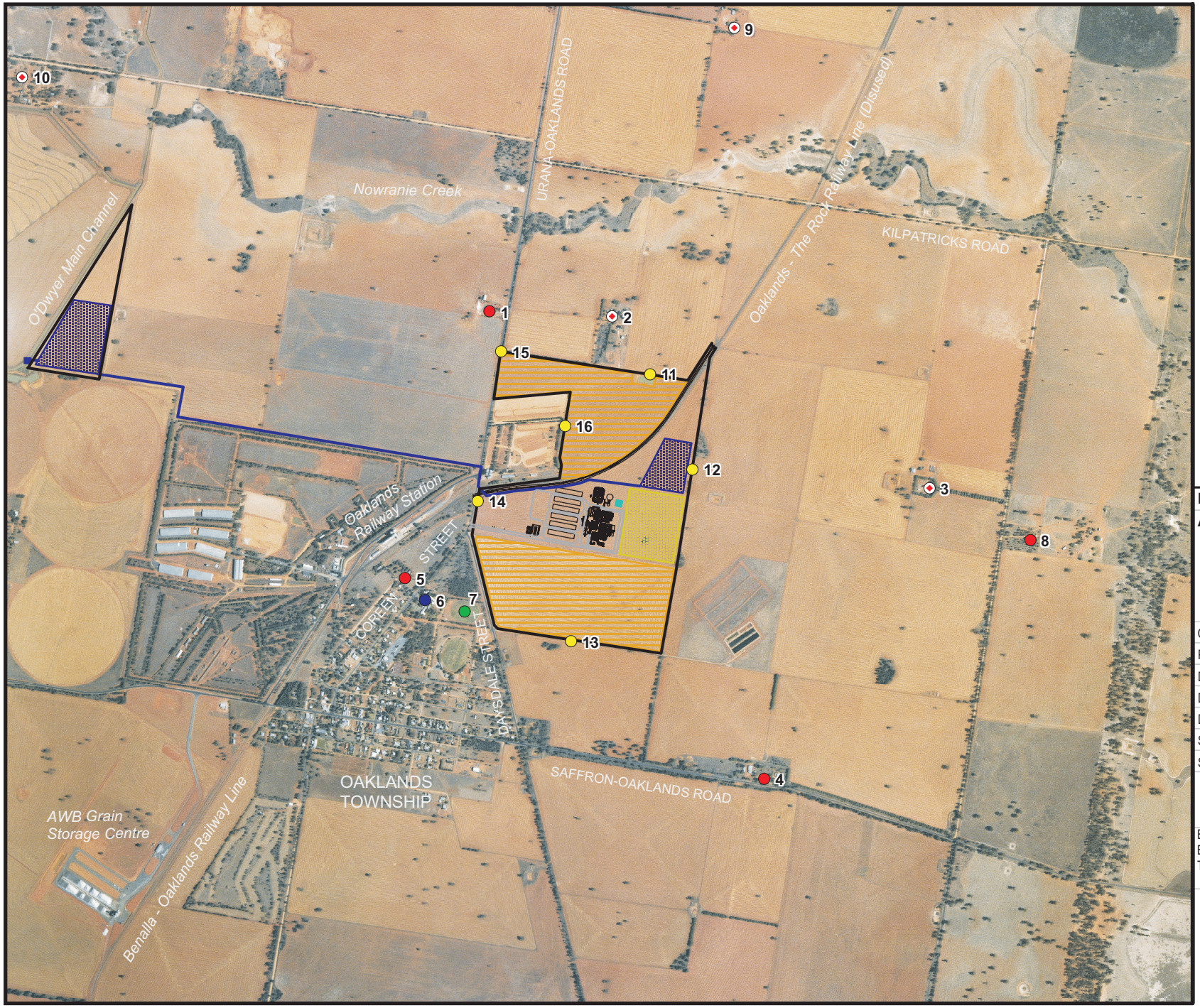
The desktop assessment did not identify any previous air monitoring undertaken within the region. The National Pollutant Inventory (NPI) includes one reporting facility in the Oaklands region. This is Wangamong Piggery which is located over 10km from the proposed ethanol facility site. As such, it is not likely to contribute to background air quality at the site of the proposed ethanol facility. Due to the lack of heavy industry in the area, background concentrations of air toxics in the area are likely to be very low. Agricultural activities and traffic would contribute to background air quality, however there is potential for the proposed facility to be a major contributor of odour and air emissions, including air toxics, in the area.

The key contaminants identified in association with the proposed development are:

- particulate matter;
- ethanol;
- combustion emissions, including nitrogen dioxide, sulphur dioxide and carbon monoxide;
- a range of Volatile Organic Compounds (VOCs) including benzene, toluene, hexane, xylenes and ethylbenzene;
- acetaldehyde;
- methanol; and
- complex odours.

7.2.2 Assessment Locations

The locations of representative receptors assessed are shown in *Figure 7.1.* These comprise eight rural residences within 3.2km of the site (four of which are unoccupied), Oaklands Central School, a recreational oval in Oaklands township and the site boundaries. The air quality assessment also set up a study area that comprised a Cartesian grid covering an area of 6km by 6km (including Oaklands township), with grid receptors at regularly spaced intervals of 100m.



Legend

- 200Ml Raw Water Dam
- 2Ml Stormwater Dam
- 40Ml Effluent Dam
- Irrigation Area
- Water Pump Station and Pipeline
- Site Boundary
- Internal Access Road

- Recreational
- Residence - occupied
- Residence - unoccupied
- School
- Site Boundary

1-16: Air Quality Assessment Locations
1-10: Noise Assessment Locations

Figure 7.1

Assessment Locations - Noise and Air

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_OA_EG_01	
Date:	07.02.2007	Drawing Size: A4
Drawn By:	DH	Reviewed By: -
Source:	-	
Scale:	Refer to Scale Bar	

N

0 400 800m

Environmental Resources Management Australia Pty Ltd
Building C, 33 Saunders St, Pyrmont, NSW 2009
Telephone +61 2 8584 8888

ERM

7.2.3 Construction

Emission Sources and Potential Impacts

The main air quality issues identified in association with construction of the proposed ethanol facility are related to particulate matter and products of engine combustion.

Particulate matter emissions are likely to result from dust generated by earthworks (including for road and plant construction), vehicle movements on unsealed exposed surfaces and wind erosion of unsealed exposed surfaces. However, these are expected to be minimal during the construction phase as large areas of land are not required to be exposed and the main access road is to be sealed, which will minimise dust generated from vehicle movements. Potential impacts from particulate matter during short-term construction activities are often nuisance related rather than health related.

Combustion emissions such as carbon monoxide, carbon dioxide, particulate matter and nitrogen oxides from the movement of trucks and vehicles on-site are also likely to occur. These are only expected to be a minor contributor to overall emissions from the site, due to the anticipated small construction fleet on-site.

Emissions generated during construction are expected to be short-term in duration and can be managed through a *Construction Environmental Management Plan*. Significant off-site impacts are not anticipated.

Management and Mitigation Measures

To minimise potential nuisance-related impacts of particulate emissions generated during the construction phase, watering of exposed surfaces will be undertaken when necessary, speeds on unsealed surfaces will be limited, the extent of disturbed areas will be kept to a minimum and dust generating activities will be minimised on days when weather conditions are considered to create a high risk of dust generation e.g. strong winds. These measures can be included in a *Construction Environmental Management Plan*.

7.2.4 Operational

Emission Sources and Potential Impacts

The major emissions to the atmosphere expected during the operational phase of the proposed ethanol facility include:

- particulate emissions from dust collectors (grain handling dust collector, DDGS loadout dust collector and milling dust collectors), which will discharge to the air from exhaust stacks;
- combustion emissions from the LNG fired boilers and dryer;
- ethanol, odour and other pollutant emissions from various stages of the process; and
- fugitive ethanol and other pollutant emissions from ethanol storage tanks.

The plant design includes installation of wet scrubbers on the fermentation plant to remove carbon dioxide and VOC emissions from the fermentation process. It also includes installation of a thermal oxidiser to control VOC and carbon monoxide emissions from the DDGS Dryer. Four dust collectors are proposed for the facility, which will incorporate fabric filter technology to control particulate emissions from grain handling, milling and DDGS loadout. These pollution control systems are included in the plant design to minimise emissions to air from these sources and ensure they do not have an adverse effect on nearby areas.

Particulate matter emissions will be generated during operation of the ethanol facility from three main sources:

- truck movements on-site (wheel generated particulate matter);
- grain receival, storage and processing; and
- blow down of the cooling towers.

Odours could be generated via VOC emissions from the fermentation process, storage and handling of WDGS and the storage and disposal of wastewater. Wet scrubbing technology minimises potential odour emissions from the fermentation process. The location of potential odour sources such as WDGS storage in enclosed structures minimises potential odour emissions from WDGS storage and handling. Wastewater biochemical oxygen demand (BOD) levels are predicted to be 33 milligrams per litre (mg/L); the wastewater secondary treatment plant incorporates an anaerobic treatment step to reduce BOD significantly. At these levels, odour impacts would not be expected from this source, particularly when taking into account the proposed size and retention time of the effluent dam.

Emission point sources included in the air dispersion model developed for the assessment of operational air quality impacts were the boiler, scrubbers (fermentation scrubber and process vent scrubber), cooling towers, dust collectors (grain handling dust collector, DDGS loadout dust collector and milling dust collectors), DDGS dryer and Loadout Flare. The WDGS storage and ethanol storage tanks were also included in the model. The locations of these emission sources are shown in *Figure 7.2*.

A summary of dispersion modelling results for the receptors identified as experiencing the highest concentration of each contaminant is presented in *Table 7.1*. These results show that predicted ground level concentrations at sensitive receptors and where applicable, at the site boundary, are well below the relevant NSW DEC criteria for toxicity based pollutants, odorous pollutants, carbon monoxide, sulphur dioxide, nitrogen dioxide, total suspended particulate (TSP) and particulate matter less than 10 micron (PM_{10}). Predicted ground level concentrations for odour at these locations are below the nominated NSW DEC criteria of 3.0 odour units.

Table 7.1 Summary of Dispersion Modelling Results

Pollutant	Maximum Concentration		Criteria	% of Criteria	
	Normal	Worst Case		Normal	Worst Case
Carbon monoxide –15 mins	34.2	16.8	100,000 µg/m³	0.03%	0.02%
Carbon monoxide – 1 hour	32.6	15.6	30,000 µg/m³	0.11%	0.05%
Carbon monoxide –8 hours	17.4	11.3	10,000 µg/m³	0.17%	0.11%
Nitrogen Dioxide – 1 hour	52.4	25.7	246 µg/m³	21.30%	10.45%
Nitrogen Dioxide - Annual	2.82	0.98	62 µg/m³	4.55%	1.58%
PM10 – 24 hour	8.31	20.1	50 µg/m³	16.62%	40.20%
PM10 – Annual	1.56	1.05	30 µg/m³	5.20%	3.50%
Sulphur Dioxide – 10 mins	0.21	0.15	712 µg/m³	0.03%	0.02%
Sulphur Dioxide – 1 hour	0.2	0.16	570 µg/m³	0.04%	0.03%
Sulphur Dioxide – 24 hour	0.073	0.091	228 µg/m³	0.03%	0.04%
Sulphur Dioxide – Annual	0.012	0.0049	60 µg/m³	0.02%	0.01%
TSP - Annual	2.13	1.49	90 µg/m³	2.37%	1.66%
Benzene	9.52×10^{-7}	7.91×10^{-7}	0.029 mg/m³	0.00%	0.00%
Formaldehyde	4.31×10^{-4}	5.22×10^{-4}	0.02 mg/m³	2.16%	2.61%
n-Hexane	6.46×10^{-3}	6.37×10^{-4}	3.2 mg/m³	0.20%	0.02%
PAH	2.23×10^{-7}	8.93×10^{-9}	0.0004 mg/m³	0.06%	0.00%
Acetaldehyde	8.17×10^{-3}	0.0147	0.042 mg/m³	19.45%	35.00%
Ethanol	0.062	0.093	2.1 mg/m³	2.95%	4.43%
Methanol	3.19×10^{-5}	3.72×10^{-5}	3.0 mg/m³	0.00%	0.00%
Toluene	8.17×10^{-6}	8.99×10^{-6}	0.36 mg/m³	0.00%	0.00%
Odour	0.22	0.49	3.0 OU	7.33%	16.33%

1. Maximum concentration has been estimated based on dispersion modelling results for the receptors identified as experiencing the highest concentration of each contaminant.

In addition, concentrations of contaminants at the proposed emission points were calculated based on conservative emission estimations, design specifications and assumptions as to stack parameters. These preliminary calculations indicated that concentrations of all contaminants from all relevant sources were below the design criteria given in the *POEO (Clean Air) Regulation 2002*. Actual concentrations will be confirmed by stack testing of the relevant emission points on commissioning. The results will then be assessed against the POEO standards of concentration to ensure compliance and set emission limits which can be maintained on an ongoing basis.

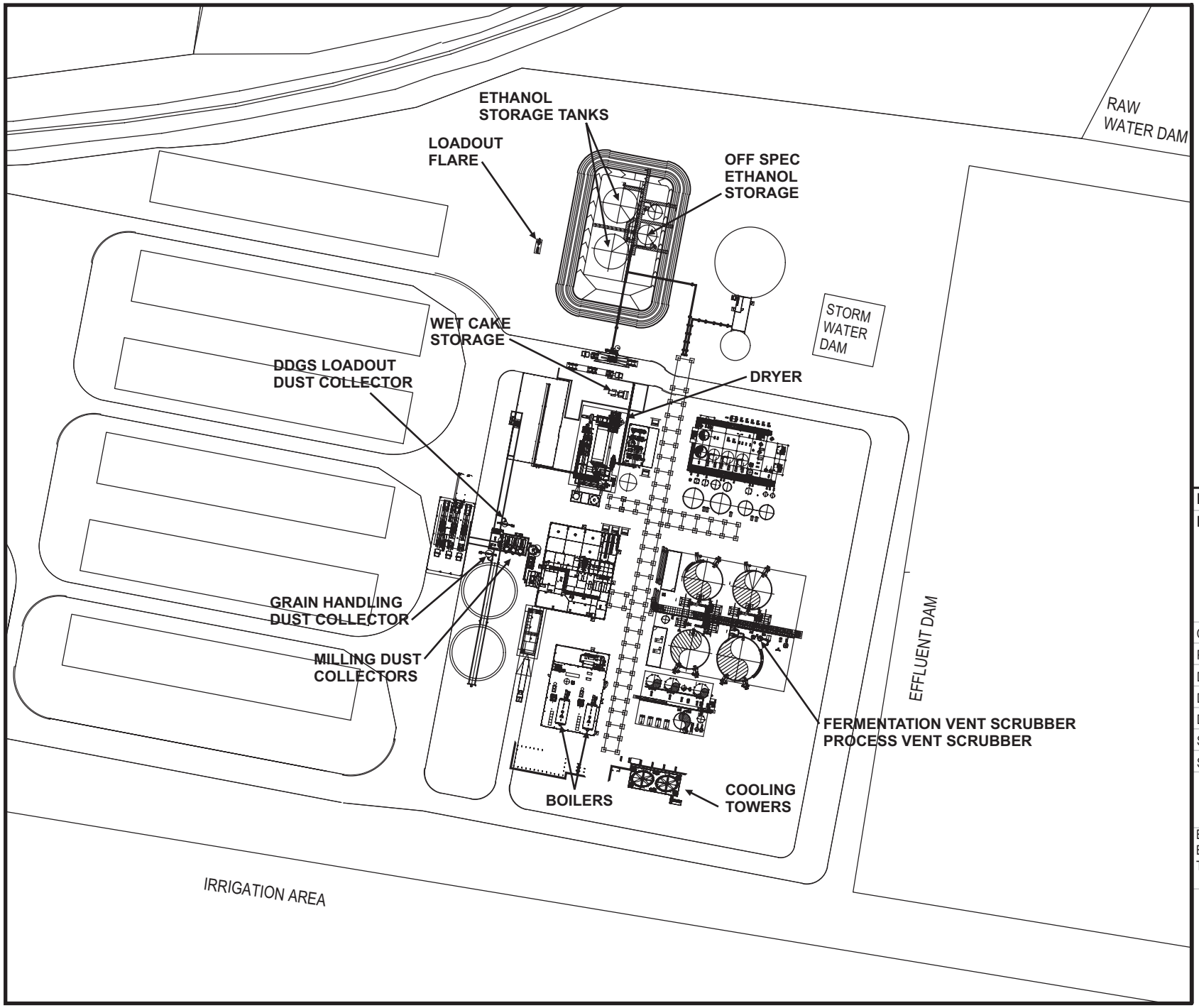


Figure 7.2

Emission Points

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_OA_EG_02	
Date:	08.02.2007	Drawing Size: A4
Drawn By:	ML	Reviewed By: -
Source:	Plant Design: PDF DWG No: M06075-0321	
Scale:	Refer to Scale Bar	

N

0 40 80m

Environmental Resources Management Australia Pty Ltd
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ERM

Management and Mitigation Measures

To reduce the risk of odorous emissions from wastewater, regular monitoring of the wastewater discharged to the effluent dam will take place to ensure that BOD remains at a low level. If BOD levels are not able to be kept at a low level, an aerator may need to be installed in the effluent dam. The facility will comply with the legislative requirement to not cause or permit the emissions of any offensive odour from the premises (Section 129 of the POEO Act). An odour management plan will be implemented, potentially as part of the *Operational Environmental Management Plan* to be developed for the facility, and include will a contact number for nearby residents to notify the facility if an offensive odour is detected.

Minimisation of particulate matter emissions on the site is an important part of the ethanol production process, in order to maintain the purity of the ethanol product and mitigate the risk of explosion resulting from ignition of grain dust. The following dust management measures will be put in place to minimise particulate emissions:

- paving all access roads, the car park and heavy vehicle standing area and most exposed surfaces on-site;
- watering paved roads when necessary;
- covering all truck loads to reduce windblown dust and spillage;
- all grain storage piles will be covered by tarpaulin to reduce wind blown dust emissions;
- maintenance of dust extraction and filtration systems at grain unloading areas;
- maintenance of dust extraction and filtration systems at grain storage silos; and
- maintenance of fabric filter dust collection systems at grain screening and milling operations and DDGS loadout.

As described above, pollution control equipment is included in the plant design to minimise emissions. To ensure the pollution control systems are functioning at optimal performance and achieving maximum capture/removal efficiencies, regular maintenance and inspections of this equipment is to be conducted. For this purpose, it will be necessary to provide sampling points and easy access points to the equipment when it is installed.

A full set of operating conditions and parameters will need to be recorded at start up, or while the unit is clean, for comparative purposes. To facilitate the necessary maintenance, a maintenance schedule which sets out required weekly, monthly and annual checks will be documented and implemented for all pollution control equipment on the site, as part of an *Operational Environmental Management Plan*. These checks should include, but not be limited to:

- visual checks for leaks, damage or corrosion;
- tests to ensure the proper airflow is being maintained in the case of dust collectors;
- checks to ensure the cleaning system is working adequately and the dust collector filter bags are not overloaded; and
- liquid flow tests, pressure and temperature

7.2.5 Greenhouse Gas Emissions

A Life Cycle Assessment (LCA) of greenhouse gas emissions associated with the proposal was undertaken by AEL (2007). The assessment included a literature review to determine appropriate data sets and calculation methodologies for emissions modelling, calculation of CO_2 emissions using an interactive Excel Spreadsheet Model developed specifically for AEL's proposed NSW ethanol plants and comparison of emissions from the use of ethanol based fuel with those from petroleum based fuel.

The following sections provide background information relating to greenhouse gases and set out the key outcomes of the assessment. The full assessment, including a description of methodology employed is presented in the AEL (2007) supporting technical report.

Background

Recently alcohol fuels have been the focus of attention as a possible means of reducing greenhouse gas emissions, and noxious emissions from transport (CSIRO *et al*., 2003). Emissions from fossil fuels used for transport contribute significantly to the greenhouse effect.

The greenhouse effect is the term used for the natural process whereby the Earth's atmosphere is warmed by heat energy from the sun being trapped by atmospheric gases. Human activities have been increasing the concentration of greenhouse gases, mainly carbon dioxide, in the atmosphere, primarily generated from industrial processes, fossil fuel combustion and changes in land use such as de-forestation. This is widely documented as leading to an increase in the world's average temperature, termed the enhanced greenhouse effect. Scientists predict that the major consequence of the enhanced

greenhouse effect will be climate change. It is likely that this will cause sea level rise and increase the incidence of extreme weather events such as damaging storms and prolonged drought.

Australian Commonwealth and State programs in place to address greenhouse gas emissions include:

- commitment to meet a target of 108% of 1990 emissions during the period 2008 – 2012 under the Kyoto protocol (notwithstanding that Australia has not ratified this protocol);

- reporting of national greenhouse gas emissions under the United Nations Framework Convention on Climate Change;

- establishment of the Australian Greenhouse Office as the Commonwealth's lead agency on greenhouse gas emissions, global warming and climate change, as announced in 1997;

- agreement by the Council of Australian Governments in 2006 to establish a single, streamlined system of greenhouse gas emission reporting that is mandatory for companies with energy production/use or greenhouse gas emissions above certain thresholds. Mandatory reporting will likely be required for industries with more than 500 TeraJoules energy produced or consumed per annum or 125 kilotonnes (kt) CO_2 equivalent (CO_2-e) gross greenhouse gas emissions per annum. Note that CO_2-e refers to the global warming potential of a gas relative to carbon dioxide. Under this agreement, it is likely that the proposed ethanol production facility will be required to undertake reporting; and

- implementation of the NSW Greenhouse Benchmark Scheme that imposes an emission benchmark on the State's electricity retailers and establishes a compliance mechanism that is essentially emissions trading.

Over the past decade the Australian public has become more aware of the need to control greenhouse gas emissions and more active in changing their behaviour to help reduce emissions. For example, 132,000 customers, including 6,000 businesses, now purchase accredited Green Power from renewable energy sources.

In response to Government drivers and increasing public awareness of the need for reduction of greenhouse gas emissions, businesses have been paying greater attention to their greenhouse gas emissions. For instance, a growing number of businesses are reporting their greenhouse gas emission performance in publicly available sustainability reports.

Ethanol Production Emissions

Dependant on how they are produced, use of biofuels can reduce greenhouse gas emissions, compared with petroleum (Australian Government Biofuels Taskforce, 2005). There have been a number of studies completed, principally in the US, that indicate the production and use of ethanol as a fuel reduces overall greenhouse emissions when compared to the use of petroleum based fuels. However, a specific result is hard to obtain as these studies have generally been focussed at an industry level and the outcomes vary due to differing project boundaries and process input assumptions adopted.

The ability of ethanol to contribute to a reduction in greenhouse gas emissions, however, is very much influenced by the nature of the feedstock and by the source of power used for the production process (CSIRO *et al*., 2003). For the current proposal AEL (2007) demonstrated that greenhouse gas emissions associated with the production and combustion of E10 were comparable with premium unleaded petrol and higher than for LPG. However, it must be noted that the Oaklands plant producing 200Ml of ethanol is displacing the use of the non-renewable 200Ml of petrol (AEL, 2007). Emissions for E85 were calculated as lower than for the alternative fuels assessed.

The ethanol production process generates valuable stock fodder co-products (WDGS and DDGS). When considering manufacturing facilities such as ethanol plants that produce more than one valuable product, it is generally accepted that the CO_2-e associated with the energy used to produce and convert grain to ethanol, including hauling grain from farms to the site, should be allocated to both ethanol and the co-products (Shapouri *et al*., 2004).

Life Cycle Analysis

A LCA model was developed to determine the specific greenhouse gas emissions associated with the proposal. In accordance with the Australian Greenhouse Office Workbook (National Greenhouse Gas Inventory Committee, 2006), the LCA comprises a full analysis of the direct and indirect emissions. It identified the following emission sources from the proposal, based on the scope of emissions in the Australian Greenhouse Office Workbook:

- ***"Scope 1*** *covers direct emissions from sources within the boundary of process production such as fuel combustion and manufacturing processes. In an ethanol plant Scope 1 emissions arise from the fermentation of simple sugars by yeast to alcohol with the concomitant release of CO_2. Steam is also used generated on-site for the Plant primarily for the conversion of starch to these simple sugars. The Heat Energy required to generate this steam is derived from LNG, LPG or natural gas and the on-site burning of these fuels will also generate Scope 1 CO_2 emissions.*

- ***Scope 2*** *covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organization. Scope 2 emissions result from the combustion of fuel to generate the electricity, steam or heat and do not include emissions associated with the production of fuel. The provision of water and electricity, that are required for the production of Ethanol and Distiller's Grain, will be obtained from an external source so that the CO_2 emissions to provide or generate these fall into the Scope 2 category.*

Scopes 1 and 2 are carefully defined to ensure that two or more organizations do not report the same emissions in the same scope.

- ***Scope 3*** *includes all other indirect emissions that are a consequence of an organization's activities but are not from sources owned or controlled by the organization. For an ethanol Plant Scope 3 emissions are generated as the result of crop production and haulage, transport of denaturant (petrol) to the site and transport of fuel ethanol from the site to bulk distribution points" (AEL, 2007).*

Input data was based on plant design parameters and data collected during literature review. Modelling was conducted for a worst case scenario involving maximum production (200Ml ethanol/year) with 100% of co-products produced as DDGS.

The allocation of total life cycle emissions to co-products is one of the most critical issues in LCA of greenhouse gas emissions. As discussed above, in determining the allocation of agriculture emissions to ethanol production it is considered that ethanol and DDGS are equally important co-products. This statement is justified by the fact that ethanol plants are generally not economical without sales of distillers grain. In dry mills, approximately 59% of the total energy purchased is expended on the production of ethanol (Shapouri *et al*., 2004). Consequently, AEL has adopted this industry recognised approach to allocation of all the greenhouse gas emissions associated with its operations between ethanol and co-products. That is, the model of CO_2 emissions associated with the plant includes allocation of 41% of CO_2 emissions to co-products (DDGS) and 59% to ethanol.

After allocation of emissions to co-products, AEL (2007) found emissions for the plant on a worst case LCA basis to be in the order of 294kt CO_2-e per annum (1.5kg/L). To put this in context, this represents 0.087% of the total CO_2 emissions in Australia for 2002. Scope 1 emissions were calculated to account for 36% of emissions, Scope 2 emissions accounted for 18% and Scope 3 for 46%.

AEL have developed a Greenhouse Gas Abatement Plan, which is included in the AEL (2007) report and outlines a number of management strategies to be implemented to reduce greenhouse gas emissions. This plan focuses on continual performance improvement and targets a reduction in greenhouse gas emissions to at least 10% below the estimated 2009 level by 2013. This is estimated to be equivalent to a 29,000 tonne reduction in CO_2 emissions.

7.3 WATER MANAGEMENT AND SOILS

A water resources assessment was undertaken for the site, including preparation of a water balance. A geotechnical investigation was also undertaken for the site, inclusive of field and laboratory analysis of soil samples. The following sections set out the key findings of these assessments. The full assessments are presented respectively in the ERM (2007b) and Geotechnical Testing Services (2006) supporting technical reports.

7.3.1 *Surface Drainage*

Oaklands is situated within the Billabong Creek catchment, which forms part of the Murray River catchment. Site drainage is poorly defined due to the relatively flat topography of the site and immediate surrounding area. The site drains to a shallow farm dam positioned near to the northern boundary of the site and toward Nowranie Creek approximately 700m to the north. Nowranie Creek flows in a north-west direction for approximately 18km before joining Billabong Creek. It is possible for minor overland flows to enter the site from slightly elevated ground to the south.

7.3.2 *Flooding*

Details of localised flooding are not known. The site is located within the designated Billabong Creek floodplain area as defined in the Billabong Creek Floodplain Management Plan (FMP) (DNR, 2006). However it is not within the area of land estimated in the FMP to be subject to flooding (situated approximately 680m from the extent of the floodplain), and therefore the development complies with the requirements of this FMP, as required under Section 168B(2) of the *Water Act 1912*. The proposed development is not expected to be impacted by large flood events within the Billabong Creek floodplain and is not expected to impact flood behaviour in areas surrounding the site.

7.3.3 *Construction*

Potential Impacts to Water Resources

Minor excavations will occur during construction, particularly for construction of plant structures, dams and laying of pipelines to connect the site to water and other utilities. Construction activities have the potential to impact water resources by:

- movement of sediment laden runoff from the site due to stormwater flowing over excavated or disturbed areas;

- soil erosion; and

- contaminating spills of fuels or chemicals.

Management Measures

Best management practices will be implemented to prevent impacts to water resources during construction. This will include adherence to a Soil and Water Management Plan prepared in accordance with *Managing Urban Stormwater – Soils and Construction* (Landcom, 2004), potentially as part of a *Construction Environmental Management Plan* and including:

- installation of temporary erosion and sediment control structures such as straw bales and sediment fences to prevent the movement of sediment from construction areas;

- installation of sediment basins and/or use of existing dams to contain sediment laden water, allow sufficient settlement time and flocculation if required and discharge of water following testing to confirm water quality meets relevant guidelines (eg < 50 mg/L suspended solids, no visible oils and greases);

- minimisation of time excavated surfaces are left exposed;

- restriction of traffic to defined internal roads;

- ensuring chemicals are appropriately stored and bunded;

- if required, cleaning soil adhered to tyres by hosing down in bunded areas prior to departure from the site; and

- regular inspection and maintenance of erosion/siltation control devices to ensure effectiveness for the entire construction period.

7.3.4 Site Water Balance

Water Sources and Consumption

Site raw water needs will be met by water extracted from the Murray River via O'Dwyer Main Channel (approximately 2.2km west of the site) under a 'high security' water licence sought from DNR under the *Water Act 1912*, and in accordance with the *Water Sharing Plan for the River Murray and Lower Darling Regulated River Water Source 2003*. O'Dwyer Main Channel forms part of the West Corurgan Private Irrigation Stock and Garden Water Supply District. A new pump station will be constructed with a pipeline to a 200Ml raw water dam constructed adjacent to the channel. From here, water will be pumped via a subsurface pipeline to the on-site 200Ml raw water dam and then onto the plant via a raw water treatment facility.

As described in *Section 3.3.5*, the plant will require approximately 5.642Ml of raw water per day. Accounting for backwash from the raw water treatment facility and evaporation losses from the storage dam (which will vary seasonally), an estimated 6.403 Ml/day to 6.731 Ml /day (6.567Ml per day on average) of raw water will need to be pumped from O'Dwyer Main Channel. A key component of the project is that 1.540Ml of water will be provided by recycling of process wastewater, as discussed below. Recycling will minimise the demand for raw water from O'Dwyer Main Channel.

The high security water licence will ensure an adequate supply of water for the production process. Appropriate sizing of the raw water dam will minimise evaporation loss, and seepage loss will be minimised by installation of a High Density Polyethylene (HDPE) liner or similar covered with 0.5m of fine grained soil. The raw water dam on site has been sized to allow for a contingency supply of approximately 30 days at full production (in addition to that provided by the proposed dam adjacent to the O'Dwyer Main Channel). Provision of two 200Ml raw water dams will provide an average contingency water supply of 60 days at full production to ensure water supply is maintained from May to August when O'Dwyer Main Channel is closed for maintenance and repair. Furthermore, there will be a supply of water in O'Dwyer Main Channel during this time. AEL could use this as a contingency supply if necessary; this water would supply an estimated additional ten days of plant water requirements.

Extraction of raw water for use in the ethanol production facility will not impact on other local water users as it will be drawn from the source (O'Dwyer Main Channel) in association with licence conditions.

Potable water demands (approximately 3.8 kilolitres (kL) per day on average) will be met by connection to the main Oaklands reticulated water supply. This is not expected to place significant demands on the existing Oakland water supply.

Wastewater Streams and Recycling

The proposed water management system has been designed to maximise recycling and beneficial use of site water. All water used within the ethanol production process will be either recycled for further use within the plant following treatment, sent to salt evaporation beds, or used for irrigation.

As discussed in *Section 3.3.5*, backwash from the raw water treatment process, blowdown from the cooling tower and the boiler, totalling 1.15Ml per day will be pumped to the 40Ml effluent dam for re-use on the irrigation area. Wastewater generated from the ethanol production process (estimated 1.896Ml per day) will be pumped to a secondary anaerobic digestion treatment system included within the plant. Approximately 80% (1.54Ml/day) of this will then be recycled back to the process and the remaining 20% (0.356Ml/ day) will be pumped to the effluent dam. The proposed large surface area of the effluent dam (6ha) will maximise evaporation losses and reduce the volume required to be disposed of through irrigation.

Preliminary assessment of predicted characteristics of process wastewater against criteria outlined in *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004b) indicate that it would be classed as medium strength due to the total dissolved solids (TDS) concentration (642mg/L). Accordingly, the allowable frequency of uncontrolled discharges from the effluent dam (which would inevitably occur as a result of prolonged rainfall events) should be limited to 25% of years i.e. the 75th percentile of all rainfall events (DEC, 2004b). Preliminary analyses indicate that sizing of the effluent dam at 40Ml would meet this requirement, as it would be sufficient to store wastewater during a period of up to 10 days of continuous moderate to heavy rainfall i.e. the calculated 90th percentile rainfall year. As such the proposed 40Ml effluent dam should be more than adequate to store wastewater during wet periods when irrigation cannot be undertaken and will minimise potential for uncontrolled discharges. A final assessment of the required volume of this dam will be undertaken during development of the detailed irrigation plan and will be based on detailed irrigation scheduling, as discussed in *Section 7.3.7*.

Baseline wastewater quality parameters have been calculated for the irrigation water and indicate very low nutrient, salt and BOD levels. These parameters will be regularly monitored following commencement of operations.

Potential adverse impacts to surface water and the irrigated crop that can result from irrigation with wastewater include:

- excess irrigation water of unacceptable quality running off irrigation areas and entering receiving waters (Nowranie Creek);
- insufficient irrigation water causing crop growth problems; and
- salt build up causing crop growth health problems.

To avoid these potential impacts and ensure sustainable use of the wastewater, a detailed irrigation plan developed prior to commencement of irrigation will be adhered to. The irrigation plan is discussed in *Section 7.3.7*.

A secondary plant wastewater stream will be generated from the regeneration streams of the water softener unit and the membrane treatment at a rate of approximately 49kL per day. This separate waste stream has a high concentration of salts (EC 30,000-35,000 µS/cm) and will be diverted to a salt evaporation system adjacent to the ethanol plant and effluent dam (refer to *Figure 1.2* in ERM (2007b)). Conceptually, the evaporation system will have dimensions of 190m x 130m, and will be separated into a series of evaporation cells used on a rotational basis.

The annual salt (NaCl) production of the proposed evaporation system will equate to 527 tonnes, which will be harvested and stored in high density concrete bins within a small undercover storage area onsite. The salt will then either be sold or offered for commercial purposes.

Sewerage (approximately 3.8 kilolitres (kL) per day) including domestic wastewater will be collected, treated and disposed of through either connection to the Oaklands reticulated sewerage system, which passes in close proximity to the southern boundary of the site or an on-site septic system.

Releases

The proposed wastewater management system ensures no discharges of plant wastewater or stormwater from the site up to the 90th percentile rainfall event. Stormwater management is discussed further in *Section 7.3.8*. All dams will be lined to prevent seepage loss and percolation to groundwater. The effluent dam will be designed to fully detain wastewater for the 75th percentile of all rainfall events. Full retention of runoff from its catchment for the 20 year, 2 hour storm runoff is selected as the minimum design criteria for the stormwater dam (this is a commonly used criteria for detention in other locations around NSW), in addition to the requirements for retention of the 90th percentile rainfall event. Hence no adverse impacts to receiving waters and associated flora and fauna are expected to result from discharges of wastewater or potentially contaminated runoff. Clean water storages will generally be designed to contain flows up to the 10 year, 2 hour Average

Recurrence Interval (ARI) event with spillways designed to convey the 100 year ARI overflows.

If an on-site septic system is constructed, it will be regularly maintained to ensure it continues to operate efficiently and therefore does not impact on the quality of ground and surface water.

7.3.5 Soils

Suitability to Accommodate Water Storages

Geotechnical Testing Services (GTS) excavated six pits on the site as part of the geotechnical investigation. Soil types within these pits were similar, in that approximately 0.2m of silty sand overlaid sandy clays with some gravel which extended to at least three metres below the surface. The soils were considered reactive to moisture variations (shrinking when dry and swelling when wet) (GTS, 2007).

GTS (2007) concluded that given the nature of the subsoil (sandy and gravely with limited volume of clay), it was likely that a HDPE membrane or similar covered with 0.5m of fine grained soil would be required to line the dams for the retention of water and prevention of percolation to groundwater.

Suitability to Accommodate Wastewater Irrigation

Chemical analysis of the soil samples from the excavated pits was undertaken by GTS (2007). Comparison of the results of this analysis against *Table 2.2* of the DEC (2004b) *Environmental Guidelines: Use of Effluent by Irrigation* shows that soil chemistry poses the following moderate limitations to wastewater irrigation on the site:

- The soil has some potential to slake and disperse (Emerson number of 2). However, structural stability can be improved by addition of gypsum, lime or organic matter.

- Soil pH (5.8 – 9) is not optimum for plant growth at all locations, given that plants generally grow best and are able to maximise the availability of nutrients when soil pH is between 6 and 7.5. The pH of the wastewater will be between 7-9 which will not pose a limitation to plant growth., If required, treatments may be used to slightly decrease pH to suit lucerne crops.

- Sodic subsoils are present, which may cause soils to disperse following irrigation. The high sodicity/low salinity evident would make subsoils prone to water logging. If soils in the root zone have sodic properties, dolomite or gypsum can be applied to reduce sodicity.

- The soils samples analysed had variable cation exchange capacity (CEC) (7.7-30). Soils with a CEC in excess of 15 generally have the potential to be more fertile than soils with a lower CEC as they have a greater capacity to hold exchangeable cations such as potassium, calcium, magnesium and hydrogen and are less susceptible to nutrient loss by leaching. Soils with a low CEC can hold less water and cation nutrients and plant growth is hindered. Soils with a low CEC may therefore require conditioning, for instance by addition of organic matter.

The site soils are likely to be suitable to sustain a wastewater irrigated crop, provided potential limiting factors such as those identified above are appropriately managed.

Salt and nutrient balances carried out for the site indicate that the leaching requirement for removal of salts out of the root zone would be easily achievable through a heavy rain event. Similarly, phosphorus and nitrogen modelling shows that no leaching or soil accumulation is predicted to occur from the proposed irrigation. Agsol Pty Limited (Agsol) (2007) conducted an independent review of available data, including that supplied by GTS (2007), and considered it likely that with a suitable crop management system the nutrient content of the wastewater would be immobilised.

Contamination

During operations, there is potential for soil contamination to occur from spills of fuel or chemicals. The following measures will minimise the risk of soil contamination occurring:

- sealing the majority of exposed surfaces around the plant, internal roadways, parking and vehicle standing areas will prevent spills in these heavy use areas coming into direct contact with soils;

- appropriate design of fuel and chemical storage facilities and spill containment facilities (refer *Section 8.2*);

- procedures for safe storage, handling and disposal of used chemical containers and routine maintenance consumables such as oil and grease included in the waste management strategy (refer *Section 7.6*); and

- emergency response procedures to be employed for the advent of spills (refer *Section 8.2*).

The irrigation plan to be developed for the wastewater irrigation scheme (refer *Section 7.3.7*) will ensure that application of wastewater to the irrigation area does not have an adverse impact on soils.

7.3.6 Groundwater

Existing System

The DNR groundwater licence database does not include any bores on the site. Historical drill log records from 18 bores within 2.5km of the site indicate that:

- there are up to three water bearing zones, with the shallowest typically intercepted at 43 to 81m below the ground surface, though intercepted at more than 120m below the ground surface at two bores;
- the standing water level in the shallowest aquifer system in the vicinity of the site is variable and is reported to range from 39 to 62m below the ground surface.

The standing water levels within the shallowest water bearing unit are above the top of the water bearing lithology which is indicative of semi-confined aquifer conditions. This is consistent with the lithological logs for the bores in the area, which suggest the presence of a low permeability clay layer above the water bearing unit.

The pits excavated by GTS on the site ranged in depth from 3.0 to 3.5m. No groundwater was encountered within these pits (GTS, 2007).

As discussed below, due to the depth of groundwater below the ground surface, the presence of clay layers above the shallowest water bearing unit, the quality of irrigation water quality and the fact that irrigation scheduling will be designed to prevent excess water migrating beyond the root zone, it is unlikely that the proposal would put groundwater at risk. Therefore groundwater testing was not conducted at the site as part of this assessment.

Groundwater Users and Quality

The site forms part of the Lower Murray Groundwater Management Area.

The DNR groundwater licence database indicates that groundwater from some bores in the vicinity of the site is used for beneficial uses i.e. industrial, domestic and stock watering purposes. The database also has salinity data for the shallowest water bearing zone from seven bores within 2.5km of the site. This data is from between 1917 and 1981 and so is potentially outdated, however suggests that salinity of groundwater in this area is highly variable, though is potentially of potable water quality (i.e. < 1000mg/L TDS) at some locations.

Wastewater Storage and Irrigation

Potential adverse impacts to groundwater that can result from storage and irrigation of wastewater include:

- percolation of wastewater of unacceptable quality from the irrigation area or effluent dam to groundwater affecting beneficial uses;
- percolation of wastewater from the irrigation area or effluent dam to groundwater causing elevation of groundwater level; and
- leakage of saline water from the evaporation beds which can be leached to groundwater.

As discussed above, percolation of wastewater from the effluent dam and salt evaporation beds to groundwater will be prevented by lining these systems.

The site irrigation strategy has been developed and a daily water balance has been prepared in accordance with the DEC (2004) *Environmental Guidelines: Use of Effluent by Irrigation* to ensure that the wastewater irrigation system will provide an efficient and sustainable means of managing wastewater from the production process to ensure sustainable irrigation of wastewater. A basic element of this plan is that wastewater will be applied at a rate that will maintain a soil moisture deficit while meeting targets for nutrient uptake, water use and salt flushing that are a function of soil conditions, climate and crop type. This will ensure that wastewater does not runoff the irrigation area, potentially polluting Nowranie Creek.

Furthermore, Agsol (2007) noted that if groundwater is not present within three metres of the ground surface and there is a barrier to groundwater movement (such as clay subsoil), risks to any underlying groundwater resource from a wastewater irrigation scheme should be minimal. The review of borelog information indicates that groundwater at the site is unlikely to be present within 30m of the ground surface. Geotechnical and hydraulic investigations undertaken for the development of the irrigation plan will enable identification of potential barriers to groundwater movement provided by the subsoils. However, as discussed above, it is likely that low permeability sediments are present between the shallowest water bearing zone and ground surface, which could impede percolation to groundwater.

DEC (2004b) recommends that if a proposed wastewater irrigation scheme has the potential to put groundwater at risk and/ or groundwater is located within 10m of the ground surface, groundwater monitoring should be undertaken. As discussed above, data from historical bore logs in the region indicates that there is no potential for groundwater within 10m of the ground surface. Due to the depth of groundwater, the presence of clay layers above the shallowest water bearing unit, the quality of irrigation water and the fact that irrigation scheduling will be designed to prevent excess water migrating beyond the root zone, it is unlikely that the wastewater irrigation scheme

would put groundwater at risk. Therefore it is unlikely that groundwater monitoring is required. This will be confirmed during preparation of the detailed irrigation plan, following determination of the hydraulic properties of the shallow subsurface geology.

Bore log information from the DNR groundwater licence database suggest that the geology between the ground surface and the upper-most water bearing unit comprises clays, clay bound gravel and sands. Hydraulic conductivities of these types of sediments generally range between 10 and 100m/day for sands and 0.2 and $2E^{-7}$ m/day for clays (Georef System Ltd, 2002). Effective porosities for clays generally approximate 0.01 to 0.18, while sands range from 0.16 to 0.46 (Georef System Ltd, 2002). Using this data, the range in potential infiltration rates into the subsurface soils is calculated to be between $1.1E^{-6}$ and 625m/day. If the irrigation application rate is higher than the hydraulic conductivity of the geology, infiltration will be limited and surface runoff could occur. To assess the implications of hydraulic conductivity on proposed irrigation rates, soil hydraulic testing will be undertaken to determine the hydraulic properties of the shallow subsurface geology. This will be undertaken during preparation of the detailed irrigation plan.

7.3.7 Irrigation Plan

A detailed irrigation plan will be developed following a full analysis of the soil infiltration rates and hydraulic conductivity at the irrigation area. It will detail aspects such as:

- types of crops and cropping methods;
- fertiliser management and details of any required treatments to address potentially limiting soil conditions e.g. application of gypsum
- the method and scheduling of irrigation (in accordance with DEC (2004b) *Environmental Guidelines: Use of Effluent by Irrigation*), including application rates and how soil moisture deficit will be maintained (typically at five to ten millimetres) and monitored to ensure excess wastewater is not applied to the area (resulting in infiltration of excess wastewater to groundwater and/or runoff to receiving waters of Nowranie Creek);
- a detailed assessment of the required size of the effluent dam;
- the level and intensity of monitoring required;
- triggers for cessation of irrigation;
- responsibilities for operation of the wastewater irrigation scheme; and
- incident and emergency response procedures e.g. in advent of equipment failure.

7.3.8 Stormwater Management

Stormwater runoff from potentially dirty areas e.g. carparks, will be fully retained on-site to avoid potential discharges and impacts on receiving waters. Runoff from clean areas i.e. undeveloped parts of the site, will be diverted around dirty areas to maintain clean water flows to receiving waters. A detailed stormwater management plan will be developed for the facility and will include the following:

- Stormwater runoff from all roofs and hard surface areas will be directed towards a 2Ml stormwater dam adjacent to the production buildings. This water will be disposed of via evaporation, and there will also be a pump installed in the stormwater dam to enable use of this water for irrigation, or to supplement the raw water dam (the quality is expected to be satisfactory for ethanol production). The pump will enable draw down of water levels (by pumping to the raw water dam) to below the designated top water level within a 48 hour period after rain. The dam will also serve as emergency spill containment and will require at least 60kL of reserve capacity between top water level and spillway level. The stormwater dam will be designed to fully retain the 90th percentile rainfall event and the 20 year, 2 hour storm runoff is selected as the minimum design criteria (this is a commonly used criteria for detention in other locations around NSW). Overflows in extreme rainfall events are expected to be sufficiently diluted to meet ANZECC and ARMCANZ (2000) guidelines for receiving waters (Nowranie Creek). Event sampling and testing will be undertaken to confirm this expectation.

- An oil-grit separator will be installed to treat water from carpark and road areas by removing coarse sediments and hydrocarbons prior to it entering the stormwater dam.

- Internal roads and areas where storage, transfer or processing of potentially contaminating material is proposed will be paved and graded to direct runoff and potential spills to the stormwater drainage system. The stormwater drainage system will comprise gutters, bunds, swales and pipe networks, installed to direct flows from these areas to the stormwater dam.

- Bunds will be constructed around all portions of the site in which potentially contaminating materials are stored, handled or processed to manage the risk of polluting local waterways from contaminating spills. Wherever practical, these areas will be roofed or otherwise covered and will include a fully contained drainage system. Bunds will prevent entry of runoff from surrounding areas for all events up to the 100 year ARI storm and will fully contain any potential spill. Design of bunding, drainage and pump-out systems will be in accordance with the relevant Australian Standards.

7.4 NOISE

A noise impact assessment was undertaken in accordance with the DEC (2000) *Industrial Noise Policy* (INP). Other guidelines referenced were the DEC (1994) *Environmental Noise Control Manual* (ENCM) and DEC (1999a) *Environmental Criteria for Road Traffic Noise* (ECRTN).

The assessment included modelling of major construction and operational plant and equipment using Version 6.3 of the SoundPLAN software and addressing the DEC's INP with regard to weather effects; the CONCAWE model was used for modelling noise levels from the construction equipment.

The following sections set out the key findings of the assessment. The full assessment, including a description of methodology employed is presented in the ERM (2007c) supporting technical report.

7.4.1 *Existing Noise Environment*

As the proposed facility is in a rural area and existing industrial noise levels do not warrant any adjustment to the amenity criteria at receptors assessed, no cumulative noise impacts are expected. The DEC's definition for a rural area is:

"*an acoustical environment that is dominated by natural sounds, having little or no road traffic*".

Unattended noise monitoring was conducted at Assessment Locations 5 (occupied residence in Oaklands) and 8 (occupied rural residence) (refer *Figure 7.1*) in accordance with the DEC's INP. The results are included in the ERM (2007c) technical report. Baseline data recorded at these locations indicated that ambient noise levels at residences in the vicinity of the proposed development are generally low. At Location 5, average ambient noise levels were 44 decibels (A-weighted) (dB(A)) during the day-time and 38dB(A) during the night-time. At Location 8, average ambient noise levels were 50dB(A) during the day-time and 46dB(A) during the night-time. Rating Background Levels (RBL) were calculated to be below 30dB(A) for all instances except for at Location 5 during the day, where an RBL of 32dB(A) was calculated.

The locations of representative noise-sensitive assessment locations are included on *Figure 7.1*. These comprise eight rural residences within 3.2km of the site (four of which are unoccupied), Oaklands Central School and a recreational oval in Oaklands township. Note that the entire Oaklands township lies within 2km of the plant.

7.4.2 Construction Noise

Identified noise sources from each major construction activity are summarised in *Table 7.2*. Site establishment and construction activities at the site are expected to occur for up to 16 months.

Table 7.2 Plant Items included in Construction Noise Model

Construction Activity	Included Plant Items
Preparatory earthworks	2 Articulated Dump Trucks, 2 Excavators, a Truck and a Dozer
Road Construction	2 Concrete Trucks, a Concrete Vibrator, a Dozer, a Grader and a Compactor
Building Construction	2 Road Trucks, a Crane, a Grinder, Welder and a Drill

As construction activities would vary over the construction period, three scenarios were modelled to gain an understanding of potential noise levels from the site as well as the potential variation. Each scenario is expected to occur for a period of less than 26 weeks. *Table 7.3* provides a comparison of construction noise modelling results for these scenarios against relevant criteria derived from the ECNM.

Table 7.3 Construction Noise Modelling Results

Assessment Location	Construction Scenario Noise Level, $L_{10, 15minute}$ dB(A)			Criterion, L_{10} dB(A)	
	Preliminary Earthworks	Earthworks plus Road Construction	Earthworks plus Road & Building Construction	< 26 weeks	> 26 weeks
1	33	35	35	40	35
2	35	**36**	**36**	40	35
3	27	28	29	40	35
4	28	29	30	40	35
5	36	**38**	**38**	42	37
6	37	39	39	n/a	n/a
7	39	41	41	n/a	n/a
8	23	24	25	40	35
9	21	22	23	40	35
10	15	16	17	40	35

1. Criteria sourced from DEC (1994) ENCM.
2. Each scenario is expected to occur for a period of less than 26 weeks.
3. Proposal criteria exceedences are in bold.
4. Modelling assumed that all equipment is operating at the same time (worst case scenario). Therefore construction noise would be substantially lower than these results for significant periods of time.

The results demonstrate that noise levels comply with criteria at all assessment locations if construction periods were less than 26 weeks. Noise levels of up to 2dB(A) above the criterion for construction activities lasting longer than 26 weeks may be experienced at Locations 2 (abandoned rural residence) and 5 (residence in Oaklands) during the noisiest periods of construction. A difference in noise level of around 2dB is generally imperceptible to the human ear. Modelling was conducted for the situation where all equipment is operating at the same time, to simulate a worst case scenario day of construction. It should therefore be noted that construction noise would be substantially lower than the scenarios modelled for significant periods of time. The exceedences predicted are therefore not considered to be significant.

Mitigation measures to reduce construction noise experienced at the potentially worst affected receptors can be included in a noise management plan, potentially prepared as part of the *Construction Environmental Management Plan* for the project. This would include:

- informing potentially affected residents in advance as to the extent and timing of potentially noisier construction activities and responsibly advising when noise levels during such works may be relatively high;
- where known to be readily available, deploying plant having lower noise emission levels;
- maintaining plant to ensure rated noise emission levels are not exceeded
- providing a contact telephone number via which the public may seek information or make a complaint. A log of complaints should be maintained and actioned by the site superintendent in a responsive manner;
- undertaking construction activities in accordance with AS2436-1981 'Guide to Noise Control on Construction, Maintenance and Demolition Sites'; and
- adhering to the following ENCM time limits for construction activities where construction noise is audible at residential premises:
    - Monday to Friday, 7am to 6pm;
    - Saturday, 8am to 1pm (or 7am to 1pm if inaudible at residential premises); and
    - no construction on Sundays or public holidays.

7.4.3 *Operational Noise*

Noise Sources

Noise generating plant and equipment that were identified for inclusion in the SoundPLAN model of plant operations were two hammermills, three front end loaders, three belt conveyors, two screw conveyors, two cooling tower fans, a blower, eight pumps and haulage trucks (three trucks were included in the model). Other items of plant such as smaller pumps and fans have lower sound power levels and would not contribute significantly to the total noise impact at the receptors. The front end loaders, transport trucks and two of the three belt conveyors do not operate during the period from 10pm to 6am.

Noise Levels – Calm Weather

Table 7.4 summarises noise modelling results for calm weather conditions against Project Specific Noise Criteria (INP intrusiveness criteria for residential receivers, INP amenity criteria - active recreation area for the sporting oval and INP amenity criteria - school for Oaklands Central School). The modelling results for day-time and night-time noise with the ethanol production plant operating are presented respectively in *Figures 7.3* and *7.4*, in the form of noise contours. The results assume all plant and equipment operate simultaneously. It should be noted that whilst the terrain is relatively flat, the contours deform due to on site structures proposed.

Table 7.4 ***$L_{eq,15minute}$ Noise Under Calm Conditions, Unmitigated***

Assessment Location	Predicted Level, dB(A)		Project Specific Noise Criteria, dB(A)	
	Day	Night	Day	Night
1	35	34	35	35
2	**37**	**36**	35	35
3	30	28	35	35
4	31	30	35	35
5	**39**	**37**	37	35
6	40	38	45	n/a
7	41	38	55	n/a
8	26	24	35	35
9	23	21	35	35
10	16	15	35	35

1. Day-time results include the period from 6am to 7am, which is classified by the DEC as 'night-time' for noise assessment purposes.
2. Proposal criteria exceedences are in bold.

The only identified exceedence of DEC's noise criteria for operation of the facility was a minor exceedence of up to 2dB(A) at the residences at Locations 2 and 5 during the day-time and night-time periods. As described above, a difference in noise level of less than 2dB is generally imperceptible to the human ear. The criteria exceedence at these locations is primarily due to noise from the two hammermills, trucks and front end loaders. The trucks and front end loaders will not operate from 10pm to 6am and so noise levels at these locations drop during the night. Acoustic treatment of noise from the hammermills and front end loaders may be used to reduce noise to comply with the Project Specific Noise Criteria at these locations.

Noise Levels – INP Weather Conditions

Under various wind and temperature gradient conditions, noise levels may increase or decrease from those experienced during calm weather conditions. Noise levels were assessed under 'INP Weather Conditions' (wind speeds below 3m/second and under temperature inversion) to simulate worst case scenarios. This required assessment of noise for wind speeds below 3m/second during autumn day, winter day, winter evening, summer night and winter night and under strong inversion conditions during the night-time.

The modelling results for adverse INP weather conditions are summarised in *Tables 7.5* and *7.6*, for the unmitigated scenario and for the scenario whereby noise treatments are applied to the hammermills and front end loaders. Six weather conditions were modelled, however to demonstrate the worst case scenario, only the maximum noise levels predicted for each assessment location are included in the tables. The modelling results for the respective day-time and night-time unmitigated scenarios identified as producing the highest noise levels for Oaklands township, i.e. winter day-time under adverse wind conditions and night-time under adverse wind conditions, are presented in *Figures 7.5* and *7.6* in the form of noise contours. It should be noted that *Figure 7.6* presents the combined modelling results for summer and winter night-time noise under adverse wind conditions, displaying the worst case result for each location.

Table 7.5 $L_{eq,15minute}$ *Noise Under Day Adverse INP Wind Conditions*

Assessment Location	Predicted Noise Level, dB(A)		Project Specific Noise Criteria, dB(A)
	Unmitigated	Mitigated	
1	**39**	34	35
2	**40**	**36**	35
3	28	26	35
4	**36**	32	35
5	**44**	**41**	37
6	44	41	45
7	45	43	50
8	24	20	35
9	25	21	35
10	23	19	35

1. Predicted noise levels at each assessment location are the maximum of the levels predicted for the three weather conditions modelled (autumn day, winter day, winter evening).
2. Proposal criteria exceedences are in bold.

Table 7.6 $L_{eq,15minute}$ *Noise Under Night Adverse INP Weather Conditions*

Assessment Location	Predicted Noise Level, dB(A)		Project Specific Noise Criteria, dB(A)
	Unmitigated	Mitigated	
1	**38**	32	35
2	**39**	33	35
3	31	26	35
4	35	29	35
5	**41**	34	35
6	42	35	n/a
7	42	36	n/a
8	27	22	35
9	25	19	35
10	21	16	35

1. Predicted noise levels at each assessment location are the maximum of the levels predicted for the three weather conditions modelled (strong inversion (8˚C/100m), summer night INP Wind Conditions, winter night INP Wind Conditions).
2. Proposal criteria exceedences are in bold.

Table 7.5 shows that day-time noise levels under adverse wind conditions are predicted to exceed the intrusiveness criteria at the residences at Locations 1, 2, 4 and 5, by between 1 and 7dB(A). As stated in the INP, *"it is recognised that excursions of noise above the intrusiveness criterion during the day would not usually have the same impact as they would at night"*. Furthermore, the predicted noise levels are below the maximum amenity criteria for day-time (55dB(A)) and night-time (45dB(A)).

The day-time noise levels at these residences are dominated by the hammermills and front end loaders. Mitigation of noise from the hammermills (to reduce noise emissions by approximately 10 dB(A)) combined with treatment of noise from the front end loaders (to reduce noise emissions by 4 dB(A)) would reduce noise levels experienced at the modelled receptors under day-time INP wind conditions by 2-5dB(A). With these acoustic treatments in place, the day-time intrusiveness criteria are still marginally exceeded by 1dB(A) at Locations 2 (unoccupied rural residence) and 4dB(A) at Location 5 (occupied residence in Oaklands) under adverse wind conditions. However these predicted noise levels are below the amenity criteria.

Table 7.6 shows that night-time noise levels under adverse INP weather conditions are predicted to exceed the relevant criteria at the residences at Locations 1, 2 and 5 by up to 6dB(A). The noise levels at these locations are also dominated by the hammermills. Acoustic treatment of the hammermills (to reduce noise emissions by approximately 10 dB(A)) would reduce 10pm to 6am night-time noise levels experienced at the modelled receptors under night-time INP weather conditions by 4-8 dB(A) to meet the Project Specific Noise Criteria at all receptors.

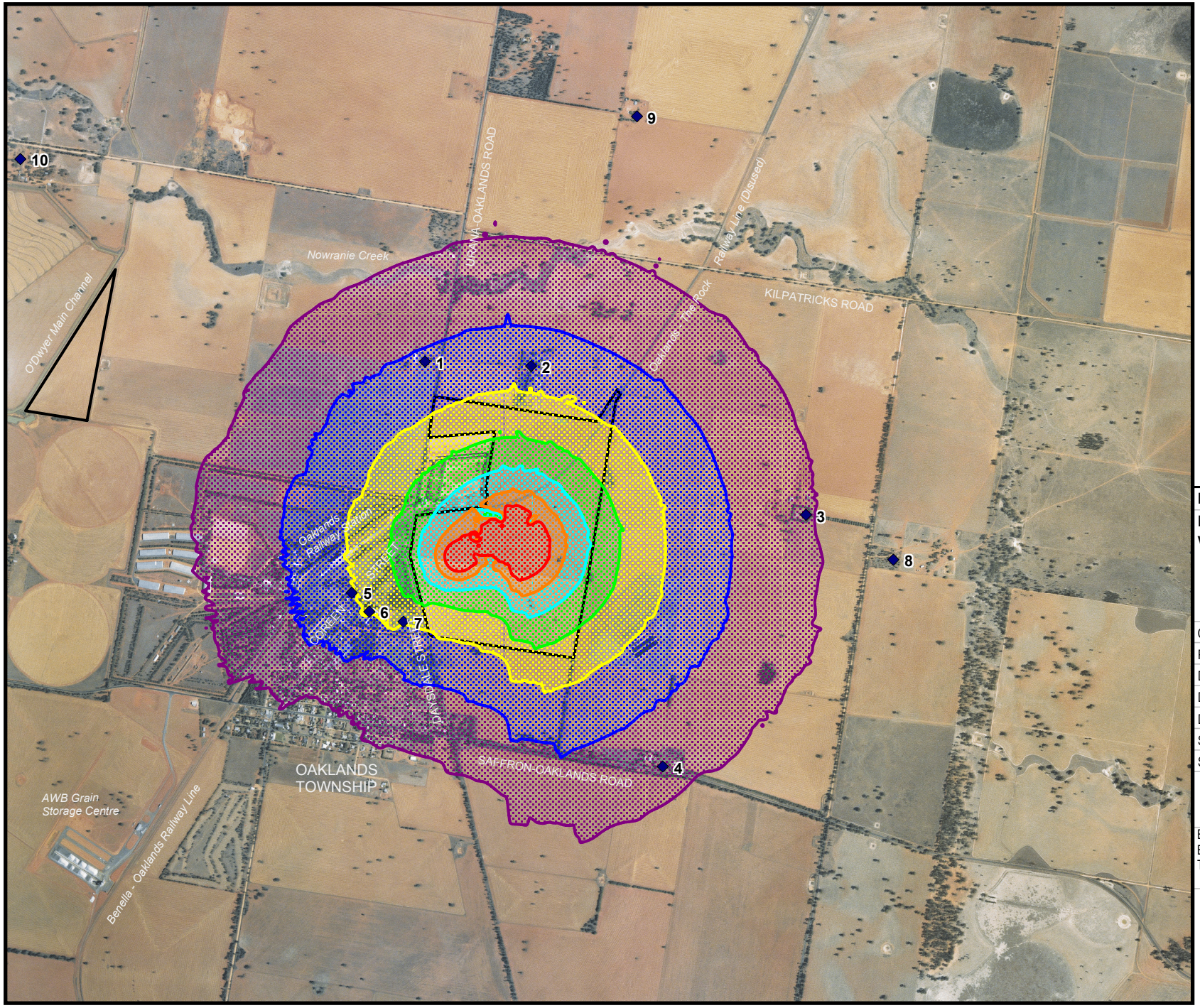

Figure 7.3

Leq Day-Time Noise Contours with Proposal - Calm Weather

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_EAR_GIS10	
Date:	09.03.2007	Drawing Size: A4
Drawn By:	DH	Reviewed By: -
Source:	Aerial: Department of Lands NSW	
Scale:	Refer to Scale Bar	

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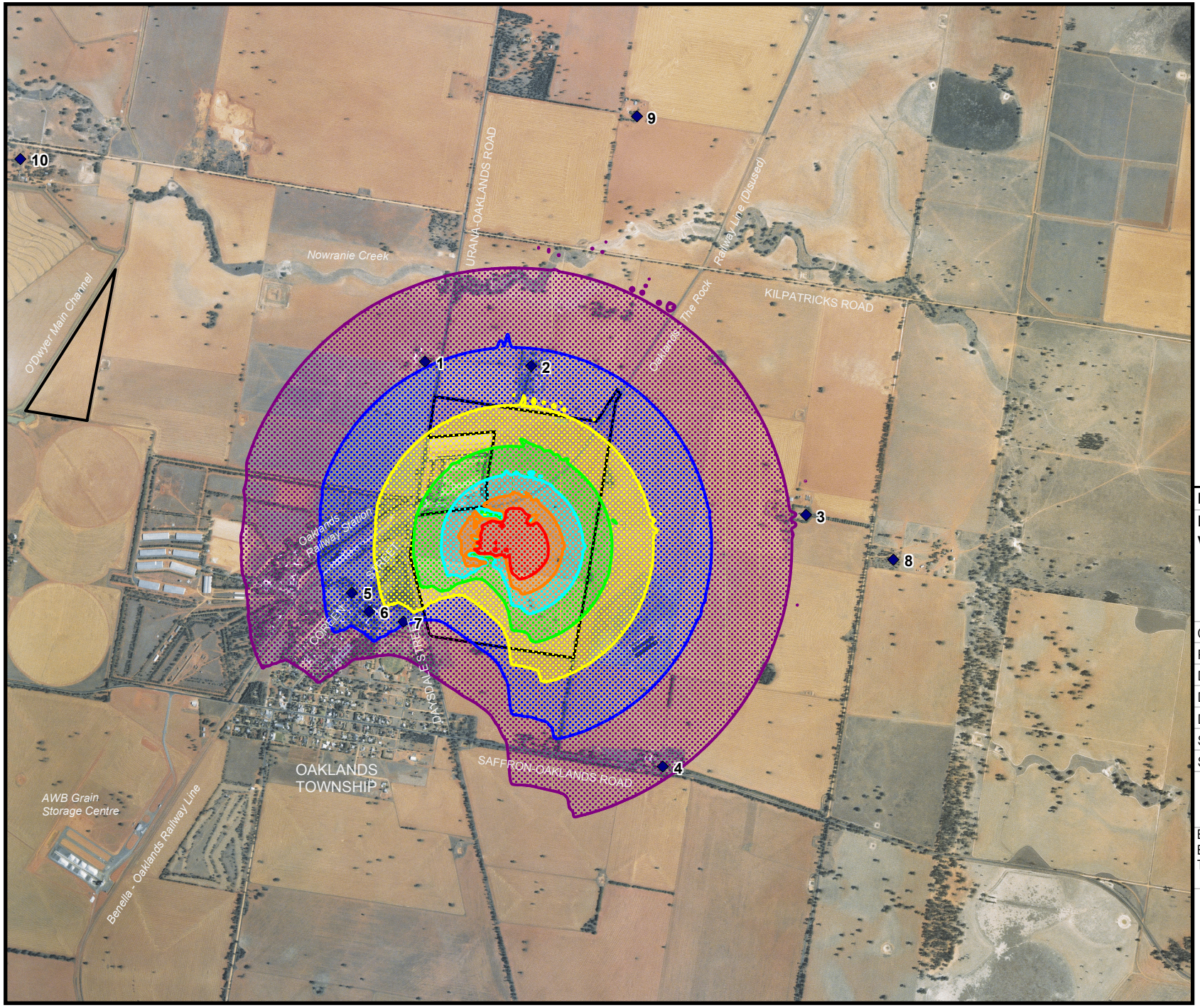

Figure 7.4

Leq Night-Time Noise Contours with Proposal - Calm Weather

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_EAR_GIS11	
Date:	09.03.2007	Drawing Size: A4
Drawn By:	DH	Reviewed By: -
Source:	Aerial: Department of Lands NSW	
Scale:	Refer to Scale Bar	

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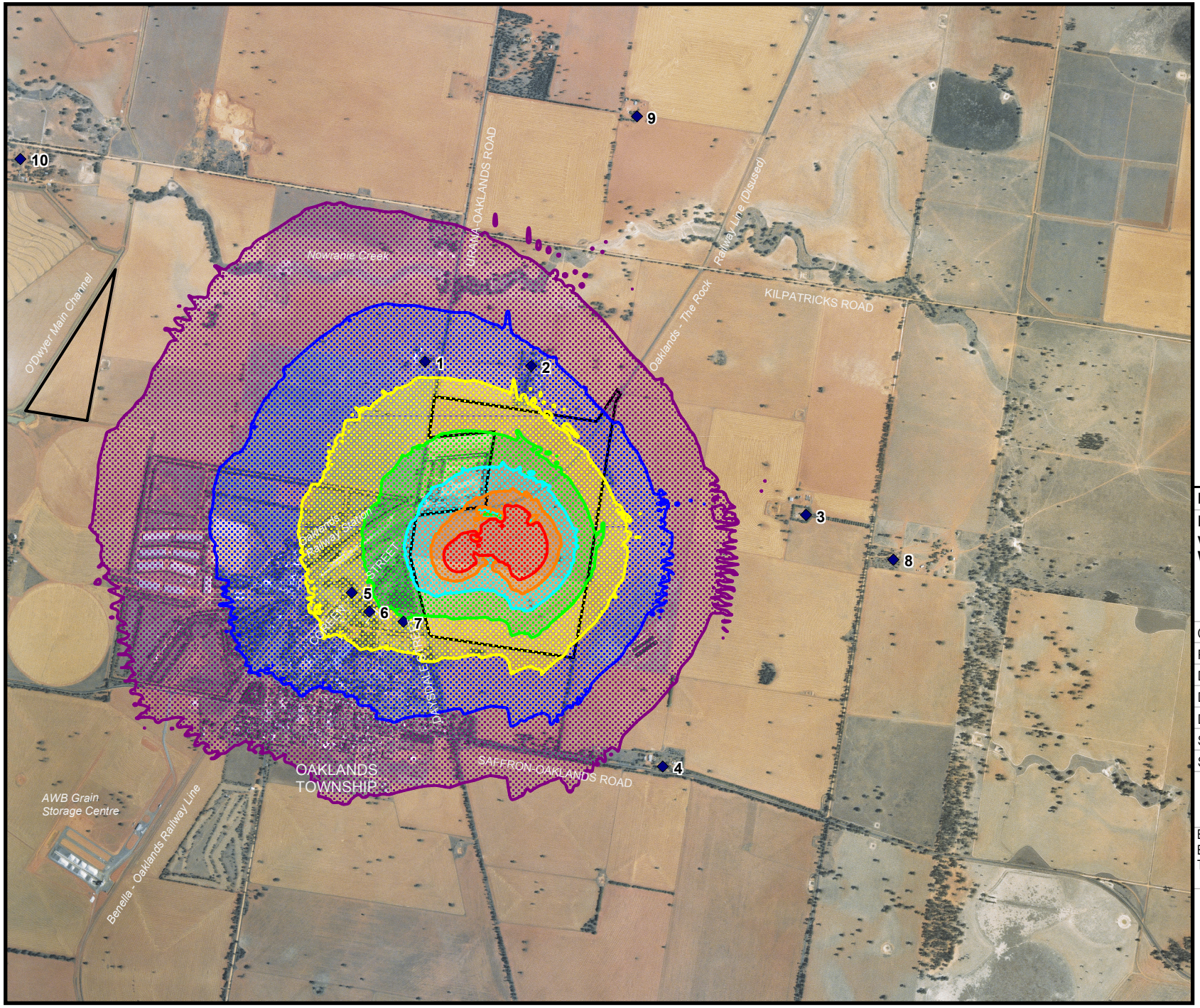

Figure 7.5

Leq Day-Time Noise Contours with Proposal - Winter (Adverse Wind Conditions)

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_EAR_GIS13	
Date:	09.03.2007	Drawing Size: A4
Drawn By:	DH	Reviewed By: -
Source:	Aerial: Department of Lands NSW	
Scale:	Refer to Scale Bar	

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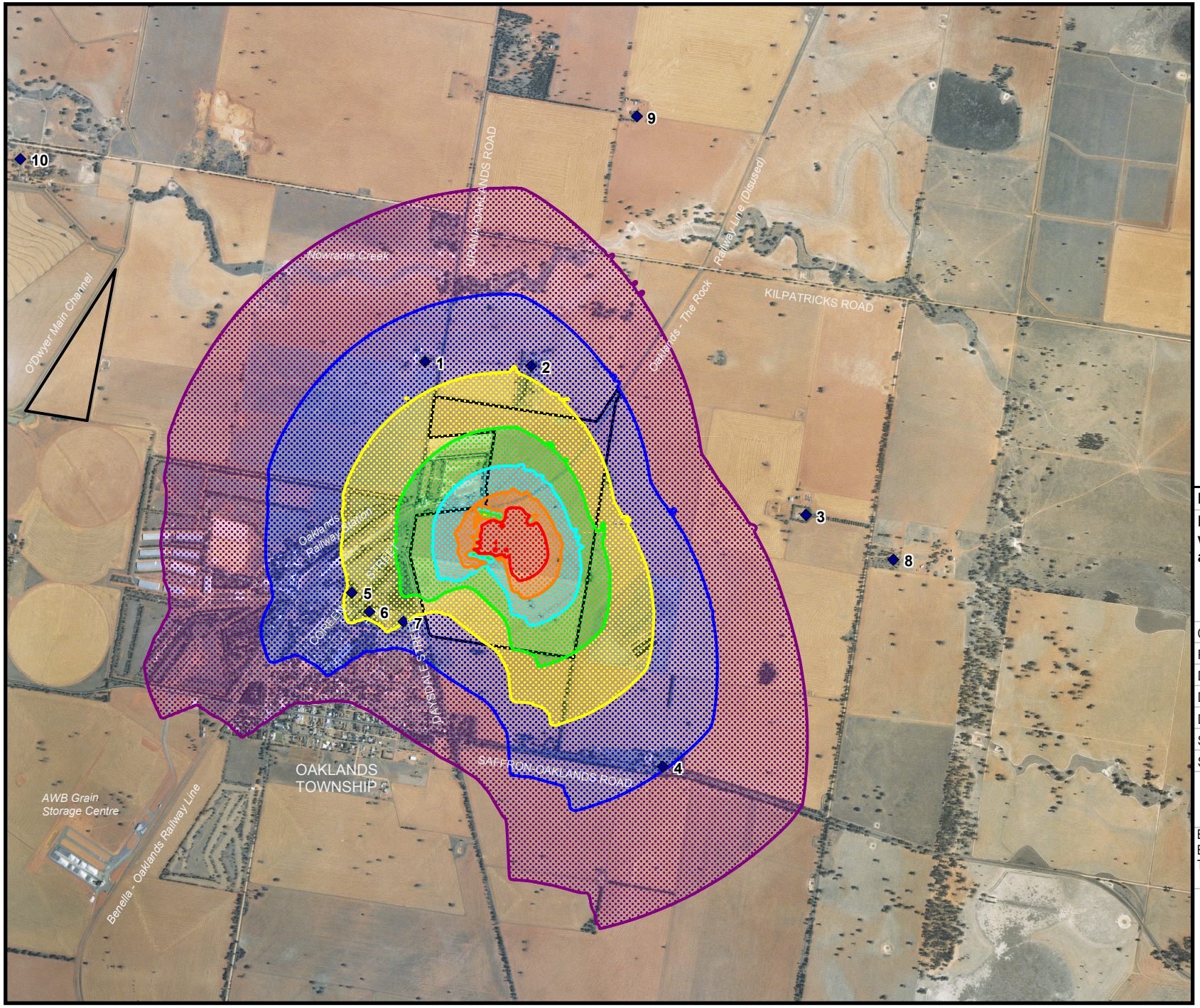

Figure 7.6

Leq Night-Time Noise Contours with Proposal - Combined Summer and Winter (Adverse Wind Conditions)

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_EAR_GIS12	
Date:	22.06.2007	Drawing Size: A4
Drawn By:	DH	Reviewed By: -
Source:	Aerial: Department of Lands NSW	
Scale:	Refer to Scale Bar	

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Sleep Disturbance

During the night period, the plant associated with the fermentation, distillation / separation and milling stages of the facility are expected to operate. As noise sources associated with these processes are continuous in nature (pumps, fans, etc), the maximum noise levels (L_{max}) during the night are expected to be similar to the L_{eq} levels predicted above.

Staff shift changes would nominally occur at 11pm and 7am. Predicted L_{max} noise levels from for example, car door slams and engine starts associated with the staff shift change are in the vicinity of 30dB(A) or less at the nearest residence, which complies with the DEC sleep disturbance noise criteria of 45dB(A).

Other noise sources with potential for sleep disturbance (eg front end loaders, deliveries / dispatch of product, etc) are operated between the hours of 6am and 10pm and therefore are generally not expected to cause sleep disturbance. However, during plant operations between the 6am to 7am night-time shoulder period (as classified by the DEC in Section 3.3. of the INP), predicted L_{max} noise levels from the front end loaders (for the worst case INP Weather Conditions i.e. summer night adverse winds) would be approximately 36dB(A) at the worst-affected residence (Assessment Location 5). This is below the DEC 45dB(A) sleep disturbance criterion.

Consequently, no sleep disturbance due to the operation of the proposed facility is expected.

Mitigation and Management

In order to reduce the noise levels at the affected residences at Locations 1, 2, 4 and 5, the noise emissions from the highest-contributing noise sources can be reduced. Treatment of the hammermills (the dominant noise source during the night) by the addition of lagging or an acoustic enclosure or barrier would enable the criteria to be met at all receptors and under all conditions during the night-time period between 10pm and 6am, as demonstrated in *Table 7.6*. Such an enclosure or hood can be of a sandwich construction consisting of sheet metal outer skins with acoustic insulation in the cavity. The proposal limits heavy vehicle and truck movements to the hours of 6am to 10pm, which will also mitigate noise impacts during the night.

Treatment of the hammermills would also enable a reduction in day-time noise levels experienced at neighbouring residences. During the detailed design stage of the proposal, additional mitigation measures will be investigated to reduce day-time noise experienced at these residences from front end loaders and trucks. The measures investigated will include treatment of front end loaders with a noise suppression kit.

The modelling results have demonstrated that it will be possible to mitigate noise levels from operation of the plant such that operational noise at all residences under winds up to 3m/second and temperature inversion conditions of 8˚C/100m, complies with DEC criteria of 35dB(A)$L_{eq,\ 15min}$ during the night-time 10pm to 6am period and does not exceed 35-41dB(A)$L_{eq,\ 15min}$ during the day and 6am to 7am night-time shoulder period.

On-site plant and equipment is to be properly maintained to ensure rated noise emission levels are not exceeded. A contact telephone number will be provided on a sign on the site fence for the public to seek information or make a noise complaint. A log of noise complaints shall be maintained and actioned in a responsive manner.

7.4.4 Traffic Noise

Impacts of traffic noise from the proposal on Daysdale Street residences are considered sufficiently representative of traffic noise impacts, given that approximately half of the heavy vehicle traffic generated by the facility will use the existing heavy-vehicle bypass of Oaklands, along Daysdale Street (refer *Section 7.6.2*). In accordance with ECRTN criteria for a sub-arterial road, peak $L_{eq,15hr}$ traffic noise levels generated from traffic on Daysdale Street for the 7am to 10pm period with and without the proposal were predicted using the Calculation of Road Traffic Noise algorithm. Although not required to be assessed, the peak night-time $L_{eq,1hr}$ traffic noise level for Daysdale Street is also provided, to represent possible impact during the nominal 11pm shift change. The results are presented in *Table 7.7*. Note that the proposal limits haulage to the hours of 6am to 10pm, thus night-time noise impacts from heavy vehicles travelling to and from the site will be restricted to the shoulder period between 6am and 7am.

Table 7.7 Predicted Traffic Noise – Daysdale Street (20m)

Scenario	Traffic			L_{eq}, dB(A)	Criteria, dB(A)
	Light	Heavy	Total		
Existing (Day/Evening (7am-10pm))	231	47	278	49 (15 hr)	60
With Proposal (Day/Evening (7am-10pm))	251	223	474	54 (15 hr)	60
AEL 11pm shift change (Peak 1-hour)	24	0	24	46 (1 hr)	55

1. The nearest receptor is modelled at 20m from Daysdale Street.
2. Modelled traffic speed is 60km/h.
3. Traffic data sourced from ERM (2007d) traffic report.
4. $L_{eq,15hr}$ criteria is ECRTN criteria for land use developments with potential to create additional traffic on existing arterials (including sub-arterials).
5. The ECRTN does not provide $L_{eq,1hr}$ criteria for sub-arterial roads, so night-time $L_{eq,1hr}$ criteria for collector roads is used.

Predicted traffic noise levels experienced 20m from Daysdale Street would increase by approximately 5dB(A), to 54dB(A), with the proposal in place (refer *Table 7.7*). A difference in noise level of 5dB is considered to be noticeable by the average person. However the predicted $L_{eq,15hr}$ traffic noise levels for Daysdale Street are below the relevant ECRTN criterion of 60dB(A) for sub-arterial roads. The ECRTN does not provide $L_{eq,1hr}$ criteria for sub-arterial roads, however traffic noise from the night-time shift change is below the stricter night-time $L_{eq,1hr}$ criteria for collector roads (55dB(A)).

7.5 *TRAFFIC AND TRANSPORT*

A traffic impact assessment was undertaken for the proposal in accordance with the RTA (2002) *Guide to Traffic Generating Developments* to ensure that the proposed ethanol production facility does not pose unacceptable impacts on the external road network and allows for efficient and safe movement within the site. The following sections set out the key findings of the assessment. The full assessment is presented in the ERM (2007d) supporting technical report.

7.5.1 *Traffic Generation*

Construction Traffic

During construction, traffic (light and heavy vehicles) would be generated on the local road network around Oaklands associated with the transportation of materials, plant and contractors to and from the site. Some additional traffic may be generated on the regional road network. Volumes generated will vary throughout the construction period, however are not expected to exceed peak operational traffic generation at any time.

The impact of construction-related traffic on the local road network would be short-term as the construction period is only expected to last for 14 to 16 months and will generally be restricted to daytime hours (ie 6am-6pm). To minimise potential impacts, a *Traffic Management Plan* will be prepared prior to commencement of works, potentially as part of the *Construction Environmental Management Plan* for the project. This should be submitted to Urana Shire Council prior to commencement of works and include:

- identification of routes and times of travel for heavy vehicles;
- specification of signage at site access point warning of additional heavy vehicles;
- any special considerations or routes required for oversized vehicles, including vehicles over 40 tonnes;

- consideration of resurfacing the site access and the on-site circulation roads, to minimise dust generation and improve all-weather access;

- minimum requirements for vehicle maintenance to address noise and exhaust emissions, and mitigation measures to ensure the relevant criteria are met; and

- speed limits to be observed along routes to and from the site and within the site.

Operational Traffic

During operation of the ethanol production facility, traffic generated during peak times will comprise heavy vehicles (semi-trailers, B-doubles and heavy rigid vehicles) for transportation of grain, ethanol, WDGS, DDGS and other products including chemicals and ethanol denaturant, and light vehicles for movement of staff, visitors and contractors. Grain deliveries and ethanol dispatch would be staggered between 6am and 10pm to allow for efficient loading and weighbridge operations. Other deliveries, such as ethanol denaturant will generally occur between 6am and 6pm. The expected peak volumes and timing of traffic to be generated by the proposal are summarised in *Table 7.8*.

Table 7.8 Peak Traffic Generation during Operation of the Proposed Facility

Component	Type and Capacity	Peak Period	Peak Traffic Generation (trips)		
			Annual	Daily	Worst Case Peak Hour
Wheat/ Barley Deliveries	B-Double (40t) 70%	Nov-Jan,	4,735	114	8
	Semi (20t) 30%	Mon-Sat	4,058	98	7
Corn/ Sorghum Deliveries	B-Double (40t) 70%	Apr-June,	As for Wheat/ Barley above		
	Semi (20t) 30%	Mon-Sat	As for Wheat/ Barley above		
Denatured Ethanol Dispatch	B-Doubles 50,000L	Mon-Sat	4,200	30	2
WDGS Dispatch	B-Double (32t)	Mon-Sat	3,212	22	2
DDGS Dispatch	B-Double (32t)	Mon-Sat	10,325	72	5
Staff/Visitors/ Contractors	Light Vehicles	Mon-Sat	12,000	80	24
Assorted other vehicles eg LNG, Gasoline, Ethanol Denaturant, Other chemical deliveries	B-doubles and Heavy Rigid Vehicles	Mon-Sat	1,529	10	2
		Total	**48,852**	**426**	**50**
	Total Heavy Vehicles		**36,852**	**346**	**26**

1. One delivery equates to two trips (access and egress from the facility).
2. Wheat/ Barley and Corn/ Sorghum deliveries will not occur concurrently.

7.5.2 Capacity of the External Road Network and Intersections

The proposed haulage routes are shown on *Figure 7.7*. In summary, surrounding roads to be used by heavy vehicles are Urana-Oaklands Road, Oaklands-Berrigan Road (MR323) and the Answerth Drive bypass of Oaklands, Saffron-Oaklands Road (MR323) and Daydsale Street. Light vehicles for movement of staff and visitors are expected to primarily travel to and from Oaklands and possibly nearby towns including Urana, Saffron, Berrigan and Jerilderie.

Legend

- 200Ml Raw Water Dam
- 2Ml Stormwater Dam
- 40Ml Effluent Dam
- Irrigation Area
- Water Pipeline and Pump Station
- Site Boundary
- Internal Access Road
- Haulage Routes to Site
- Haulage Route from Site

Figure 7.7

Proposed Haulage Routes

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_OA_EG_03	
Date:	07.02.2007	Drawing Size: A4
Drawn By:	ML	Reviewed By: -
Source:	-	
Scale:	Refer to Scale Bar	

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Baseline traffic volume data for the nearby road network was obtained from the Urana Shire Council and the RTA. This data indicates that the traffic volumes on Saffron-Oaklands Road, Milthorpe Street and Oaklands-Berrigan Road, Urana-Oaklands Road and Coreen Street are between 182 and 411 Annual Average Daily Traffic (AADT), with a relatively high (16 to 31%) heavy vehicle composition.

Of the facility's total predicted peak traffic generation of 426 trips per day, 346 trips are predicted to be heavy vehicles and 80 trips to be light vehicle movements (refer *Table 7.8*). The predicted peak daily volumes of traffic to be distributed on the surrounding road network during operation of the facility are summarised in *Table 7.9*.

Table 7.9 Future Peak Traffic Flows with the Proposal

Road	Vehicles Generated by the Proposal (trips/day)		Total Estimated Traffic Volumes (trips/day), Peak Season
	Heavy	Light	
Urana-Oaklands Road	+85	+ 20	320 (33% heavy vehicles)
Berrigan-Oaklands Road	+85	-	377 (47% heavy vehicles)
MR323/Answerth Drive Daysdale Street/Saffron-Oaklands Road MR323	+176	+20	474 (47% heavy vehicles)
Coreen Street	-	+60	170 (0% heavy vehicles)

Table 7.9 shows that taking into account existing AADT, the predicted additional traffic volumes from the proposal will not cause any affected road to exceed its potential daily traffic capacity of 3,000 to 5,000 vehicles per day as defined by Austroads (1988).

Heavy vehicles travelling to and from the site will be restricted to signposted heavy vehicle detour routes around Oaklands, including Answerth Drive and Daysdale Street. These roads are currently utilised by heavy vehicles. Except for possible use of Coreen Street within Oaklands to access fuel and mechanical repair services, they will generally not utilise roads through the residential area of Oaklands, thus minimising impacts to existing urban areas.

The key intersections to be potentially affected by the development are:

- the Daysdale Street/Coreen Street T-intersection;
- the Daysdale Street/Saffron-Oaklands Road MR323 T-intersection; and
- the Answerth Drive/Urana-Oaklands Road T-intersection.

No upgrades to the Daysdale Street/Coreen Street T-intersection were considered necessary as it has an angle that allows for B-double movements.

The results of an assessment of the Daysdale Street/MR323 Saffron-Oaklands Road intersection and the site access intersection against Figure 6.41 of Austroads 2005 (from RTA 1999) for 'rural turning lane warrants' indicated that due to the relatively low levels of traffic on the existing road network, there is no requirement for auxiliary turning lane treatments at these intersections. However, it is considered that upgrade of the left turn from Daysdale Street onto Saffron-Oaklands Road is appropriate to maintain traffic safety at this intersection. Upgrade works should widen the left-turn apron to allow B-doubles to negotiate the turn without crossing the MR323 centreline.

The Answerth Drive/Urana-Oaklands Road intersection was not included in the 'turning warrant assessment' as heavy vehicles generated by the development would not turn right into Answerth Drive. As 40% of heavy vehicle haulage (85 trips per day) would utilise this intersection (that is, turn right from Answerth Drive into Urana-Oaklands Road to access the site and returning by turning left into Answerth Drive from Urana-Oaklands Road), it is considered that to maintain road safety it should be upgraded to cater for the turning heavy vehicles associated with the facility. The left turn apron into Answerth Drive should be upgraded to be consistent with Austroads (2005) standards.

7.5.3 Site Access

The existing site entry from Coreen Street will be utilised for site access. It will be sealed to minimise dust and will be upgraded to dimensions that ensure the swept path of a left-turning B-Double entering or exiting the site does not cross the centre line of Coreen Street.

Sight distance from this access point is 500m to the north along the Urana-Oaklands Road which has a speed limit of 100km/hr. The sight distance to the south is restricted to approximately 140m by a bend in the alignment, however is sufficient when the speed limit of 60km/hr for this stretch of road is taken into account. These site distances are adequate, as assessed against AUSTROADS (2005) requirements.

7.5.4 Internal Roadways and Parking

The proposed network of internal roadways and location of parking and loading/ unloading areas are shown in *Figure 7.8*. The internal roadways will service all loading and unloading areas, including ethanol, WDGS and DDGS dispatch areas and grain bunkers. The internal road subject to heavy vehicle usage will be sealed to minimise dust and will be wide enough to accommodate passing B-Doubles.

This design caters for the safe and efficient movement of proposed traffic around the facility, including wide heavy vehicle circulation roads and a large sealed heavy vehicle standing area. The internal circulation roads do not cross the 'disused' rail line.

The 40-space sealed carpark for light vehicles is to be located near the administration building and with the exception of sharing the main accessway, light vehicle traffic is separated from heavy vehicle circulation around the site. The proposed amount of car parking is sufficient to accommodate employees and visitors, particularly as the number of employees on site are spread over three shifts.

7.5.5 Rail Network

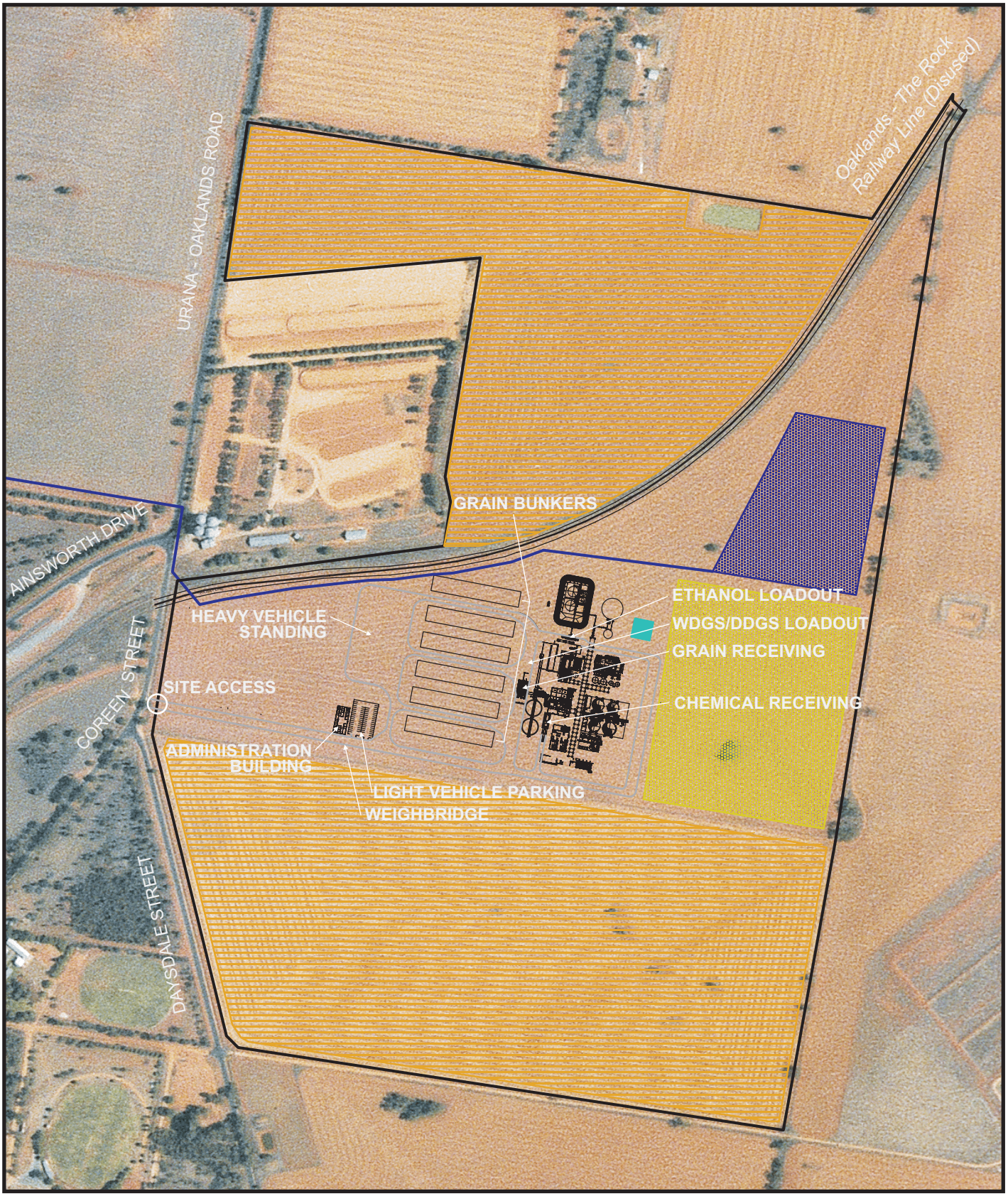
Oaklands – The Rock Railway Line that extends through the site is disused. Rail transport still operates from Oaklands to the south, via the Benalla Oaklands Line. It provides the potential for future rail transportation of ethanol, however is not part of the current proposal.

A disused crossing of the Oaklands - The Rock railway line, posted with 'Give Way' signs is located approximately 100m north of the proposed site access point, at the point where Coreen Street becomes Urana-Oaklands Road. It would be utilised by traffic generated from the facility.

Consent will be obtained from the Australian Rail Track Corporation for the construction of the water pipeline within the railway easement and under the railway track.

7.5.6 Public Transport, Pedestrians, Cyclists and Emergency Access

There are currently no plans to provide facilities for public transport, pedestrians or cyclists. The site is on the outskirts of Oaklands and pedestrian and cyclist movements to and from the township can be catered for on the existing road network. Emergency vehicles are able to access the site via the existing road network.



Legend

- 200Ml Raw Water Dam
- 2Ml Stormwater Dam
- 40Ml Effluent Dam
- Irrigation Area
- Water Pipeline
- Site Boundary
- Internal Access Road

Figure 7.8

Internal Site Network

Client:	Agri Energy Limited		
Project:	Oaklands Ethanol Production Facility		
Drawing No:	0056132_OA_EG_04		
Date:	07.03.2007	Drawing Size:	A4
Drawn By:	ML	Reviewed By:	-
Source:	-		
Scale:	Refer to Scale Bar		

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7.5.7 Road Safety

A search of the NSW RTA database over the last five years indicates no reported traffic incidents along Daysdale Street. Two incidents were recorded along MR323 (Milthorpe Street, Berrigan-Oaklands Road), being:

- a single vehicle run-off-road incident four kilometres east of Oaklands (non-casualty); and
- a two-vehicle incident within Oaklands near the intersection of Milthorpe Street MR323 and Gaffney Street.

Neither incident relates to the primary haulage routes to be utilised for the proposal.

It is considered that the development does not pose a road safety issue to the external network as:

- there is sufficient sight distance at the site access point on Coreen Street;
- due to current spare capacity in the external road network, the traffic generated by the proposed facility does not pose unacceptable delays or known road safety impacts to nearby roads or at key intersections;
- the site access intersection, and relevant components of the Answerth Drive/Urana-Oaklands Road T-intersection and Daysdale Street/MR323 Saffron-Oaklands Road intersections will be upgraded to cater for turning heavy vehicles in accordance with Austroads standards; and
- all heavy vehicles associated with the transport of grain and dispatch of materials to and from the site shall use approved B-Double routes (marked 'heavy vehicle bypass' only).

7.6 WASTE MANAGEMENT

Resource NSW, a State Government agency created under the Waste Avoidance and Resource Recovery (WARR) Act, produced the WARR Strategy in 2003. The operating principles of the Strategy emphasize a life cycle approach to waste prevention. Two key areas identified by the Strategy are the avoidance and prevention of waste and the increased use of renewable and recovered materials.

The State Government also recognises the need to reduce waste as a means of promoting ecological sustainability. The proposed facility will incorporate waste reduction strategies in accordance with the NSW Waste Management Hierarchy: avoid, re-use, recycle/reprocess, dispose.

The proposed facility requires an Environmental Protection Licence from DNR under the POEO Act. It will involve the handling and production of waste from a limited number of sources:

- co-products of the ethanol production process (WDGS and DDGS);
- surplus treated wastewater from the plant;
- sewerage/ wastewater from the plant and office amenity buildings;
- used chemical drums and the like;
- used oils, filters and machinery parts; and
- general office and administrative waste.

Co-Products

The co-products of the ethanol production process will be 50% WDGS and 50% DDGS, with annual production quantities of approximately 330,000 tonnes and 100,000 tonnes respectively.

In accordance with the DEC (1999b) *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes*, WDGS would be classified as a 'non-controlled aqueous liquid waste' and DDGS as 'inert solid waste'.

WDGS and DDGS will be stored on-site in a dual-purpose shed, which has a concrete bunded bunker for WDGS storage and open-fronted concrete bins for DDGS storage. Storage of the WDGS in an enclosed area and frequent dispatch will minimise the potential for odour emissions. WDGS and DDGS will be onsold as stockfeed to feedlots, dairies and piggeries, preferentially within the Murray Region, under an off-take arrangement with James & Sons. Due to its short shelf-life, WDGS will be dispatched by truck at least weekly.

Limiting the volume of by-product produced as WDGS to 50% will minimise the potential for production of WDGS in excess of market demands. In the future, if there is a reduction in the local demand for WDGS, other options for its disposal may be investigated including:

- increasing the proportion of DDGS produced;
- reduction of plant production to limit WDGS production;
- reduction in product price; and
- disposal to landfill.

DDGS is 90% solids and only 10% water and has a useful shelf life of over 12 months. Accordingly, it can be packaged and economically transported over long distances and may be marketed locally, nationally and/or internationally. DDGS will be preferentially sold to intensive agriculture facilities within the Murray Region, though it may be marketed further afield if there is a reduction in local demand.

Ethanol Plant Process Wastewater

The proposed wastewater management system is discussed in *Section 7.3.4*. This system has been designed to maximise recycling and beneficial use of site water. All water used within the ethanol production process will be either recycled for further use within the plant following secondary treatment, or used for irrigation. Approximately 1.15Ml/day of effluent will be generated surplus to that recycled back into the plant following treatment and would be classified as a 'non-controlled aqueous liquid waste'. This wastewater will be discharged to the 40Ml effluent dam. Due to the permeability of the sites' soils, it is likely that the dam would need to be lined with a HDPE membrane or similar, covered with 0.5m of fine grained soil, to prevent seepage losses. The wastewater will be pumped from the effluent dam to the proposed irrigation areas in the north and south of the site to facilitate the growing of crops such as lucerne hay.

Wastewater

Approximately 3.8kL of sewage and wastewater from the amenity buildings and site offices will be produced per day. This will be disposed of via the Council's sewerage treatment plant or an on-site septic tank system which will be constructed and maintained. The wastewater generated by the facility is classified as 'Group C non-controlled aqueous liquid waste' under the DEC (1999b) waste guidelines.

Stormwater

The stormwater management strategy is set out in *Section 7.3.8*. Stormwater runoff from potentially dirty areas will be fully retained on-site and runoff from clean areas will be diverted around dirty areas. A stormwater management plan will be developed during the detailed design phase of the project to provide concept design and sizes of stormwater drainage elements. This plan will include direction of runoff to the 2Ml stormwater dam, installation of an oil-grit separator and sealing and grading of areas where storage, transfer or processing of potentially contaminating material occurs to direct runoff and potential spills to the stormwater drainage system. Bunding will be in accordance with the relevant Australian Standards. Existing drainage paths from the site will be maintained.

Chemicals, Oils and Filters

Plant chemical containers and routine maintenance consumables such as oil and grease for equipment and site vehicles will be stored in a bunded area and collected by a licensed waste contractor as required. A portion of this waste stream would be classified as 'solid' or 'hazardous wastes' under the DEC (1999b) guidelines.

General Waste

A small amount of 'inert', general domestic waste, such as paper, cardboard and packaging, will be generated within the site office. It will be collected in appropriate bins and recycling containers for disposal by Council.

7.7 FLORA AND FAUNA

An ecological impact assessment was undertaken for the site the proposed pipeline route and the proposed dam site adjacent to O'Dwyer Main Channel, which included a desktop assessment incorporating a DEC Wildlife Atlas database search, DEH search for Matters of National Environmental Significance and BioNet search for records of threatened species locations within the DEC, Australian Museum and DPI databases.

The assessment was undertaken to ensure appropriate safeguards and strategies are put in place to avoid, mitigate and/or ameliorate potential impacts on ecological resources. A field investigation was conducted by two ecologists on 12 October 2006. The following sections set out the key findings of the assessment. The full assessment, including a description of methodology employed is presented in the ERM (2007e) supporting technical report.

7.7.1 Threatened Species

Flora

Database searches revealed that one threatened flora species, the Slender Darling Pea (*Swainsona marrayana*) has been recorded within the locality. This species is also listed as vulnerable under the EPBC Act. It was not recorded on site during the site inspection.

No threatened flora species were recorded during the site inspection.

Fauna

Database searches revealed eight threatened fauna species listed under the TSC Act have been recorded within the locality. These are all bird species and include the Grey-crowned Babbler (*Pomatostomus temporalis temporalis*), Painted Honeyeater (*Grantiella picta)*, Superb Parrot (*Polytelis swainsonii),* Brolga *(Grus rubicunda),* Bush Stone-curlew *(Burhinus grallarius),* Hooded Robin *(Melanodryas cucullata),* Major Mitchell's Cockatoo *(Cacatua leadbeateri),* and the Australian Painted Snipe *(Rostratula australis)*. Additional database searches for matters listed under the EPBC Act revealed a further seven threatened fauna species (refer ERM, 2007e), had the potential to occur in the locality.

No threatened fauna species were recorded on-site during the site inspection. A Grey-crowned Babbler (*Pomatostomus temporalis temporalis)* was heard calling within the vicinity of the site. However, there is no suitable habitat for the Grey-crowned Babbler on-site.

Endangered Ecological Communities

No endangered ecological communities were located within the site, along the proposed pipeline route or within the proposed dam site adjacent to O'Dwyer Main Channel.

Draft Guidelines for Threatened Species Assessment

In regards to addressing the key thresholds set out in Step 5 of the *Draft Guidelines for Threatened Species Assessment under Part 3A of the Environmental Planning and Assessment Act 1979* (DEC and DPI, 2005), the ERM (2007e) report concluded that the proposed development:

- will not significantly impact on biodiversity values of the site;
- will not reduce the long-term viability of a local population of any threatened species, population or endangered ecological community;
- will not accelerate the extinction of threatened species, populations or ecological communities; and
- will not adversely affect critical habitat.

7.7.2 Vegetation

Site vegetation was highly disturbed by agricultural practices and was dominated by exotic species. The majority of the site was vegetated with sown barley crops and there was a small, isolated patch of approximately 20 mature *Callitris* sp. in the east of the site. The proposal will remove the small stand of *Callitris* trees however these trees appear to be in poor health and do not provide significant habitat for native fauna.

Scattered native trees were located outside the site, adjacent to the eastern and northern site boundaries. These comprised Yellow-Box (*Eucalyptus melliodora*) along the eastern boundary and tall, mature *Callitris* sp. which appeared to be farm plantings along the northern boundary.

The proposed dam site adjacent to O'Dwyer Main Channel and the pipeline route comprised agricultural land that had been cleared of native vegetation and was vegetated with exotic groundcover species.

The potential for any adverse impacts resulting from introduction of new weed species to the site can be minimised by use of certified weed free materials.

7.7.3 Fauna Species

Fauna species recorded on the site were the Eastern Grey Kangaroo (*Macropus giganteus)*, as identified by the presence of scats, and seven bird species (predominately common woodland species). Another five bird species were recorded adjacent to the site. The majority of birds were recorded in the patches of trees on and adjacent to the site. No reptile or amphibian species were observed during the field investigation.

7.7.4 Fauna Habitat

The likely occurrence of threatened and migratory species on the site was considered to be low due to a lack of suitable habitat. Thus no assessments of significance of potential impacts of the proposal upon these species were required.

There was little to no habitat identified for native fauna on the site, along the proposed pipeline route or at proposed dam site adjacent to O'Dwyer Main Channel. This was primarily present in the form of the relatively depauperate stand of approximately 20 *Callitris* trees in the east of the site. However, the trees did not have any hollows and thus are considered unlikely to provide significant habitat for native fauna. They may provide some shelter and foraging resources, and be used as a stepping – stone connecting habitat for highly mobile species such as birds and bats.

The small, shallow, highly disturbed farm dam located in the north of the site was completely exposed with earthen banks. As such, it was considered unlikely to provide suitable habitat for aquatic species such as native frog species, and only marginal habitat for waterbirds.

Impacts are limited to potential off-site impacts to habitat quality of the Yellow-Box trees. The mature Yellow-Box trees adjacent to the eastern boundary of the site contained a number of hollows and stick nests, indicating that they have the potential to provide habitats for birds. These are located off-site and will not be removed as part of the proposal.

Identified potential impacts to the habitat quality of the Yellow Box trees include construction and operational noise, dust and lighting, which may deter birds from utilising the native trees surrounding the site. The location of the plant, away from the trees, suitably located and designed directional lighting and noise and air quality mitigation measures will be employed to mitigate these potential off-site impacts.

7.8 VISUAL AMENITY

The potential visual impact of the proposed ethanol production facility was assessed by examining the ability of the existing environment to absorb or accommodate the proposed physical changes, viewpoint sensitivity and the proposed mitigation measures.

7.8.1 Existing Landscape

Regional Setting

The defining landscape feature of the region surrounding the site of the proposed Oaklands ethanol production facility is flat rural land.

In general, the visual landscape of the Murray region is dominated by land that has been cleared of native vegetation for agricultural purposes, including areas of large scale irrigated farmland, serviced by artificial irrigation channels. Agricultural landuse is primarily wheat and barley cropping, sheep and beef cattle grazing and dairying. Typical features of the rural properties include sparse scattered rural dwellings and supporting infrastructure including silos, storage sheds, farm dams, fencing and access roads. There are also several areas of State Forest in the region, which are densely vegetated.

Other landscape features of the area include Billabong Creek approximately 15km to the north of the site, the Urana township approximately 55km to the north of the site, and Daysdale township and Coreen State Forest 18km to the south-east.

Local Setting

The site is situated on flat land, with an elevation of around 140m above the Australian Height Datum. The disused Oaklands-The Rock railway line runs across the site in a generally north easterly direction (refer to *Photograph 7.1*). The visual landscape surrounding the site is typical of the region, characterised by relatively flat cleared agricultural cropping and grazing land, with scattered rural residences, and the Oaklands township approximately 350m south-west of the proposed site access.

The site surrounds the Ray Brooks & Co. bulk grain storage facility and terminal on the western boundary which is the dominant feature in the local viewscape. The facility comprises two large steel clad sheds, five silos and a number of accompanying storage bunkers, as pictured in *Photographs 7.2* and *7.3*.

Pentarch Magazine Area, a storage facility owned by the Department of Defence, is situated 100m west of the site and is approximately 1km^2 in area. The AWB GrainFlow Oaklands Grain Storage Centre is located approximately 2.3km to the south-west of the site.

Nowranie Creek flows approximately 700m to the north of the site and is flanked by discontinuous stands of trees. The artificial O'Dwyer irrigation channel flows in a north easterly direction approximately 2.2km to the west.

Visual Catchment

The visual catchment of the site is defined as the area in which the development is visible, and is limited by distance, topography and presence of any screening features. Distant views are less significant by comparison to closer views as for distant views a wider landscape is viewed and details are obscured by distance.

The site itself is cleared of native vegetation and used as agricultural land with the exception of a stand of trees near to the eastern boundary. There is a rectangular farm dam in the far north of the site.

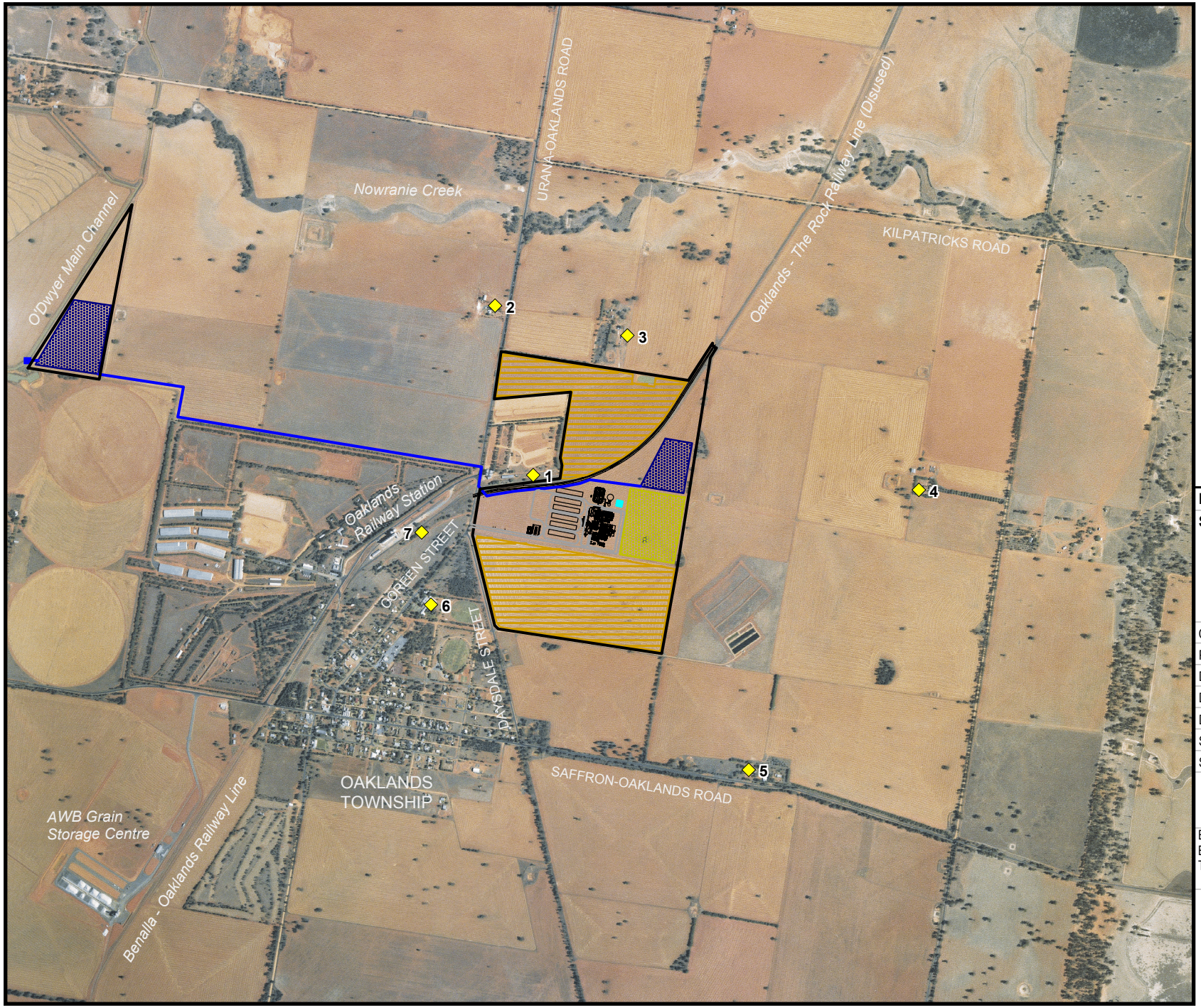
The visual catchment north of the site includes agricultural lots, an abandoned house, associated farm sheds and surrounding vegetation and vegetation along the banks of Nowranie Creek which marks the limit of the visual catchment in this direction. To the west, the visual catchment is limited by the Ray Brooks & Co. facility and an avenue of mature trees along Urana – Oaklands Road. To the east and south, features of the visual catchment are cultivated lands, scattered rural dwellings, Oaklands sewage treatment plant and associated settling ponds, remnant vegetation and Daysdale Street. The catchment boundary extends to a line of mature trees along Rockliffs Road to the east (refer to *Photograph 7.4*) and to vegetation along Saffron-Oaklands Road and Daysdale Street to the south of the site (refer to *Photograph 7.5*).

These corridors of trees provide full screening of the site of the proposed ethanol plant.

The locations of potentially sensitive visual receptors are shown on *Figure 7.9*. Viewpoint 1 is at the Ray Brooks & Co. facility, which has immediate views to the site. Views to the site from the rural dwellings at Viewpoints 2, 4, 5 and 7 are fully screened by existing vegetation, including garden vegetation, paddock trees and vegetation along the site boundaries and Urana - Oaklands Road. The residence at Viewpoint 3 (refer to *Photograph 7.6*) has background views of the plant site, which will be partially obscured by garden vegetation and distance (approximately 750m to the proposed plant site). The dwellings at Viewpoints 3 and 4 are currently uninhabited. Views from Oaklands Central School (Viewpoint 6) are fully screened by vegetation within the adjoining Crown Reserve.

Public roads with viewpoints to the site are Daysdale Street, Coreen Street and Urana-Oaklands Road, which border the site. Users of these roads will experience intermittent passing views of the ethanol facility, which are obscured by roadside vegetation. Views from Urana-Oaklands Road are brief, as the speed limit is 100km per hour (refer to *Photograph 7.7*).

The flat landscape means that there are no receivers with elevated views of the site.



Legend

- 200Ml Raw Water Dam
- 2Ml Stormwater Dam
- 40Ml Effluent Dam
- Irrigation Area
- Water Pump Station and Pipeline
- Site Boundary
- Internal Access Road
- Visual Receptor

Figure 7.9

Sensitive Viewer Locations

Client:	Agri Energy Limited	
Project:	Oaklands Ethanol Production Facility	
Drawing No:	0056132_EAR_GIS08	
Date:	20.02.2007	Drawing Size: A4
Drawn By:	DH	Reviewed By: -
Source:	Aerial: Department of Lands NSW Plant Design: PDF DWG No: M06075-0321	
Scale:	Refer to Scale Bar	

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Photograph 7.1

Looking across Site to the South with 'Oaklands – The Rock' rail line in foreground

Photograph 7.2

Looking West across Site toward Ray Brooks & Co bulk grain storage and terminal

Photograph 7.3

Ray Brooks & Co bulk grain storage and terminal, Coreen Street and Railway crossing, looking north

Photograph 7.4

View of site and Land to the East

Photograph 7.5

View of site and land to South

Photograph 7.6

Abandoned sheds & house to north of site

Photograph 7.7

Trees lining Urana – Oaklands Road, looking south

Photograph 7.8

US Ethanol Plant

7.8.2 Built Form and Construction Works

The location of the proposed ethanol plant in the centre of the site provides a separation to nearby residences, public places within Oaklands and public roads and thereby reduces the visual impacts on these potentially sensitive visual receptors.

Expected visual elements of the ethanol facility include the following:

- the plant and associated infrastructure as described in more detail in *Section 3.3* located in the north-west of the site;
- two grain storage silos which will be the tallest structures on site with a maximum height of 35m;
- grain storage bunkers located adjacent to the main buildings;
- various smaller buildings associated with the production facility;
- various sealed roads and parking areas, for access to and from the facility to deliver/receive goods and supplies;
- an irrigation area;
- a 200Ml raw water dam adjacent to the production buildings;
- a 190m x 130m salt evaporation system; and
- a 40Ml effluent dam located adjacent to the plant and access road.

Photograph 7.8 shows an ethanol production plant in the US, similar to that proposed at Oaklands. The proposed silos, grain storage bunkers and water dams will be similar to those on properties in the surrounding area and common throughout the Murray Region.

The closest occupied residences to the proposed facility (Viewpoints 2, 5 and 7) do not currently have views to the site and are screened by existing vegetation. The proposed ethanol plant will be the closest to the Ray Brooks & Co. facility at Viewpoint 1, however due to its similar landuse and built form, the visual impact is not likely to be significant. Accordingly, the proposal is expected to have a low visual impact on the surrounding area.

Construction of the plant and associated infrastructure will be carried out over a period of approximately 14 to 16 months, during which additional equipment such as cranes and bulldozers will also be present on the site. Moderate to low visual impacts are expected to occur during the construction of the facility and establishment of the irrigation area, however impacts during construction would be temporary.

The following mitigation measures will be implemented to further minimise the extent of impacts upon visual amenity:

- any trees along the boundaries of the site will be maintained wherever possible, particularly along the western site boundary where the most sensitive receptors are located;

- making use of existing landscape features where possible, including utilisation of existing site access;

- establishment of an area of cultivation in accordance with historical land-use;

- where possible, avoidance of highly reflective materials/ colours on the site, unless necessary for safety reasons; and

- the site will be maintained in an orderly manner and the spread of material stockpiles, waste, plant, equipment and vehicle parking will be minimised and kept to designated areas.

Subject to incorporating the above recommended mitigation measures, operation of the plant, including the introduction of associated built form elements is expected to have a low visual impact on the surrounding area based on the following:

- occupied residences in the vicinity of the site and Oaklands Central School do not currently have views of the site;

- the only residence with views of the site (Viewpoint 3) is unoccupied and experience only background views of the facility, which are obscured by garden vegetation and scattered paddock trees;

- users of Coreen Street, Daysdale Street and Urana – Oaklands Road obscure brief passing views of the facility, which are obscured by roadside vegetation and in the case of Urana-Oaklands Road by the Ray Brooks & Co. facility;

- the flat landscape means that there are no receptors with elevated views of the site; and

- the proposed silos, grain storage bunkers and water dams will be similar to those on the adjoining properties and common throughout the Murray Region, including the structures at the Ray Brooks & Co. Facility and the AWB Grain Storage Centre at Oaklands.

Construction of the plant and associated infrastructure will be carried out over a period of approximately 14 to 16 months, during which time moderate to low visual impacts are expected to occur. However impacts during construction would be temporary and can be minimised further by implementation of the following mitigation measures:

- plant, equipment and stockpiling of materials will be kept to designated areas; and
- the contractor will maintain the site in an orderly manner and will minimise the spread of material stockpiles, waste and vehicle parking.

7.8.3 Proposed Lighting

Plant operations will be undertaken over a twenty-four hour period at the Oaklands ethanol production facility. To ensure that night-time operations are carried out in a safe and efficient manner some outdoor lighting is required. This lighting will be located at the following places:

- along internal access roads (AEL are currently investigating the option for provision of solar lighting along internal roadways);
- infrastructure zones frequented by plant operators and staff, including process buildings, delivery and dispatch areas, weighbridge, storage tanks offices and car parks; and
- tall buildings/ structures may require a warning light for low-flying aircraft.

In general, lighting will be restricted to the minimum necessary for safety and efficiency purposes and will be directed away from residences, Urana – Oaklands Road, Coreen Street and Daysdale Street, through the use of directional lighting equipment and shielding. Buildings, distance and tree screening will be effective in restricting light spill beyond the boundaries of the site and the plant will generally be seen as a distant glow from nearby residences.

Shielding by roadside vegetation and the Ray Brooks & Co. facility mean that lighting of the proposed facility is unlikely to produce additional glare to an extent that would cause a reduction in the vision of motorists along adjacent roads. Headlights from vehicle movements within the site are unlikely to cause disturbance to motorists using local roads due to these reasons. It should be noted that the facility is adjacent to an existing built up area (Oaklands township), with associated lighting from residences and business and street lighting.

To further minimise the potential impacts of external lighting, it will be:

- designed in adherence with relevant Australian Standards, including AS4282-1977 'Control of Obtrusive Effects of Outdoor Lighting' and AS1158 'Lighting for Roads and Public Places';
- kept to a minimum; and
- directed away from residences through the use of directional lighting equipment and shielding.

Subject to implementation of these mitigation measures, lighting from the proposal is expected to have a low visual impact on the surrounding area.

7.9 ABORIGINAL HERITAGE

An Aboriginal heritage assessment was undertaken for the site, the proposed pipeline route and the proposed dam site adjacent to O'Dwyer Main Channel (the 'study area'). The aim of this assessment was to identify any Aboriginal heritage values of the study area, potential impacts of the proposal on those values and provide suitable management recommendations. It included a desktop assessment, incorporating a database search of the DEC Aboriginal Heritage Information Management System (AHIMS). A field surface survey was conducted by an ERM archaeologist and a representative from the Cummeragunja Local Aboriginal Land Council (CLALC) on 19 October 2006. The methodology employed for the preparation of the archaeological assessment was in accordance with guidelines provided in the NSW National Parks and Wildlife Service (1997) Aboriginal Cultural Heritage Standards and Guidelines Kit and the Australia ICOMOS Burra Charter 1999. Consultation was undertaken with relevant Aboriginal stakeholders in accordance with DEC (2004a) *National Parks & Wildlife Act 1974: Part 6 Approvals – Interim Community Consultation Requirements for Applicants* guidelines. The full assessment, including a description of methodology employed is presented in the ERM (2007f) supporting technical report.

The desktop assessment and consultation with the CLALC identified that few Aboriginal archaeological studies have been undertaken in the Oaklands area. No known Aboriginal sites have previously been identified within the study area and there are very few registered Aboriginal sites surrounding the study area. The AHIMS database search for sites within a radius of approximately five kilometres of the proposed facility revealed two registered sites (stone artefact scatters), located 500m and 2km south of the study area.

No Aboriginal sites were identified during the archaeological inspection of the study area. The Aboriginal heritage assessment concluded that the study area has a low archaeological potential to yield evidence relating to Aboriginal habitation and subsistence in the Oaklands region. Research and consultation with the CLALC did not identify any heritage values associated with the study area, unrelated to specific Aboriginal sites. As such, the proposal will have no impact on known Aboriginal heritage sites or values and no further archaeological work, such as excavation, collection or monitoring, is required.

7.10 SOCIAL IMPLICATIONS

An assessment of the existing social and economic profile of the surrounding communities and predicted socio-economic impacts of the proposal on local and regional communities was completed. Its purpose was to identify the potential impact of the proposal and opportunities to enhance the socio-economic contributions of the proposal to the region.

The assessment was based on publicly available information sourced from the Australian Bureau of Statistics (ABS).

7.10.1 Existing Demographic Profile

Oaklands is within the Urana Local Government Area (LGA). Urana is part of the Murray Statistical Division (SD) which is in the southern Riverina area of NSW. The administrative centre for the Murray SD is Albury. At the 2001 census, the Murray SD had a population of 108,435, comprising 1.7% of the NSW population. The area's main industries are Agriculture, Forestry and Fishing, Manufacturing, Retail and Construction.

At the 2001 census, Oaklands had a population of 249 and the Urana LGA had a population of 1,425. The population of the Urana LGA has steadily decreased over the period 1991-2001, with a total reduction of 3.4% over this ten year period (refer to *Table 7.10*).

Table 7.10 Population Growth 1991-2001

	Persons 1991	**Persons 1996**	**Persons 2001**	**% Change 1991-1996**	**% Change 1996-2001**
Urana LGA	1,692	1,598	1,425	–1.1	–2.3
NSW	5,732,032	6,038,696	6,371,745	+5.1	+5.6

1. *Source:* ABS (2002)

Table 7.11 indicates that the Urana LGA's population is clustered in the 5-14 (15.7% of the population) and 35-64 (41.2%) age groups, which suggests a high incidence of families with young children. Urana's population of 15-34 year olds (19.4%) is noticeably lower than that for the Murray SD (24.3%) and NSW (27.9%) as a whole. The median age of Urana residents, according to the most recent population figures taken by the ABS in 2005, was 39.2 years, which is consistent with the NSW average of 36.7 years.

Table 7.11 Age Distribution at 2001 Census

Age	Urana LGA Persons	Urana LGA %	Murray SD %	NSW %
0-4	111	8.3	6.8	6.7
5-14	211	15.7	15.3	14.1
15-24	113	8.4	12.3	13.4
25-34	148	11	12	14.5
35-44	222	16.5	14.6	15.3
45-54	177	13.2	13.9	13.5
55-64	155	11.5	10.3	9.4
65-74	108	8	8.2	7.1
75+	99	7.4	6.6	6.1
TOTAL	**1,344**	**100**	**100**	**100**

1. *Source:* ABS (2003a), ABS (2003b) and ABS (2003c).
2. Urana LGA Persons excludes overseas visitors.

7.10.2 Employment Profile

Employment Rate

The unemployment rate in Urana LGA at the 2001 census (5.3%) was comparable with that for the Murray SD (6.2%) and lower than NSW as a whole (7.2%) (refer to *Table 7.12*). The unemployed residents are polarised in the younger and older working age groups, with exactly half of those unemployed aged 15-29 years and half aged 55-64 years. A quarter of the Urana LGA's working age population stated that they do not take part in the labour force.

Table 7.12 Labour Force Participation Rates at 2001 Census

Employment Rate	Urana LGA %	Murray SD %	NSW %
Employment Rate	94.7	93.8	92.8
Unemployment Rate	5.3	6.2	7.2
TOTAL	**100**	**100**	**100**

1. *Source:* ABS (2003a), ABS (2003b) and ABS (2003c).

Occupation

Like many other regional areas in NSW, Urana LGA is highly dependent on agriculture as the main economic base. The agricultural sector dominates with more than 40% of its workforce being 'Managers and Administrators' (refer to *Table 7.13*), of which 92.7% are 'Farm Managers and Administrators'. Urana also has a significantly higher number of 'Labourers and Related Workers' and 'Intermediate Production and Transport Workers' than NSW as a whole.

Table 7.13 Occupation at 2001 Census

Occupation	Urana LGA Persons	Urana LGA %	Murray SD %	NSW %
Managers and Administrators	193	42	25.3	9.2
Labourers and Related Workers	103	22.4	18.8	8.2
Intermediate Production and Transport Workers	71	15.5	14.1	8.5
Intermediate Clerical, Sales and Service Workers	48	10.5	21.5	16.2
Professionals	44	9.6	20.3	17.9
TOTAL	**459**	**100**	**100**	**100**

1. *Source:* ABS (2003a), ABS (2003b) and ABS (2003c).
2. Urana LGA Persons excludes overseas visitors.

7.10.3 Industry Profile

Industry Sectors

Like many other regional areas in NSW, Urana LGA is highly dependent on agriculture as the main economic driving force. Agriculture and the transport of agricultural products are key industries in Urana LGA. Almost two-thirds (63.3%) of Urana's population are employed in the 'Agriculture, Forestry and Fishing' sector, which is noticeably higher than that for Murray SD and significantly higher than that for NSW (refer to *Table 7.14*).

Table 7.14 Sectoral Composition at 2001 Census based on Top Five Industry Sectors for Urana LGA

Employment Sectors	Urana LGA Persons	Urana LGA %	Murray SD %	NSW %
Agriculture, Forestry and Fishing	274	63.3	35.8	3.6
Transport and Storage	59	13.6	7.6	4.7
Government Administration and Defence	34	7.9	8.2	4.3
Retail trade	34	7.9	28	13.3
Health and Community Services	32	7.3	18.6	9.3
TOTAL	**433**	**100**	**100**	**100**

1. *Source:* ABS (2001)
2. Urana LGA Persons excludes overseas visitors.

7.10.4 Contribution of AEL to the Murray Region

Employment and Industry Contribution

The existing population, employment and occupation profile suggests that the Urana LGA and that the existing occupation and skill base is dominated by the agriculture sector. This profile complements the needs of the AEL ethanol production facility.

The facility will contribute to better job prospects in the LGA by direct and indirect employment opportunities during construction and operation. AEL will directly employ approximately 32 people for operation of the proposed facility at Oaklands and approximately 120 people during its construction. The majority of these will be from the Murray region, with some specialists sourced from outside the area. AEL will work with the community to upgrade its skill base. This will entail provision of in-house and external qualifications training and skills development for staff.

The proposed AEL ethanol production facility at Oaklands will provide the LGA with the opportunity to diversify its economic base by establishing a rural industry that adds value to local product. It will constitute an investment of in excess of $30 million in the region. It will directly support local farmers by sourcing surplus cereal grains grown in the Murray region and provide opportunities in the fields of manufacturing and administration.

The proposed facility will provide indirect benefits to local industry by increasing demand on local contractors, maintenance and service providers and businesses that support agriculture, such as equipment, seed and chemical manufacturers and wholesalers, and by attracting other agricultural businesses such as intensive livestock industries.

Impacts on Community Infrastructure

As discussed in *Section 5.2.1*, payment of a monetary contribution under Section 94 of the EP&A Act may be required as a condition of project approval, to be put towards public amenities and public services. As AEL proposes to source the majority of employees for the proposed facility from the local area (including nearby towns of Jerilderie, Finley, Berrigan and Urana), it is unlikely that there will be significant impacts on service demand for housing, schools, hospitals, health care facilities and other community infrastructure in the Urana LGA and broader Murray region of NSW. The townships of Jerilderie, Finley, Berrigan and Urana have a combined population of nearly 3000 people (ABS census, 2001) and are within 60km of the site. Funding for the proposed road upgrade works will be facilitated by AEL.

8 PRELIMINARY HAZARD AND RISK ASSESSMENT

This Chapter summarises the key findings of the Preliminary Hazard Analysis undertaken for the project and identifies fire/ emergency procedures and measures to be put in place.

8.1 INTRODUCTION

As discussed in *Section 5.2.4*, the project can be defined as a 'potentially hazardous' and 'potentially offensive' industry in SEPP 33. The project is 'potentially hazardous' as it will exceed the SEPP 33 threshold limits for volumes of Class 3 (ethanol/ petrol) and Class 8 (acids/ alkalis) dangerous good stored on site. A preliminary hazard analysis (PHA) for the project was undertaken by Sherpa Consulting (Sherpa) and assessed the 'potentially hazardous' nature of the development. The 'potentially offensive' aspect of the development is assessed in *Chapter 7*.

The PHA was undertaken in accordance with Department of Infrastructure, Planning and Natural Resources (DIPNR) (1992a) *Hazardous Industry Planning Advisory Paper (HIPAP) No 6 – Guidelines for Hazard Analysis* and DIPNR (1997) *Multi Level Risk Assessment* and with reference to screening methods outlined in SEPP 33. The risk acceptance criteria set out in DIPNR (1992b) HIPAP 4 were followed. The PHA identified and assessed potential hazards and risks associated with the proposal. It was based on a Level 2 Risk Assessment, where the results are sufficiently quantified to allow an assessment of the off-site risk levels against acceptance criteria.

Preparation of the PHA included a desktop assessment and a hazard identification (HAZID) 'brainstorming' session between PDF (project design engineers) and Sherpa to identify potential hazard scenarios, their causes, consequence and safeguards in place in the design. The Process Flow Diagrams and Process Plant Layouts supplied by PDF for the approved AEL 100Ml ethanol plant in Swan Hill, Victoria, were used for this process. These are similar to the current proposal. Detailed design information for the proposed LNG storage was not available at the time of this PHA therefore, hazard identification was based on similar facilities in the LNG industry and guidance in AS 3961-2005.

Consequence analysis modelling of identified major accidents was carried out using the proprietary consequence modelling package *Shell FRED* (Version 4) and BREEZE LFG Fire/ Risk Version 5.0.3 (incorporating DEGADIS). The risk assessment for LNG was undertaken in accordance with the requirements of Clause 2.6.3 of AS 3961-2005 'The storage and handling of liquefied natural gas' and was based on a 'maximum design spillage' to simulate a worst-case liquid release scenario.

The following sections set out the key findings of the PHA. The full assessment is presented in the Sherpa Consulting (2007) supporting technical report.

8.2 HAZARD IDENTIFICATION

Hazardous substances handled at the site include:

- LNG (used for steam raising);
- ethanol;
- petrol; and
- chemical additives i.e.:
    - sulphuric acid;
    - sodium hydroxide;
    - nitric acid;
    - aqueous ammonia; and
    - urea.

Ethanol and petrol will be stored in a bunded storage building, within tanks designed to AS1940. LNG will be stored within pressurised, double-containment (vessel-within-vessel) type vessels, designed to meet the requirements of AS 3961-2005 'The storage and handling of liquefied natural gas'. Other chemicals listed above will be stored in a bunded chemical storage building and clearly signed as specified in the relevant Australian Standards and the NSW Dangerous Goods Regulations.

Sherpa considered the other hazardous materials to be grain due to its potential for dust explosions and high pressure steam due to the potential for steam boiler explosions.

Hazardous incident scenarios were developed for each of the hazardous materials and activities on site. Potential hazardous incident scenarios that were considered to have local rather than off-site consequences and therefore were not carried forward for quantitative analysis of off-site risk levels are as follows:

- Dust/grain fire or explosion in the grain handling area was not modelled, because of the large separation distance (>100m) between this area and the closest site boundary. In addition numerous safeguards will be in place to prevent dust accumulation (extraction system) and ignition (earthing), and to detect fire (smoke detectors in the grain elevators).

- Steam loss from containment was not modelled because consequences of this type of event are limited to the immediate vicinity of the release and steam lines do not run in close proximity to the site boundary.

- Chemicals lost from containment were not modelled, as all chemicals stored in bulk have only local corrosive effects and are not toxic at distance.

- Methane vapour cloud explosion (deflagration) was not modelled as the potential for this incident is low due to the relatively low reactivity of methane and the proposed low-level of equipment congestion in the vicinity of the LNG storage area (optimised for safety per AS 3961 Clause 2.6.2).

The HAZID identified a set of seven 'significant' hazardous incident scenarios (major accidents) with the potential for off-site impact. These were:

- petrol pool fire at the tank truck loading area (ID P1);

- petrol full surface bund fire in the bulk storage area (ID P2);

- ethanol pool fire at the tank truck loading area (ID E1);

- ethanol full surface bund fire in the bulk storage area (ID E2);

- ethanol jet fire in the distillation process area (ID E3);

- LNG pool fire at the LNG storage vessels/ tanker unloading area (ID L1); and

- unignited LNG pool at the LNG storage vessels/ tanker unloading area, leading to evaporation of methane from pool, flammable vapour cloud dispersion and ignition of the vapour cloud resulting in a flash fire (ID L2).

These were carried forward for quantification and a consequence analysis for each scenario was conducted, using the applicable thermal radiation criteria for injury, fatality and escalation potential. The results for the critical thermal radiation values are presented in *Table 8.1*. The heat radiation criteria adopted for pool fires are not applicable for the methane flash fire (L2); consequence analysis and results for L2 are described below.

Table 8.1 Consequence Results

ID	Downwind Distance to Critical Thermal Radiation from Fire Centre (metres)			Proposed Distance to closest Site Boundary from Fire Centre	Off-site Impact?
	$4.7kWm^{-2}$ (injury)	$12.6kWm^{-2}$ (fatality)	$23kWm^{-2}$ (escalation potential)	(metres)	
P1	45	35	30	>300	No
P2	34	26	20	>300	No
E1	53	32	34	>300	No
E2	84	54	35	>300	No
E3	38(a)	29(a)	25(a)	>300	No
	$5kWm^{-2}$ (off-site injury)	$10kWm^{-2}$ (on-site escalation)	$20kWm^{-2}$ (off-site escalation/ fatality)		
L1	52	43	36	>300	No

(a) Distance from fire source.

Methane evaporating from an unignited LNG maximum design spillage (calculated to be 13,000kg) was modelled as leading to a flash fire (L2) for two representative wind speed and Pasquill weather stability classes:

- **D5** – Neutral, common conditions (D Class) with moderate wind speed (5m/second); and
- **F2** – Very stable, rare conditions (F Class – accounts for atmospheric inversion layer) with low wind speed (2m/second).

Modelling was based on conservative assumptions as detailed by Sherpa (2007). The results showed that the centre of the LNG vessels should be located more than 292m from the site boundary to avoid the methane flash fires modelled having an off-site impact. The LNG siting selected for this assessment therefore provided an adequate separation distance between the LNG storage vessels and site boundary (>300m).

Fatality/ serious injury could occur to those physically caught within the flash cloud, however this is unlikely to occur, given the protective environments provided by buildings.

Table 8.1 and consequence analysis of a methane flash fire indicate that the identified significant hazardous incidents at the site, that is ethanol, petrol and LNG fires, would not have the potential for off-site impact (fatality, injury or off-site escalation) and therefore would not affect places beyond the site boundary, including adjacent residences, schools or recreational areas in Oaklands township. Therefore, according to Sherpa (2007):

- off-site individual and societal risk of injury, due to heat radiation, from the development would not exceed the 50×10^{-6} per year NSW Land-Use Safety Planning risk criteria for heat radiation injury; and

- risk of accident propagation off-site from the development would not exceed the 50×10^{-6} per year NSW Land-Use Safety Planning risk criteria for accident propagation.

Whilst there is potential for a fire to escalate to other tanks (containing petrol or ethanol) within the storage area, the consequences would be no worse than the full surface bund fire modelled, which was found to have no potential for off-site impact. Ethanol and petrol full-surface bund fires would not have the potential to escalate to the LNG vessels due to the large separation distance (>300m). A pool fire or methane flash fire at the LNG vessels would not have the potential to escalate to the ethanol and petrol bulk storage tanks due to the large separation distance (>300m). It should be noted that by nature, flash fires are unlikely to lead to escalation as they are short duration events with low thermal radiation and negligible overpressure.

Off-site impacts are not currently anticipated, however to ensure that separation distance is greater than the critical distances set out in *Table 8.1*, the distance from the ethanol, petrol and LNG storage areas to the site boundary should be confirmed during the detailed design stage. To avoid off-site impacts, the distance from the petrol storage area to the site boundary should be greater than 45m and the distance from the ethanol storage area to the site boundary greater than 84m (refer *Table 8.1*).

An AS 3961-compliant location was selected for siting of the LNG storage facility for the purpose of this PHA. Should the detailed design require another location to be chosen, it should be in compliance with AS 3961 – Clause 2.6.2 and a minimum 292m separation distance should be maintained between the vessel and the site boundary (if the quantity of stored LNG exceeds $100m^3$). The PHA demonstrated that there is sufficient land at the site to provide this separation distance and ensure that the consequences of a fire resulting from an LNG Maximum Design Spillage would not have the potential to escalate to on-site protected places (e.g. ethanol and petrol bulk storage tanks) or have an off-site impact. Should the final design require an LNG storage capacity less than $100m^3$, vessel location and spacing can be determined from AS 3961-2005 Clause 2.6.3 (i.e. rather than Clause 2.6.2).

The design of the floor grade beneath the LNG vessels must ensure that any LNG spills will:

- drain away from the LNG vessels (and other stores of flammable, combustible or hazardous goods) to a safe location; and

- not enter any open drains, creeks, waterways or other feature where water may be present at any time (to avoid the likelihood of Rapid Phase Transition i.e. rapid vaporisation of LNG on contact with water resulting in a large pressure increase).

It should also drain away from equipment to avoid failure of process equipment, supports and pipework due to brittle failure which could result form an LNG spill (typically between -160°C and -140°C).

Fuels and chemicals used or stored on the site will be stored in designated bunded areas and appropriate safeguards and spill containment facilities will be installed. Accidental emissions (spills) of ethanol, petrol and other chemicals will be captured in the tank bunds and directed to the site interceptor for recovery. Provision of spill kits and training of site personnel in their use will ensure that in the event of any spills, appropriate action can be taken rapidly to prevent and minimise any hazards posed.

The LNG storage vessels will be the double-containment (vessel-within-vessel) type, therefore, leaks from the primary containment vessel would be captured by the secondary containment vessel. In the event of an LNG leak outside the secondary vessel, the slope of the floor beneath the vessels would direct the spill to the drainage system.

Therefore, accidental spills will not affect the long-tem viability of the ecosystem of any sensitive natural environmental areas.

8.3 FIRE/ EMERGENCY MEASURES AND PROCEDURES

Design of all systems with respect to fire/ emergency measures and procedures shall be in compliance with the appropriate Australian Standard. With respect to fire protection, emergency management, fire exposure protection and emergency planning and management, the proposal will be in compliance with AS1940:2004, which covers the flammable liquids stored at the site (e.g. ethanol and petrol). Classification of hazardous areas for flammable gas and dust will be carried out using AS60079.10 and AS 2430.3. The design of the LNG storage facility (including storage vessel integrity, gas detection and emergency shutdown safeguards) will follow AS 3961-2005 'Storage and handling of liquefied natural gas'.

Other relevant standards to be adhered to include:

- AS 2444 for the location of fire extinguishers; and
- The Building Code of Australia for fire protection of buildings.

Fire fighting water is provided in the raw water dam. The location of the plant and associated fuel and chemical storages in a cleared agricultural area where there is a lack of available fuel minimises the risk of bushfires close to the development. Emergency access is provided via the existing road network.

8.4 FURTHER SAFETY AND RISK STUDIES

As the design develops the project will be required to complete a number of other safety and risk studies following the seven step approval process, and as requested by the Director General:

- Hazard and Operability Study (Detailed Design Stage);
- Final Hazard Analysis by updating this PHA (Detailed Design Stage);
- Fire Safety Study (Detailed Design Stage);
- Emergency Plan (Detailed Design Stage) in accordance with HAPIP 1;
- Construction Safety Study (Construction/Commissioning Stage);
- Safety Management System (Operation Stage) in accordance with HIPAP 9; and
- Independent Hazard Audit (Operation Stage).

The development was screened against SEPP 33, and it found that a Route Selection Study is necessary as the number of ethanol truck movements will exceed the SEPP 33 threshold limits. As set out in *Section 7.6*, truck movements will be limited to B-double approved haulage routes however if a further route investigation is required as part of this approval, a Route Selection Study would be completed at the Detailed Design Stage.

The requirement to prepare these further studies is included in the draft statement of commitments set out in *Section 9.2*.

9 STATEMENT OF COMMITMENTS

This Chapter includes AEL's environmental management, mitigation and monitoring commitments which will be adhered to as part of the proposal.

9.1 INTRODUCTION

The commitments detailed in this section have been compiled based on the environmental assessments undertaken during preparation of this EA. They constitute a commitment from AEL, inclusive of allocation of responsibilities and timing, to implement measures to minimise all potential environmental impacts that have been identified through this EA and ensure that the project is environmentally, socially and economically sustainable.

9.2 DRAFT STATEMENT OF COMMITMENTS

AEL is committed to minimising the potential for environmental impacts from the proposed ethanol production facility. *Table 9.1* outlines the measures that AEL will implement to manage, mitigate and/or monitor any potential environmental, social and economic impacts associated with the proposal.

Table 9.1 Commitments

Item	Commitment	Responsibility	Timing
1. Scope of Development			
	AEL will carry out the approved aspects of the development in accordance with the EA lodged with the DoP prepared by ERM March 2007.	AEL	At all times
2. Statutory Requirements			
	AEL will obtain and maintain all licences, permits and approvals as required.	AEL	At all times
3. Construction and Operation EMP			
	A Construction Environmental Management Plan (CEMP) and an Operational Environmental Management Plan (OEMP) will be developed and approved by the Director-General and will respectively: • describe all activities to be undertaken on the site during construction and operation; • describe the work program outlining relevant timeframes for activities; • detail statutory and other obligations that must be met during construction and operation, including all approvals and agreements required from authorities and other stakeholders; • describe the roles and responsibilities for all relevant personnel involved in construction and operation; • detail the environmental management procedures, monitoring and reporting to be implemented during the construction and operation phases and timing and triggers for their implementation; • detail what incident management procedures will be in place during construction and operation; • detail procedures for community consultation and complaints handling during construction and operation; and • be made available for public viewing after approval from the Director-General.	AEL/ Director General	CEMP – prepared prior to commencement of any site activity and implemented for the duration of construction. OEMP – prepared prior to commencement of operations and implemented for the duration of operations

Item	Commitment	Responsibility	Timing
4. Construction Environmental Performance			
4.1 Air Quality			
4.1.1	Dust generation will be minimised through: • application of water to roads and exposed areas, as required; • minimising exposed areas, ground disturbance and the area of earthworks; • limiting traffic speed on exposed surfaces; and • minimising dust generating activities on days when weather conditions are considered to create a high risk of dust generation (e.g. strong winds).	AEL and Construction Contractor	Throughout construction
4.1.2	The plant design will include installation of the following pollution control systems: • dust extraction and filtration systems to control particulate emissions from grain handling, milling and DDGS loadout; • wet scrubbers on the fermentation plant; and • a thermal oxidiser on the DDGS Dryer. Sampling and easy access points to the pollution control equipment will be provided.	AEL	During construction
4.2 Surface Water, Groundwater and Soils			
4.2.1	An Erosion and Sediment Control Plan and a Stormwater Management Plan prepared in accordance with *Managing Urban Stormwater – Soils and Construction* (Landcom, 2004) will be adhered to and include: • installation of temporary erosion and sediment control structures such as straw bales and sediment fences to prevent the movement of sediment from construction areas; • installation of sediment basins and/or use of existing dams to contain sediment laden water, allow sufficient settlement time and flocculation if required and discharge of water following testing to confirm water quality meets relevant guidelines (eg < 50mg/L suspended solids, no visible oils and greases); • minimisation of time excavated surfaces are left exposed; • restriction of traffic to defined internal roads; • ensuring chemicals are appropriately stored and bunded; • if required, cleaning soil adhered to tyres by hosing down in bunded areas prior to departure from the site; and • regular inspection and maintenance of erosion/siltation control devices to ensure effectiveness for the entire construction period.	AEL and Construction Contractor	Prepared prior to commencement of any site activity and implemented for the duration of construction

Item	Commitment	Responsibility	Timing
4.2.2	The effluent dam and stormwater dam will be designed and constructed to fully contain wastewater/ runoff for the 90th percentile of all rainfall events.	AEL	Detailed design phase and during construction
4.2.3	Clean water storages will be designed and constructed to contain flows up to the 10 year, 2 hour ARI event with spillways designed to convey the 100 year ARI overflows.	AEL	Detailed design phase and during construction
4.2.4	All dams will be lined with High Density Polyethylene liner or similar.	AEL	During construction
4.3 Noise Management			
4.3.1	Construction activities where construction noise is audible at residential premises will be restricted to: • Monday to Friday, 7:00 am to 6:00 pm; • Saturday, 8:00 am to 1:00 pm (7:00 am to 1:00 pm if inaudible at residential premises); and • no construction on Sundays or public holidays.	AEL and Construction Contractor	Throughout construction
4.3.2	The following measures will be implemented as part of the CEMP: • informing potentially affected residents in advance as to the extent and timing of potentially noisier construction activities and responsibly advising when noise levels during such works may be relatively high; • where known to be readily available, deploying plant having lower noise emission levels; • maintaining plant to ensure rated noise emission levels are not exceeded; • providing a contact telephone number via which the public may seek information or make a complaint. A log of complaints should be maintained and actioned by the site superintendent in a responsive manner; and • undertaking construction activities in accordance with AS2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*".	AEL and Construction Contractor	During construction
4.4 Hazards and Risks Management			
4.4.1	AEL will prepare and submit a Construction Safety Study to the Director General for approval.	AEL	Prior to the commencement of construction

Item	Commitment	Responsibility	Timing
4.4.2	Relevant standards and requirements relating to fire/ emergency measures and procedures will be adhered to, in particular: • AS1940:2004 for storage of flammable liquids (e.g. ethanol and petrol); • AS 3961-2005 for the storage and handling of liquefied natural gas; • AS 2444 for the location of fire extinguishers; • The Building Code of Australia for fire protection of buildings; and • AS60079.10 and AS 2430.3 for classification of hazardous areas for flammable gas and dust.	AEL and Construction Contractor	During construction
4.4.3	The ethanol storage area will be located a minimum of 84m from any site boundary.	AEL	Detailed design phase and during its construction
4.4.4	The petrol storage area will be located a minimum of 45m from any site boundary.	AEL	Detailed design phase and during its construction
4.4.5	LNG storage will be in compliance with AS 3961-2005 for the storage and handling of liquefied natural gas. The design of the floor grade beneath the LNG vessels must ensure that any LNG spills will: • drain away from the LNG vessels (and other stores of flammable, combustible or hazardous goods) to a safe location; and • not enter any open drains, creeks, waterways or other feature where water may be present at any time.	AEL	Detailed design phase and during its construction
4.5 Traffic Management			
4.5.1	A traffic management plan developed as part of the CEMP submitted to the Urana Shire Council will be adhered to and include: • identification of routes and times of travel for heavy vehicles; • specification of additional signage at site access point warning of additional heavy vehicles; • any special considerations or routes required for oversized vehicles, including vehicles over 40 tonnes; • consideration of resurfacing the site access and the on-site circulation roads, to minimise dust generation and improve all-weather access; • minimum requirements for vehicle maintenance to address noise and exhaust emissions, and mitigation measures to ensure the relevant criteria are met; and • speed limits to be observed along routes to and from the site and within the site.	AEL and Construction Contractor	Prepared and submitted prior to commencement of any site activity and implemented for the duration of construction

Item	Commitment	Responsibility	Timing
4.5.2	All internal access roads subject to heavy vehicle usage, the car park and heavy vehicle standing area will be sealed.	AEL and Construction Contractor	Prior to commencement of operations
4.5.3	The site access will be sealed and upgraded to a standard that caters for B-Doubles entering the site from the north (turning left) or exiting the site to the south (turning left) to turn without having to cross the centre line of Coreen Street.	AEL and Construction Contractor	Prior to commencement of operations
4.5.4	The left turning apron into Answerth Drive at the Answerth Drive/Urana Oaklands Road T-intersection will be upgraded to Austroads (2005) standards.	AEL and Construction Contractor	Prior to commencement of operations
4.5.5	The left-turn apron for vehicles turning into MR323 Saffron Oaklands Road at the Daysdale Street/MR323 Saffron Oaklands Road intersection will be upgraded to a standard that allows for the swept path of a turning B-double without the need to cross the Saffron Oaklands Road centreline.	AEL and Construction Contractor	Prior to commencement of operations
4.6 Ecological Management	Only certified weed free fill will be imported.	AEL and Construction Contractor	Throughout construction
4.7 Visual Amenity			
4.7.1	The site will be maintained in an orderly manner and the spread of material stockpiles, waste, plant, equipment and vehicle parking will be minimised and kept to designated areas.	AEL and Construction Contractor	Throughout construction
4.7.2	AEL will install outdoor lighting in accordance with AS4282-1977 'Control of Obtrusive Effects of Outdoor Lighting' and AS1158 'Lighting for Roads and Public Places'. The lighting will be kept to the minimum necessary for safety and efficiency purposes and will be directed away from residences and roads through the use of directional lighting equipment and shielding.	AEL and Construction Contractor	During construction
4.8 Socio-Economic	Where possible, AEL will locally source jobs created for construction.	AEL and Construction Contractor	On hiring of construction staff

Item	Commitment	Responsibility	Timing
5. Operational Environmental Performance			
5.1 Hazard and Risk Management			
5.1.1	AEL will prepare and submit the following studies to the Director General for approval: • Hazard and Operability Study; • Final Hazard Analysis; • Fire Safety Study; • Emergency Plan; • Safety Management System; and • Independent Hazard Audit.	AEL	Prior to commencement of operations
5.1.2	Fuels and chemicals will be stored in designated bunded areas and appropriate safeguards and spill containment facilities will be installed. Spill kits will be provided and site personnel will be trained in their use.	AEL	Throughout operations
5.2 Air Quality			
5.2.1	Concentrations of TSP, nitrogen dioxide, VOCs and carbon monoxide from all relevant sources (Dust Collector – Grain handling, Dust Collector – DDGS, Dust Collector – Milling, DDGS dryer, Boilers, Fermentation Scrubber, and Process Vent Scrubber) will be confirmed by stack testing of the relevant emission points. The results will then be assessed against the *POEO (Clean Air) Regulation 2002* standard of concentration to ensure compliance and set emission limits. A program of ongoing monitoring will be prepared based on the results and in consultation with the Department of Environment and Conservation.	AEL	On commissioning
5.2.2	The following dust minimisation measures will be employed at the site: • paving all access roads, the car park and heavy vehicle standing area and most exposed surfaces on-site; • watering paved roads when necessary; • covering all truck loads to reduce windblown dust and spillage; • all grain storage piles will be covered by tarpaulin to reduce wind blown dust emissions; • maintenance of dust extraction and filtration systems at grain unloading areas and grain storage silos; and • maintenance of fabric filter dust collection systems at grain screening and milling operations and DDGS loadout.	AEL	Throughout operations

Item	Commitment	Responsibility	Timing
5.2.3	A maintenance schedule which sets out weekly, monthly and annual checks will be documented and implemented for all pollution control equipment on the site, as part of an OEMP and will include: • visual checks for leaks, damage or corrosion; • tests to ensure the proper airflow is being maintained in the case of dust collectors; • checks to ensure the cleaning system is working adequately and the dust collector filter bags are not overloaded; and liquid flow tests, pressure and temperature tests for wet scrubbers.	AEL	Prepared prior to commencement of operations and implemented throughout operations
5.2.4	Wastewater BOD will be monitored to assess the requirement for installation of an aerator in the effluent dam.	AEL	Monthly
5.2.5	The facility will comply with the legislative requirement to not cause or permit the emissions of any offensive odour from the premises (Section 129 of the POE Act).	AEL	Throughout operations
5.2.6	An odour management plan will be developed and implemented and will include a contact number for nearby residents to notify the facility if an offensive odour is detected.	AEL	Prepared prior to commencement of operations and implemented throughout operations
5.3 Surface Water, Groundwater and Soils			
5.3.1	A detailed irrigation plan will be developed following a full analysis of soil infiltration rates and hydraulic conductivity at the irrigation area and will include: • types of crops and cropping methods; • fertiliser management and details of any required treatments to address potentially limiting soil conditions; • the method and scheduling of irrigation (in accordance with DEC (2004b) *Environmental Guidelines: Use of Effluent by Irrigation*), including application rates and how soil moisture deficit will be maintained (typically at five to ten millimetres and monitored to ensure excess wastewater is not applied to the area; • a detailed assessment of the required size of the effluent dam; • the level and intensity of monitoring required; • triggers for cessation of irrigation; • responsibilities for operation of the wastewater irrigation scheme; and • incident and emergency response procedures.	AEL	Prepared prior to the commencement of irrigation and implemented for the duration of irrigation

Item	Commitment	Responsibility	Timing
5.3.2	A detailed design and operation plan of the salt evaporation system will be determined as part of the preparation of the site CEMP.	AEL	Prepared prior to commencement of operations and implemented throughout operations
5.3.3	Wastewater will be monitored for total suspended solids (TSS), BOD, pH, total dissolved solids (TDS), oil and grease, total phosphorus, total nitrogen, cations, Sodium Adsorption Ratio and metals to ensure that it is consistent with expected criteria detailed in the irrigation plan.	AEL	On commencement of operations and; o Monthly for TSS, BOD, pH and TDS o Quarterly for oil and grease, total phosphorous, total nitrogen, cations and sodium absorption ratio o Annually for metals Monitoring frequency and parameters should be assessed on a regular basis and reviewed based on previous monitoring results
5.3.4	A detailed stormwater management plan will be developed and include the requirements set out in *Section 7.3.8* of this EAR.	AEL	Prior to commencement of operations

<table>
<tr><th>Item</th><th>Commitment</th><th>Responsibility</th><th>Timing</th></tr>
<tr><td>5.3.4</td><td>Soil pH, electrical conductivity, Nitration - N, total N, Available P, total P, exchangeable sodium percentage, heavy metals, pesticides and P sorption capacity will be monitored in accordance with DEC (2004b) Environmental Guidelines: Use of Effluent by Irrigation for the following parameters at the frequency set out below.
<table>
<tr><th rowspan="2">Parameter</th><th colspan="2">Sampling Frequency</th></tr>
<tr><th>Surface Soil</th><th>Soil at four depth increments</th></tr>
<tr><td>pH</td><td>Annually</td><td>Annually</td></tr>
<tr><td>Electrical Conductivity</td><td>Annually</td><td>Annually</td></tr>
<tr><td>Nitration – N</td><td>Annually</td><td>Annually</td></tr>
<tr><td>Total N</td><td>After 3 years</td><td>N/A</td></tr>
<tr><td>Available P</td><td>Annually</td><td>N/A</td></tr>
<tr><td>Total P</td><td>After 3 years</td><td>Every 3 years</td></tr>
<tr><td>Exchangeable sodium percentage</td><td>Annually</td><td>Every 3 years</td></tr>
<tr><td>Heavy metals and pesticides</td><td>After 10 years</td><td>N/A</td></tr>
<tr><td>P sorption capacity</td><td>After 3 years</td><td>Every 3 years</td></tr>
<tr><td colspan="3">Based on Table 5.2 DEC, 2004</td></tr>
</table></td><td>AEL</td><td>As specified in the adjacent table</td></tr>
<tr><td>5.3.5</td><td>If an on-site septic system is constructed, it will be regularly maintained.</td><td>AEL</td><td>Throughout operations</td></tr>
<tr><td>5.4 Traffic Management</td><td>All heavy vehicles associated with the transport of grain and dispatch of materials to and from the site via Oaklands will use approved B-Double routes, including those indicated on Figure 7.7 of this EAR.</td><td>AEL</td><td>Throughout operations</td></tr>
<tr><td colspan="4">5.5 Noise Management</td></tr>
<tr><td>5.5.1</td><td>On-site plant and equipment is to be properly maintained to ensure rated noise emission levels are not exceeded.</td><td>AEL</td><td>Throughout operations</td></tr>
<tr><td>5.5.2</td><td>With the application of reasonable and feasible mitigation, operational noise levels at all residences will not exceed 35dB(A)$L_{eq,\ 15min}$ during the night-time 10pm to 6am period or 35 to 41dB(A)$L_{eq,\ 15min}$ during the day and 6am to 7am night-time shoulder period under conditions of:
winds up to 3m/second; and
temperature inversion conditions of 8˚C/100m.</td><td>AEL</td><td>Throughout operations</td></tr>
<tr><td>5.5.3</td><td>A contact telephone number will be provided on a sign on the site fence for the public to seek information or make a noise complaint.</td><td>AEL</td><td>Throughout operations</td></tr>
<tr><td>5.5.4</td><td>A log of noise complaints will be maintained and actioned in a responsive manner.</td><td>AEL</td><td>Throughout operations</td></tr>
</table>

Item	Commitment	Responsibility	Timing
5.5.5	Heavy vehicle and truck movements will be limited to the hours between 6am and 10pm.	AEL	Throughout operations
5.6 Waste Management			
5.6.1	WDGS and DDGS will be stored on-site in a bunded, enclosed, dual-purpose shed.	AEL	Throughout operations
5.6.2	Sewage and wastewater from the amenity buildings within the plant and site offices will be treated through construction and maintenance of an on-site septic tank system or connection to the Oaklands reticulated sewerage network.	AEL	Throughout operations
5.6.3	Chemical containers and routine maintenance consumerables will be stored in a bunded area and collected by a licenced waste contractor.	AEL	Throughout operations
5.6.4	'Inert' general domestic waste, such as paper, cardboard and packaging generated from the site office will be collected in appropriate bins and recycling containers for disposal by Council.	AEL	Throughout operations
5.6.5	Wastewater will be treated and recycled back into the plant or pumped to an effluent dam and on to the irrigation area in accordance irrigation plan which will be prepared in accordance with the DEC (2004b) *Environmental Guidelines: Use of Effluent by Irrigation.*	AEL	Throughout operations
5.7 Visual Management			
5.7.1	Where possible, use of highly reflective external materials/ colours on the site will be avoided unless necessary for safety reasons.	AEL	Throughout operations
5.7.2	AEL will operate outdoor lighting in accordance with AS4282-1977 'Control of Obtrusive Effects of Outdoor Lighting' and AS1158 'Lighting for Roads and Public Places'. The lighting will be kept to the minimum necessary for safety and efficiency purposes and will be directed away from residences and roads through the use of directional lighting equipment and shielding.	AEL	Throughout operations
5.7.3	The site will be maintained in an orderly manner and the spread of material stockpiles, waste, plant, equipment and vehicle parking will be minimised and kept to designated areas.	AEL	Throughout operations
5.8 Human Environment			
5.8.1	AEL will implement health, safety and risk management plans for the facility.	AEL	Throughout operations
5.8.2	Where possible, AEL will locally source staff.	AEL	On hiring of operation staff

10 CONCLUSION

AEL seeks project approval for the development of an ethanol production facility at Oaklands, NSW, which is capable of producing 200Ml annually and will include several holding dams, a wastewater treatment facility and an irrigation area. The facility will contribute to the economic wellbeing of the community and foster economic growth in the region.

There is considered to be significant growth potential in the Australian fuel ethanol market and ethanol from the Oaklands facility is planned to help meet market demands in Melbourne.

The preparation of the project has involved input from a range of disciplines including engineering, heritage, water, acoustics, planning, risk, air, traffic, ecology and socio-economics. It has evolved in response to consideration of the suitability of the site in terms of location and product and source markets and technical investigations to ensure that the proposal does not adversely impact the environmental features of the site and surrounds.

The environmental assessment for the project has shown that pending implementation of recommended mitigation and management measures and monitoring programs throughout the detailed design, construction and operational phases of the project, the proposal is not expected to have an unacceptable impact on air quality and odour, surface water, groundwater, noise, traffic and transport, ecology, visual amenity or Aboriginal heritage. It will not create unacceptable hazards or risks and will have a positive impact on the Oaklands and wider Murray region in terms of socio-economic considerations.

Measures were developed to mitigate potential environmental impacts identified during the environmental assessment and are included in the draft statement of commitments provided in *Section 9.2*. AEL is committed to implementing these measures during the detailed design, construction and operation phases of the project, as applicable.

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Annex A

Director General's Requirements

Table A.1 Address of Director-General's Requirements

Requirement	Section Addressed
General Requirements	
Executive Summary	E
Detailed description of the project including the:	3
• need for the project;	1.3
• alternatives considered; and	3.2
• various components and stages of the project.	3.4, 3.5
Consideration of any relevant statutory provisions	5
General overview of the environmental impacts of the proposal, taking into consideration any issues raised during consultation.	7.1
Detailed assessment of the key issues specified below and any other significant issues identified in the general overview of the environmental impacts of the proposal (see above), which includes: • a description of the existing environment; • an assessment of the potential impacts of the project, including any cumulative impacts; and • a description of the measures that would be implemented to avoid, minimise, mitigate, offset, manage, and/or monitor the impacts of the project.	7, 8
Draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures.	9
Conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and the costs and benefits of the proposal.	4, 10
A signed statement from the author of the EA certifying that the information contained in the report is neither false nor misleading.	EA
Key Issues	
Air Quality- including a comprehensive air quality assessment focusing on odour, particulate emissions, greenhouse gas emissions and other emissions from the ethanol plant.	7.2
Soils and Water – including: • a water balance for the site detailing water sources, water consumption, water recycling, the quantity and quality of waste water streams and the impact of any water release from the site on surface and groundwater; • proposed erosion and sediment controls (during construction) and the proposed stormwater management systems (during operations); • an assessment of potential groundwater impacts associated with the storage of water and waste water, and the irrigation of the timber plantation; • details of the suitability of the soil structure to accommodate storage facilities and wastewater irrigation application; and • soil contamination.	7.3

Requirement	Section Addressed
Waste Management – including the quantity and type of all liquid and solid waste to be generated at the site and describe how this waste would be handled, processed and, if necessary, disposed of. Details of the measures to dispose/remove wet distillers grain and solubles from the site and details of contingencies should this option(s) become unavailable must be provided.	7.6
Noise – including construction, operation and traffic noise.	7.4
Traffic – including details of the traffic volumes likely to be generated during construction and operation, and an assessment of the predicted impacts of this traffic on the safety and capacity of the surrounding road network. Details on site access, internal roadways, infrastructure works and parking must also be provided.	7.5
Hazards and Risk – including a Preliminary Hazard Analysis (PHA) in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* and *Multi-Level Risk Assessment* and details of fire/emergency measures and procedures.	8
Flora and Fauna – including an assessment of any impacts on critical habitats, threatened species, populations or ecological communities and their habitats in the region.	7.7
Visual – including lighting impacts.	7.8
Social – including consideration of development contributions or a planning agreement.	7.10
Aboriginal Heritage	7.9
Consultation	
During the preparation of the Environmental Assessment, you must consult with the relevant local, State or Commonwealth government authorities, service providers, community groups or affected landowners. In particular you must consult with: • Department of Environment and Conservation; • NSW Roads and Traffic Authority; • Department of Natural Resources; • NSW Fire Brigade; • Rural Fire Service; and • Urana Shire Council. The consultation process and the issues raised should be described in the EA.	6

Annex B

Community Newsletter

OAKLANDS
ETHANOL PRODUCTION FACILITY



AUSTRALIAN ETHANOL LIMITED

AUSTRALIAN ETHANOL LIMITED - FUELING OUR FUTURE

Introduction

Australian Ethanol Limited is proposing to project finance, construct and operate three ethanol production facilities at Condobolin, Coleambally and Oaklands, New South Wales.

The purpose of this Newsletter is to inform the local community about the proposed Ethanol Production Facility in Oaklands.

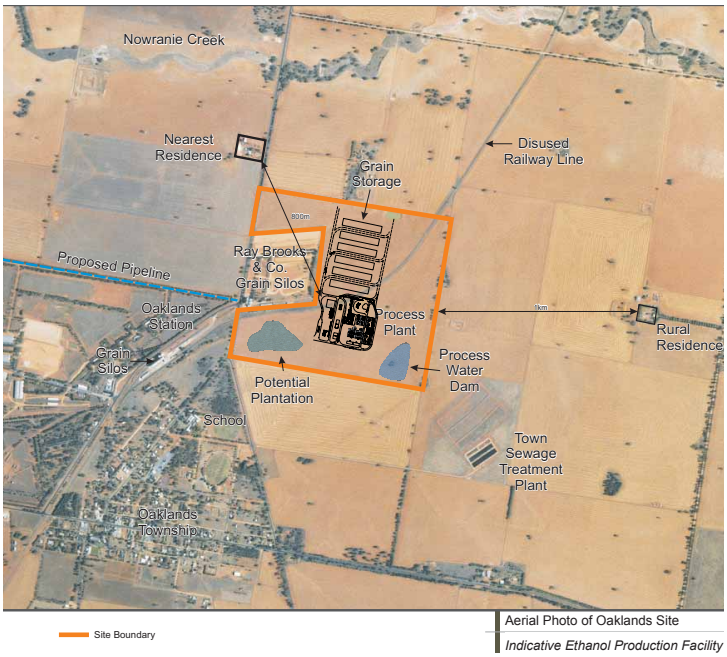
What is Ethanol and why do we need to produce it?

Ethanol is a liquid fuel, produced principally from natural products (grain or sugar). It has traditionally been used as a fuel, a solvent or potable drink for hundreds of years. When blended with petrol, ethanol is an oxygen enhancer and results in a cleaner burning more efficient fuel. It is renewable and therefore presents a sustainable option for use in conjunction with petrol.

The demand to produce ethanol has been driven by global vehicle compliance with international emissions and vehicle efficiency legislation, cleaner fuel policy and energy security issues faced by consumer countries. More recently, the increase in international fuel prices has triggered the fuel ethanol debate in Australia and internationally. An ethanol industry in Australia may reduce the reliance on imported fuels, improve domestic fuel productivity, reduce reliance on fossil fuels and create local employment.

Location

The site in Oaklands is agriculture cropping land located off Daysdale Street, north east of the township. It is on the northern side of Saffron-Oaklands Road and adjacent to Ray Brooks & Co Grain Silos.



Aerial Photo of Oaklands Site
Indicative Ethanol Production Facility

What is being proposed?

The proposal will involve the construction of an ethanol production facility which will be capable of processing a range of cereal grains (such as corn, wheat, barley and sorghum) grown in the Murray region of NSW. It will produce up to 200ML of ethanol product annually.

The facility will include an office administration area, various storage and production processing buildings, a maintenance workshop, a shift silo and a distillation building and tower. A number of holding dams and effluent treatment and recycling areas will also be incorporated into the facility, while a portion of the site will be dedicated as a forestry plantation to provide carbon sequestration for the facilities by-products.

Continued overleaf

Above, **Photograph of a similar ethanol facility in the United States, indicative of current proposal.**

How is ethanol produced?

The production of ethanol involves the receival and storage of grain, milling of the grain to flour followed by a cooking, fermentation and distillation process.

The ethanol production process converts starch which comprises up to 75 per cent of the grain seed to sugar and subsequently to ethanol. The ethanol to be produced on the site will be suitable for use as:

- a fuel blend stock;
- export grade industrial ethanol; and
- extra neutral (potable) ethanol.

The co-product of the ethanol production process is wet distiller's grain and solubles (WDGS), which is sold as stockfeed and is in high demand in feedlots, dairies and piggeries.

Australian Ethanol Limited has an off-take arrangement with James & Sons for wet distiller's grain (WDGS). James & Sons is an international feed and marketing firm which will remove and on sell the WDGS to the intensive agriculture industry in the region.

What is happening now?

The Minister for Planning has indicated that he will consider the proposal a 'major project' under Part 3A of the Environmental Planning and Assessment Act 1979. This means that the application and supporting documentation will be submitted and assessed by the NSW Department of Planning.

Australian Ethanol Limited has commissioned ERM Pty Ltd, an environmental and planning firm, to prepare the application and submit to the State Government. Key environmental issues that will be assessed include:

- surface and groundwater management;
- air quality and odour;
- traffic;
- Aboriginal heritage;
- noise;
- visual character of the area;
- flora and fauna;
- an analysis of potential hazards and risks; and
- socio-economic implications.

Project Information Session

Australian Ethanol Limited invites you to attend a project information session to find out more about the proposed ethanol production facility and provide comment. Representatives from Australian Ethanol Limited and ERM will be available to answer any questions that you may have.

Location:	**Country Women's Association** **Cnr Milthorpe and Coreen Street** **Oaklands**
Date:	**Thursday 26 October**
Time:	**4pm-7pm**

The application will be submitted to The Department of Planning later this year once the key environmental issues have been undertaken. The draft will be placed on public exhibition to provide the community, councils, government agencies and other interested parties the opportunity to comment on the proposal.

Further Information

If you would like to find out more about the project information session, please contact ERM:

Environmental Resources Management
Building C, 33 Saunders Street
PYRMONT NSW 2009

FREECALL 1800 788 388

Annex C

Letter - West Corurgan

West Corurgan

Oaklands Rd, PO Box 156, Berrigan NSW 2712
www.corurgan.com.au email ; info@corurgan.com.au
Ph 03 5885 2392 Fax 03 58852660 Mobile 0419 156 429
ABN 92 793 193 219

ATTENTION : Mr. Stewart Rendell

I refer to previous discussions in relation to potential development by Australian Ethanol within the West Corurgan Private Irrigation District .

It is my understanding that the development would be seeking water supply from West Corurgan's O'Dwyer Main Canal in the Oaklands area.

West Corurgan foresees no problems in being able to supply a minimum of 8 Megalitres (your estimated requirement) per day during the normal irrigation season. Historically West Corurgan's average irrigation season has been for a duration of 243 days. Season commencement being dependent upon demand from the irrigation sector and in most years is in mid August. Season closure is normally towards the end of April each year. It is presumed that the development would further secure its water requirements by the construction of on farm storage to cater for its out of season needs etc.

It is further understood that at this time, Australian Ethanol is not securing a West Corurgan Water Entitlement in conjunction with its proposed land purchase. It is strongly recommended that Australian Ethanol source a Water Entitlement either from within West Corurgan or from the Murray River system. West Corurgan Board of Management must be involved in a consultative process in relation to the sourcing of that water.

Please contact this office at any time to discuss the matter further.

Yours faithfully,

Peter M Wallis
Manager.

ERM consulting services worldwide **www.erm.com**

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