

Trucks will enter the site and drive onto a weighbridge, where the gross weight will be recorded. At the weighbridge grain samples will be taken for quality control purposes. Once sampled and weighed the vehicle will proceed to one of two unloading areas where the grain will be stored waiting production. The two unloading areas are as follows:

- a grain receival platform at the grain storage building, where the grain will be discharged into a collection hopper and conveyed to the storage silos; and
- a grain storage area, which will consist of up to 10 separate grain piles approximately 30m wide, 200m long and up to 20m high. The piles will be constrained within a containment area and once formed, each storage bunker will be covered with plastic tarpaulin to protect the grain from rain and wind.

Once the grain truck is unloaded the vehicle will return to the weighbridge and then exit the site via Ercildoune Road.

Grain Retrieval

The ethanol production process requires a constant supply of grain. For the production of 200 million litres/year of ethanol the daily demand for grain is about 1600 tonne or 67 tonnes per hour.

Grain will be supplied to the ethanol plant from a small 'shift silo'. Retrieval of the grain for feed to the shift silo will occur in two ways:

- Retrieval from the bunker storage area. This will involve picking up the grain using a front-end loader and feeding it into a mobile dump hopper placed over a belt conveyor. The belt conveyor feeds the grain to the main feed conveyor and on to a screening station. The screening station will include a dust collecting and filtering system to eliminate dust emission from the facility. The grain will then be elevated to the shift silo; and
- Retrieval from the grain storage silo. The grain will be conveyed from the bottom of the storage silo via a screw feeder and elevator to a smaller shift silo. This system will also include dust extraction and filtering facilities to eliminate dust emissions.

Milling and Slurry Preparation

As part of the production process the grain needs to be milled and then mixed into slurry. The process is set out below:

- Grain from the shift silo will be gravity discharged to the grain mills.
- The milling system will include a dust collection system, which will extract dust by vacuum from appropriate points in the circuit. The dust will be directed to a bag filter, which will collect the dust and return it to the mill discharge conveyor.
- A monitored weight of milled grain flour will be conveyed to a pug mixer. The pug mixer enables the addition of 'slops mix' for maintaining proper slurry density.
- The pug mixer directs the slurry mix to a mixing tank where additional slops or process water can be added to make up the correct slurry density and percent solids.
- The mix tank contains two-discharge pumps (operating and spare) to pump the mixed slurry preparation (mash) to the feed storage tank 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 area consists of a series of small mixing tanks fitted with access platforms, mixing agitators if required, dosing delivery pumps and pipe work. The pipe work delivers the chemical mix to the required process stage.

The packaged chemicals will be fed by forklift or manually from the bag or container into the mixing tank.

Liquefaction Stage

Liquefaction is the process of converting insoluble starch in the mash to a soluble starch mix by enzyme reaction at an elevated slurry temperature. The enzyme mix, which is prepared in the chemical preparation area, is metered as a liquid into the pug mill and the mash storage tank (or pre-liquefaction tank).

The mash is strained and heated, and then pumped to the liquefaction tank for the processing of the insoluble starch. The reaction occurs in sealed, insulated, agitated tanks inside the preparation building and takes up to 4 hours depending upon grain type. The reaction at this point does not generate any emissions.

From the liquefaction tank the mash is pumped to the pre-saccharification tank via mash coolers, which lower the slurry temperature to about 60 degrees Celsius.

Saccharification Stage

Saccharification is the enzymatic conversion of the soluble starch to glucose. The reaction occurs in the pre-saccharification tank 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. As with the liquefaction stage, the reaction occurs in sealed, insulated, agitated tanks inside the preparation building and does not generate any emissions.

From the pre-saccharification tank the mash is pumped to one of three pre-fermentor tanks via mash coolers.

Fermentation Stage

Fermentation is the conversion of glucose to ethanol and carbon dioxide by the action of yeast. The mash from the pre-saccharification tank is pumped to one of three pre-fermentor tanks where propagated yeast and other chemicals that promote and sustain the reaction are added prior to pumping to the fermentor tank. Fermentation is a batch process with each fermentation tank being filled, emptied and cleaned in series. There will be up to 12 fermentation tanks and each will have a cycle time of about 45 to 55 hours each.

Each tank is filled with mash containing yeast and nutrient, allowed to react for the required time to achieve maximum conversion of sugars to ethanol and then emptied to a beer well. The empty tank is then cleaned by the addition of steam and caustic soda. Once cleaned the tank is filled again for the next cycle. This process occurs continuously by using all six fermentor tanks in series.

The fermentor tanks will be stainless steel construction and sealed with a sloping floor to allow discharge of all slurry by gravity feed.

The reaction produces carbon dioxide, which is vented to a wet scrubber (which effectively cleans the carbon dioxide). The cleaned, scrubbed carbon dioxide gas is emitted to atmosphere while the scrubber water is recycled back to the front of the process.

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

Distillation involves boiling off the ethanol from the fermented slurry mix with steam to produce a hydrous ethanol product containing 95 per cent ethanol and 5 per cent water.

Two boilers will produce the steam requirement for the facility. On site storage of LPG will be provided for the operation.

The distillation process involves pumping slurry from the beer well in the fermentation area to the mash distillation column. The column operates under a vacuum at a temperature up to 125 degrees Celsius. The column will be approximately 3.5 metres in diameter and 12 metres high, constructed of stainless steel and will contain a number of heating trays to distribute the heat into the slurry and gas mixture.

The hydrous ethanol can either be dehydrated (water removed) to a fuel ethanol or purified by further distillation to an industrial ethanol or purified even further to a potable ethanol. The ethanol products are then pumped to the ethanol storage area.

The by-product of distillation is slurry containing all unfermentable products - principally water and distiller's grain.

The distiller's grain is extracted as a mash cake by centrifuging and then the cake is transferred to the mash storage silo. The liquid by-product is transferred to a slops tank where approximately 60 per cent is returned to liquefaction for addition to the milled grain flour at the start of the process. The remaining 40 per cent, which is in liquid form (thin slops) is processed in the evaporation circuit to thicken the product to a more concentrate form (syrup), then it is pumped to a syrup collection tank. The syrup, which is about 30 per cent solids, is then pumped to a syrup storage silo for storage prior to dispatch to market.

In the case of fuel ethanol production, vapour and liquid from the top of the rectifier distillation column is superheated and transferred to molecular sieve vessels, which remove any water from the ethanol product. The dehydrated ethanol product is then cooled, filtered and transferred to the ethanol storage area.

In the case of industrial and potable ethanol production, vapour and liquid from the top of the exhaust column is transferred to the further smaller distillation columns where impurities are distilled off from the hydrous ethanol mix. The industrial ethanol produced from the purification columns is then filtered and transferred to the ethanol storage area.

The potable ethanol is also cooled and transferred to the ethanol storage area to uncontaminated vessels used exclusively for potable product. The storage and handling is to food grade hygiene levels in order to accommodate the end use requirements of the product.

Distillers Grain Storage and Dispatch

The distiller's grain cake is conveyed to a cake storage silo or concrete holding bunker. Distiller's cake is loaded from the bottom of the cake silo directly into the transport vehicles, or loaded from the concrete bunker into a screw conveyor, which then loads the vehicles.

The distiller's grain syrup is pumped from the syrup storage silo to the load point on the syrup transport vehicle or to the cake truck feed screw conveyor where it is mixed with the cake and fed into the WDGS transport truck.

Ethanol Storage and Dispatch

The cooled ethanol from dehydration will flow to one of three shift storage ethanol receiver tanks in the storage area. After passing relevant quality tests the ethanol receiver tanks contents are transferred to the product storage tanks. This system is replicated for both industrial and potable ethanol.

For the production of fuel grade ethanol only, denaturant from the denaturant storage tank is metered continuously into the pure ethanol stream during transfer to the main storage tank to yield a finished product containing 5% denaturant.

The product storage tanks are sized to provide 14 days of storage of fuel ethanol at full flow rate (200 ML/yr) and 3 days of storage for industrial and potable ethanol. The denaturant tank is sized to hold sufficient denaturant to cover 10 days ethanol production.

All storage tanks are vented through a vent pipe fitted with an in-line flame arrester and a breather vent valve.

3.3

PROPOSED PLANTATION

Australian Ethanol Limited intends to establish an effluent irrigated timber plantation approximately 40 hectares in size in the south east of the site to create a carbon sink via carbon sequestration, and to dispose of any plant effluent water not recycled back into the process chain. The potential location of the plantation is shown on *Figure 2*.

The plantation will be established using hybrid hardwood species suitable to the site and will be determined prior to construction. Options include a hybrid between *Eucalyptus camaldulensis* (River Red Gum) and *Eucalyptus grandis* (Flooded Gum), and *E. camaldulensis* and *E. globulus* (Blue gum). These hybrids have been developed especially for saline areas and combine the salt and stress tolerance of the *Eucalyptus camaldulensis* with the growth potential and wood property traits of *Eucalyptus grandis* and *Eucalyptus globulus*. This hardwood will be a future timber resource for the region as well as providing carbon sequestration.

The plantations forming part of the ethanol facility provides three key opportunities.

- The carbon sequestration potential of the forestry plantations. One of the key emissions as a result of the ethanol production process is carbon dioxide. The Kyoto protocol identifies that reforestation is one way to provide carbon sequestration.
- The opportunity to reuse effluent produced by the ethanol production facility for irrigation of the plantation.
- The potential to create a future timber resource for the Coleambally area.

A buffer will be provided between the plantations and the surrounding site boundaries and between the plantations and adjoining native vegetation. This boundary will allow for access, and provide a buffer between plantation and native forest areas.

3.4

PROPOSED WATER RECYCLING

A significant component of the development of the ethanol facility at Coleambally is the reuse of the majority of wastewater produced by the facility. The effluent from the facility will be treated as per statutory requirements prior to being held in a storage dam. Effluent will either be recycled back into the ethanol production plant, or treated and used to irrigate the onsite timber plantations.

Investigations will be undertaken, as part of the environmental assessment, to determine the capability of the land to support an effluent-irrigated timber plantation based on its climate, topography, hydrogeology and ability to provide adequate buffer distances from local waterways and public access areas. The investigations will form part of the EAR to accompany the project application and would specifically address the following issues:

- effluent quality;
- land suitability for irrigation of effluent;

- wet weather storage requirements;
- potential for impacts on downstream ground and surface waters; and
- any mitigation measures.

An irrigation schedule and monitoring program would also be determined before any irrigation with reclaimed water occurs. The irrigation schedule would be prepared in accordance with the Department of Environment and Conservation (DEC) *Environmental Guidelines: Use of Effluent by Irrigation*. The guidelines outline the beneficial use of effluent and how it can be accomplished in an ecologically sustainable and socially responsible way. Further details of the statutory conditions that would need to be considered related to reclaimed water quality are listed in *Chapter 4*.

4.1 STATE ENVIRONMENTAL PLANNING INSTRUMENTS

4.1.1 *Environmental Planning and Assessment Act 1979*

The proposed development will be assessed in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000*.

The EP&A Act has recently been amended 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 Clause 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 authorisation for a Part 3A application are not required under the *Heritage Act 1977*, *National Parks and Wildlife Act 1974*, *Native Vegetation Act 2003*, *Rivers and Foreshore Improvement Act 1948* and *Rural Fires Act 1997*.

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

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 2005, 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 Coleambally will have a capital investment value in excess of \$30 million, the project satisfies the relevant criteria set out in SEPP MP and Part 3A of the Act applies.

A project application will therefore 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'.

4.1.3 **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 NSW Roads and Traffic Authority (RTA) is made aware of and given the opportunity to make representations in respect of developments such as liquid fuel depots.

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.

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

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) seeks to require development consent for hazardous or offensive development proposed to be carried out 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 and in accordance with clause 12, a preliminary hazard analysis will be prepared as part of the EAR.

4.1.5 *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.

Under Schedule 1 of the POEO Act the site will require an Environmental Protection Licence for 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.*"

4.1.6 *Water Act 1912*

The *Water Act 1912* is administered by the Department of Natural Resources (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.

The proposal will require the extraction of approximately 8ML of water per day from the Murrumbidgee River via the Tubbo drainage channel. Water will be extracted from the channel via the construction of a pumping station and pipeline on site. A 'high security' licence under the *Water Act 1912* will be required for this activity.

4.1.7 *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 were 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 *Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2003* falls under Section 50 of the WM ACT. The *Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2003* applies to all the regulated reaches of the Murrumbidgee River including the Murrumbidgee River from Taemas Bridge within Burrinjuck Dam water storage to its junction with the Murray River, the Tumut River from the upper reaches of Blowering Dam to its junction with the Murrumbidgee River, and the Yanco/Billabong Creek system from the off-take of Yanco Creek from the Murrumbidgee to the junction of the Billabong Creek with the Edward River.

The vision for the Plan is '*to provide equitable sharing of limited water resources to sustain a healthy and productive river and the welfare and well-being of Murrumbidgee regional communities*'.

The Plan proposes to do this through monitoring of environmental indicators as well as undertaking strategies for maintaining the water quality of the River including monitoring, licensing and rules for access and extraction. The proposed extraction of approximately 8ML per day from the Murrumbidgee River via the Tubbo irrigation channel for the proposed facility will be assessed in the EAR against the share components of regulated river (high security) access licences authorised to extract water from this water source.

4.1.8

Roads Act 1993

Under section 138 of the *Roads Act 1993* consent from the Roads and Traffic Authority of NSW (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. A consent may not be given with respect to a classified road except with the concurrence of the RTA.

The intersection of Ercildoune Road with The Kidman Way may require upgrading and the provision of truck turning lanes. The Kidman Way is a Main Road (MR 321) under the care and control of the RTA such that concurrence from the RTA will be required for any work carried out on this road.

Ercildoune Road is a minor road maintained by Council, which will require partial upgrading and sealing from its intersection with Kidman Way. Concurrence from the RTA will not be required for this work.

Murrumbidgee Local Environmental Plan 1994

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 Murrumbidgee Local Environmental Plan 1994 (LEP 1994), the site and its surrounds are zoned Rural 1(a). The proposed project is defined 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, under the Standard Instrument (Local Environmental Plans) Order 2006.

In the Rural 1(a) zone agricultural produce industries are permissible with development consent.

The general aims of this plan are to encourage the proper management, development and conservation of natural and manmade resources within the Murrumbidgee Shire.

The environmental assessment will take into consideration the aims and objectives of the Rural 1 (a) zone of LEP 1994, which include:

“(a) to encourage the proper management, development and conservation of natural and man-made resources within the Murrumbidgee area by protecting, enhancing and conserving:

(i) natural drainage lines,

(ii) prior streams,

(iii) prime crop and pasture land,

(iv) timber, minerals, soil, water and other natural resources,

(v) areas of significance for nature conservation,

(vi) areas of high scenic or recreational value,

(vii) places and buildings of archaeological or heritage significance, including aboriginal relics, and

(viii) the bed and banks of the Murrumbidgee River, and

(ix) waterways and associated wetlands for their fish and fish habitat values, and

- (b) to replace the existing planning controls with a single local environmental plan to help facilitate the growth and development of the Murrumbidgee Area in a manner which is consistent with the aims specified in paragraph (a) and which:*
- (i) minimises the cost to the community of fragmented and isolated development of rural land,*
 - (ii) facilitates the efficient and effective provision of amenities and services,*
 - (iii) facilitates a range of residential and employment opportunities in accordance with demand,*
 - (v) ensures that the efficiency of arterial roads is not adversely affected by development on adjacent land"*

4.3 SUMMARY OF PERMITS, LICENCES AND APPROVALS

The following permits, licences and approvals will be sought for the proposed construction and operation of the ethanol production facility:

- project approval will be sought from the Minister for Planning;
- an Environment Protection Licence will be sought from the Department of Conservation (DEC), specifically the Environmental Protection Authority (EPA); and
- 'high security' water licence will be sought from DNR under the *Water Act 1912*.

5.1 GEOLOGY, SOILS AND LANDFORM

5.1.1 *Coleambally/Darlington Point Topography*

Information from the *Darlington Point 8028-1 & IV 1:50 000 Topographic Series Sheet (1st Edition)*, indicates the site is at an elevation of approximately 125 metres above the Australian Height Datum (AHD). The site and immediate surrounding local topography is generally flat with a very gradual slope to the east towards Boona State Forest.

Information from Murrumbidgee Council in the Section 149 (2) & (5) indicated that the site is not located on or part of land that is flood prone. As such no further assessment of flood flows and levels will be undertaken as part of the EAR.

5.1.2 *Coleambally/Darlington Point Geology and Soil Landscapes*

As identified in the *CSIRO: Physical Properties of Soils in the Murrumbidgee and Coleambally Irrigation Areas 1999*, the predominate geological units are the Renmark Group, the Calivil Formation and the Shepparton Formation. The Renmark group is primarily comprised of light brown or quartz sand, the Calivil Formation consists predominantly of pale grey coarse to granular quartz sand with lenses of kaolin and carbonaceous clay, and, the Shepparton Formation consists of a matrix of clay, silt and silty clay with lenses of fine to coarse sand and gravel.

The diversity of soil landscapes in the region means that the soil has variable qualities. In general, silty sands are porous and clays are less permeable except under dry conditions where it is prone to cracking. In addition, the region may be affected by salinity and waterlogging due to intensive irrigation.

No further specific soil investigations are required as part of the EAR; however soil quality will be assessed as part of the surface/groundwater assessment.

The site is located within the Murrumbidgee Catchment Area. The Murrumbidgee Catchment ranges from the alpine areas of Kosciusko National Park and the Monaro plains, through to the South West Slopes and Plains to the Western Riverina and covers an area of 84,000 square kilometres.

The Murrumbidgee River flows for 1,600 km from its headwaters in Kosciusko National Park to its junction with the Murray River near the town of Balranald in NSW. The river and its catchment is a significant part of the Murray-Darling Basin, supplying water for people, agriculture and wildlife along its length. The township of Coleambally lies between the Murrumbidgee River to the north and Spillers Creek to the south.

The Murrumbidgee is also the most significant water body located in proximity to the site lying approximately 20 kilometers to the north of the site.

Both the Murrumbidgee Irrigation Area and the Coleambally Irrigation Area are situated in the lower-Murrumbidgee Catchment. More than 10 000 kilometres of irrigation channels supplied by Burrinjuck Dam near Yass and Blowering Dam near Tumut provide these irrigation areas with water. As part of the Coleambally Irrigation Area (CIA) the district is supplied with water from the Murrumbidgee River via the Coleambally main channel and minor channels throughout the area.

Tubbo drainage channel is a part of the CIA channel system and runs across the site from the northeast corner across and off the site on the mid-western boundary of the site.

The following structures are proposed as part of the project.

- A run-off catchment dam adjacent to the production buildings which will store runoff from the buildings and hard surface areas.
- A larger process water dam, with a capacity of up to 100 ML, adjacent to the production buildings. This dam will store water to be used in the ethanol production process.
- An effluent storage dam centrally located adjacent to the process water storage dam. This dam will have a capacity of approximately 30 ML and will be used to store effluent waste water from the facility, which will also be used to irrigate the plantations.

Water will be pumped from the channel via a 'high security' water licence sought from DNR under the *Water Act 1912* and in accordance with the *Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2004*. Further investigations into the reliability and harvestable water rights associated with the project will be undertaken as part of the EAR. A water balance with regards to irrigation of the plantation will be undertaken as part of the EAR.

In addition, an assessment of surface water quality, wastewater and erosion and sediment control will be undertaken as part of the EAR to determine appropriate strategies to manage these resources.

5.3

GROUNDWATER

Data supplied in the *CSIRO: Hydrogeology of the Coleambally Irrigation Area Technical Report 1997*; the NSW Department of Infrastructure, Planning and Natural Resources *State of the Environment Report-Murrumbidgee Catchment 1995*; and the NSW EPA, *State of Environment 2003*, indicated the following for groundwater in the Murrumbidgee region:

- groundwater within the Murrumbidgee River catchment is suitable for some domestic, agricultural and limited industrial uses, although some groundwater from low yield systems is suitable for drinking;
- natural variations in ground water quality and volume in the region are affected by human activities such as water extraction and pollution;
- groundwater levels over the last eight years have been on a gentle decline. Prior to this the levels were fairly static or rising gently;
- there is a potential for groundwater to be vulnerable to salinity and as such future land use changes or development should take this into account;
- contamination of groundwater by nitrates, pesticides, pathogens, hydrocarbons and other substances is known to occur but virtually no data is available for groundwater quality specifically in the Murrumbidgee;
- groundwater pumping from the Murrumbidgee subsystem impacts on flows in the streams in areas with a direct hydraulic connection between the aquifer and the watercourses; therefore water management planning in the Murrumbidgee catchment needs to consider both the surface water and groundwater resources as a single resource;
- a *Water Sharing Plan for the Lower Murrumbidgee Groundwater Source 2003* has been developed by local groundwater management committees and is expected to commence in October 2006. Although these plans are principally focused on water sharing, they also address quality and quantity issues surrounding groundwater in the region;

- regional groundwater flow in the area is expected to be towards the Murrumbidgee River, in a northerly direction; and
- the underlying geology and soils have variable permeability and therefore, groundwater is vulnerable to pollution.

The main pollution risks to the groundwater from the proposed ethanol facility are identified as being:

- spills and leaks onto the ground surface due to incidents associated with the plant operation;
- leaks from underground infrastructure installed at the plant; and
- impacts to surface and groundwater associated with operation of the irrigation system.

The *Department of Environment and Conservation (DEC) Environmental Guidelines: Use of Effluent by Irrigation*, states how effluent irrigation areas and systems should be located, designed, constructed and operated so that the current or future beneficial uses of groundwater do not diminish as a result of contamination by the effluent or runoff from the irrigation scheme or changing water tables.

An assessment on groundwater vulnerability to the proposed irrigation scheme will be undertaken to ensure that the proposed reuse of effluent on the plantations will not result in significant groundwater impacts. In addition an assessment will be undertaken to determine the risks to groundwater from operation of the facility. These assessments will form part of the EAR.

5.4 *TRAFFIC AND TRANSPORT*

5.4.1 *Surrounding Road Network*

Trucks accessing and egressing the site will do so from Ercildoune Road which adjoins the northern boundary of the site. Ercildoune Road is a predominantly unpaved single-carriageway road with one lane in each direction and a speed limit of 100 km/h. It is sealed to approximately 100m west of its intersection with Kidman Way and is currently maintained by Council. The surrounding road network consists of:

- Kidman Way is located approximately 700 m east of the site, and is the main road out of Coleambally leading north to Darlington Point and Griffith;

- Kidman Way continues north and leads to the Sturt Highway which leads in a westerly direction to Hay and an easterly direction to Narrandera;
- Kidman Way also continues south to Jerilderie before meeting up with the Newell Highway; and
- The Newell and Sturt Highways are major transport highways in the region.

Traffic in the area generally comprises local traffic between the towns and rural areas, and highway trucks and road-trains transporting goods and materials throughout the region.

5.4.2 *Vehicle Movements*

The total number of vehicle movements to and from the proposed ethanol production facility is estimated to be 100-200 per day.

It is estimated that traffic movements along Ercildoune Road will increase substantially as a result of deliveries to and from the site during operation of the facility, comprising:

- grain transport in;
- ethanol product out;
- wet distillers grains and syrup sales out;
- denaturant (petrol) deliveries;
- LPG deliveries;
- chemicals and miscellaneous deliveries; and
- light vehicles (staff cars).

Upgrades will need to be made to Ercildoune Road in the form of all-weather paving and widening to accommodate turning into the site by road-train and B-double trucks.

Ethanol product will be transported from the site by truck and/or rail via the Leeton, Whitton or Yanco junctions of the Southern Railway.

An assessment of the impact of traffic and transport associated with the development and operation of the ethanol facility, and the cumulative impacts of the surrounding proposed developments, will be undertaken as part of the EAR.

The emissions to the atmosphere expected from the proposed plant include:

- dust from the milling operations;
- carbon dioxide and residual gases including ethanol and other volatiles from the fermentation stage;
- carbon dioxide and residual gases including ethanol and other volatiles from the distillation, evaporation and dehydration stage, with the potential for some of these to be odorous; and
- odour associated with headspace emissions from the ethanol storage and disposal stage.

Coleambally township is located approximately 7km south-west of the site along Kidman Way. Three rural dwellings are located approximately 800m south and 1 km southeast and northwest of the site, and as such potential air quality impacts are not expected to be significant. In order to reduce any odour issues the facility will be designed based on best practice to ensure that the facility's air emissions are minimised.

A comprehensive air emissions assessment report will be prepared for the proposed plant, which will meet both the USEPA standards and NSW DEC guidelines

The NSW EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) lists the statutory methods that are to be used to model and assess emissions of air pollutants from stationary sources in NSW. It is referred to in Part 4: Emission of Air Impurities from Activities and Plant of the *Protection of the Environment Operations (Clean Air) Regulation 2002*. An air quality assessment for the proposed project will be undertaken as part of the EAR in accordance with these methods.

The potential odour impacts of the proposed plant will be assessed in accordance with the NSW EPA's draft policy *Assessment and Management of Odour from Stationary Sources in NSW*, which outlines the legislation that applies to odour assessment and management and recommends a policy framework for dealing with odour issues.

5.6 NOISE

The nearest sensitive receptors to the site are three rural dwellings, located approximately 800 m south and 1 km southeast and northeast of the property.

5.6.1 *Operational Noise*

Australian Ethanol Limited intends for all reasonable measures to be taken to prevent noise emissions for the proposed project. The likely noise generating activities from the proposed facility include:

- trucks accessing and egressing the site;
- staff vehicles accessing and egressing the site;
- milling of grain (using two rotary hammer mills) in an enclosed building as part of the milling and slurry preparation process; and
- external conveyors used throughout the process.

5.6.2 *Construction Noise*

Noise generating activities expected to occur during the construction of the proposed plant include:

- heavy and light transport truck (in/out) in transit;
- clearing and grading;
- earthwork concrete preparation;
- aggregate processing;
- foundation grouting and positioning of large structures (e.g. building walls);
- facility construction; and
- trenching and earthwork.

5.6.3

Acoustic Assessment

As the nearest receptors are more than 800m from the site potential noise and vibration impacts are not expected to be significant. An acoustic report will be prepared for the proposed plant as part of the EAR to assess the likely impacts of potential noise sources on the nearest residences. Noise sensitivity models will be assessed against the following criteria:

Construction Noise Criteria

The NSW EPA acknowledges that noise from construction sites is unavoidable and mitigation is often limited. The EPA's current view is that noise limits will not be set for most construction sites, but expect that all reasonable and feasible noise mitigation is applied. Construction noise is explicitly excluded from the EPA's Industrial Noise Policy (INP) (2000). The assessment criteria for construction noise set out in the Environmental Noise Control Manual ENCM (EPA, 1994) will be used.

Operational Industrial Noise Criteria

The NSW Government INP stipulates guidelines for assessment of noise from the operation of industrial facilities. The INP was specifically developed to provide a comprehensive assessment technique that complies with the POEO Act. Assessment criteria depend on the existing environment of areas potentially affected by the proposed development and will include both residential intrusiveness and residential amenity criteria.

The proposed facility will operate on a 24 hour basis and as such the acoustic assessment will take both 'day' and 'night' time criteria into account.

Sleep Disturbance

As the proposed facility will operate 24 hours per day, transient noise sources such as reversing alarms will be assessed for the potential to disturb the sleep of nearby residents. The EPA's Environmental Noise Control Manual indicates that to prevent sleep disturbance, the $L_{1\text{min}}$ noise level from an intrusive source should not exceed the background noise level by more than 15dB.

However, this criterion does not take account of more recent research on the effects on sleep of road traffic noise. The EPA's Environmental Criteria for Road Traffic Noise policy indicates that maximum noise levels below 50 - 55dB (A) within residences are unlikely to cause awakening reactions. If bedroom windows are open, this corresponds to an external maximum noise level of approximately 60 - 65 dB (A) at a residence.

In our experience, adopting the more stringent Noise Control Manual criterion for the facility would be desirable in the first instance, and if exceedances are predicted, the EPA's more recent Road Traffic Noise criteria may be applicable.

5.7 *HERITAGE*

5.7.1 *European Heritage*

A preliminary search of the relevant heritage registers for the Murrumbidgee local government area was undertaken and included the Australian Heritage Database (including the Commonwealth Heritage List the National Heritage List and the Register of the National Estate), the Australian Heritage Places Inventory, the Heritage Office Department of Planning State Heritage List and the State Heritage Register. The Murrumbidgee LEP 1994 was also examined for heritage items in the local area.

A total of eight historic heritage items were identified during these searches. Most of these were located in Darlington Point approximately 35km to the north. None were recorded as being located on or adjacent to the site and therefore are not likely to be impacted by the proposed project.

No further assessment of European heritage is proposed as part of the EAR.

5.7.2 *Aboriginal Heritage*

The Murrumbidgee LEP 1994 was searched for indigenous places. One indigenous place was listed in this document; however no locational information was recorded for use in positioning it in relation to the proposed site.

The Department of Environment and Conservation (DEC) Aboriginal Heritage Information Management System (AHIMS) was searched within an area of 5 km surrounding the proposed plant site. This search revealed a scarred tree (49-4-0014) located almost in the centre of the subject property. The next closest recorded Aboriginal site was an Aboriginal resource and gathering site located approximately 1.5 km north of the proposed facility. *Figure 4* identifies Aboriginal sites located within a 5 kilometre radius of the site

The National Native Title Tribunal website was searched for Native Title applicants, and revealed no applications in the area. As the subject site is Crown Land, Native Title is not extinguished and therefore can be claimed by Native Title applicants.

An Aboriginal heritage assessment will be undertaken as part of the EAR in light of the fact that an Aboriginal site (scarred tree) is registered on the property and also due to confirmation of the existence of the scarred tree registered in the vicinity. This Aboriginal heritage assessment will include consultation with the local Aboriginal community regarding heritage issues, and a field survey of the proposed site. Appropriate mitigation measures would be developed following the assessment in line with DEC Aboriginal Consultation Guidelines.

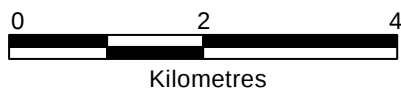
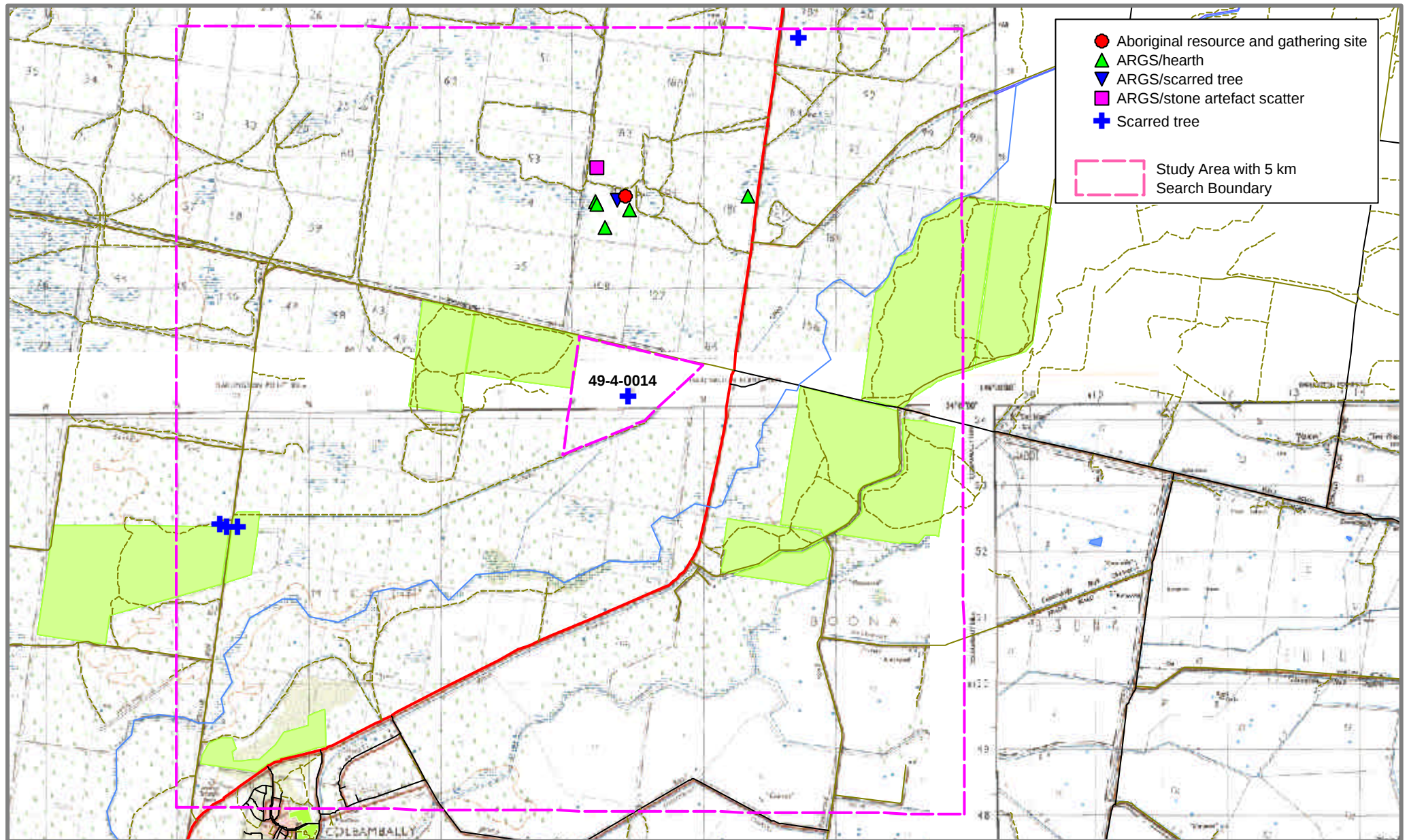


Figure 4

Location of Aboriginal Sites (registered on AHIMS database) within 5 km of Study Area

Preliminary Environmental Assessment for
Proposed Ethanol Production Facility: Coleambally

Preliminary background literature reviews and database searches were undertaken to obtain information on flora and fauna species and vegetation communities likely to occur on the site or surrounding area. This included searches for threatened species listed under the *Threatened Species Conservation Act* (TSC Act) 1995 and Commonwealth EPBC Act previously recorded in the locality within a 10 km radius of the site. Sources of information included the following:

- DEC Wildlife Atlas Database; and
- DEH online search for Matters of National Environmental Significance (NES).

The database searches indicated 7 threatened fauna species, 2 threatened flora species and 5 Commonwealth listed migratory species with the potential to occur within a 10 km radius of the site. Species identified under the TSC Act are listed in *Figure 5*.

The DEH and DEC online database indicated that the following three EEC's have been reported to have habitat available within 10 kilometres of the site:

- *Myall Woodland* in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes;
- *Fuzzy Box Woodland* on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions; and
- *White Box Yellow Box Blakely's Red Gum Woodland*.

Historic and current land use for agricultural cropping has greatly modified the indigenous vegetation of the site. Bretts State Forest adjoins the site on its western boundary. The current biological values are considered to be low; however a desktop search under the TSC Act identified at least one sighting of a Superb Parrot (*Polytelis swainsonii*) on and immediately adjacent to the site. As such, the following will be carried out as part of the EAR:

- a site assessment to determine habitat type and the likelihood of the occurrence of the threatened species based on site habitat, including roosting, foraging and nesting habitat; and
- an assessment as to the significant impacts if the threatened species is found to likely occur on site.

Specifically the significance of impacts will be assessed by conducting an assessment of significance, as described in the Draft Guidelines for Threatened Species Assessment for applications assessed under Part 3A of the identified threatened species will be completed as part of the EAR.

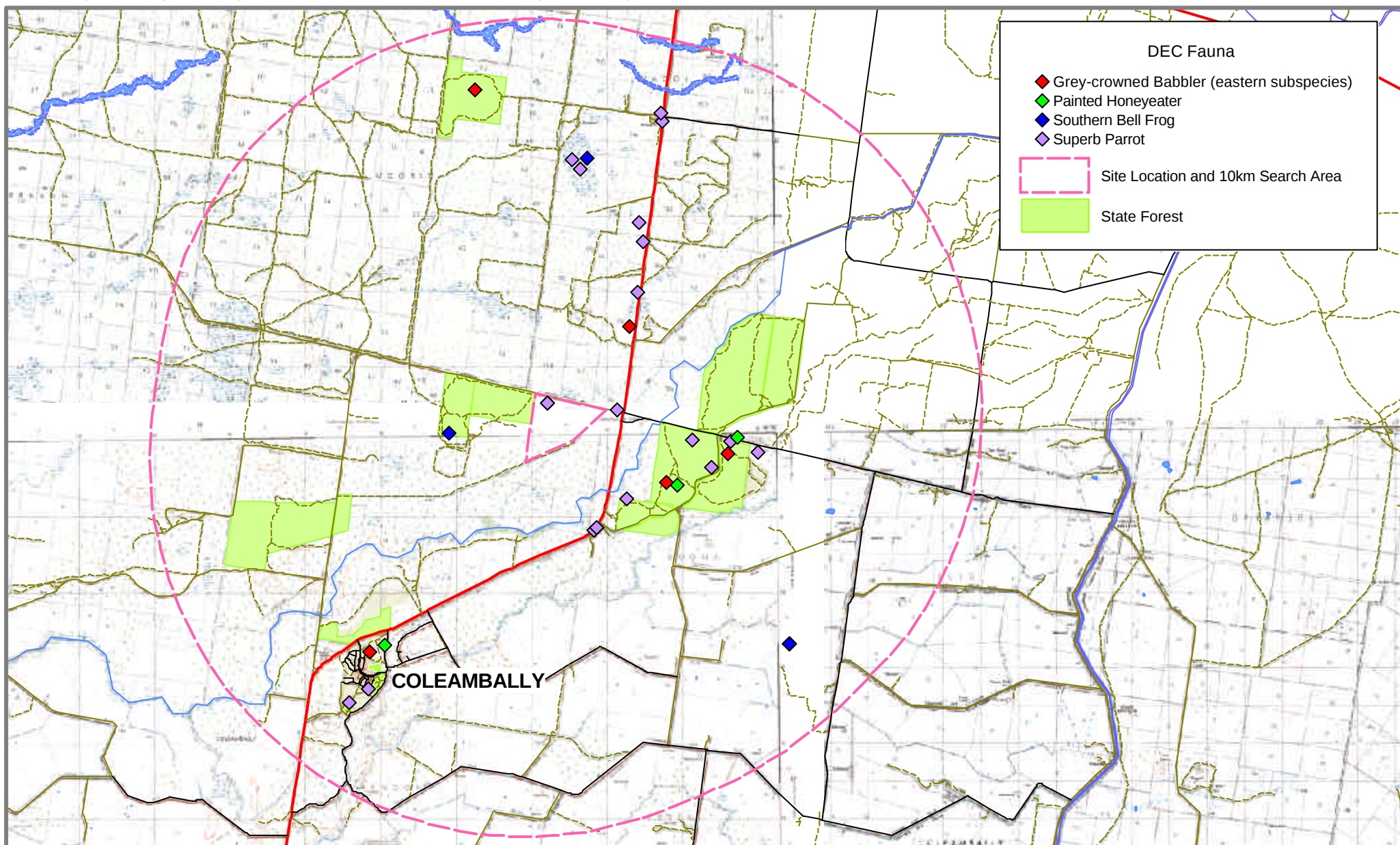
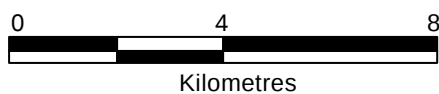


Figure 5

Threatened Species Previously Recorded
within 10km of the Coleambally Site

Preliminary Environmental Assessment for
Proposed Ethanol Production Facility: Coleambally



5.9.1

Existing Landscape

The immediate visual catchment of the site is defined by Ercildoune Road, agricultural lots and dense forest to the north, Tubbo channel and low rising vegetation to the south and east, various agricultural plots and State Forests to the west and agricultural land and Kidman Way and State Forests to the east. The general area is flat rural agricultural land characterised by cropping and grazing and sparse rural development.

The majority of the property is rural agricultural land with clusters of trees visible in patches throughout the property. Access to the site is via Ercildoune Road on the northern boundary of the site.

Surrounding properties are characterised by primarily agricultural uses with some rural dwellings and some patches of dense vegetation to the north, east (Boona State Forest) and west (Bretts State Forest). The Coleambally (Murrumbidgee Shire Community Experimental Demonstration) Farm and the NSW Rice industries Coleambally Depot are located adjacent to the north-east corner of the site on Ercildoune Road. Coleambally township is located approximately 7km south-west of the site along Kidman Way.

Three rural dwellings are located approximately 800m south and 1 km southeast and northwest of the proposed plant site. These rural dwellings will be partially to fully protected from views of the facility by Bretts State Forest and a line of tree cover along the drainage channel located south of the site.

The site and surrounding area are generally flat.

5.9.2

Proposed Landscape

Expected visual elements of the ethanol facility include the following items, landforms and activities:

- the plant and associated infrastructure as described in more detail in *Section 2.1.2* located in the north-east boundary of the site;
- a grain storage building which will be the tallest structure on site with maximum height of 35 metres;
- grain storage bunkers located adjacent to the main buildings;
- various smaller buildings associated with the production facility;
- various sealed roads, for access to and from the facility to deliver/receive goods and supplies;

- the forest plantation in the south east of the site;
- a larger process water dam, with a capacity of up to 100 ML, adjacent to the production buildings; and
- an effluent storage dam located adjacent to the process water dam. This dam will have a capacity of approximately 30 ML and will be used to store effluent waste water from the facility.

5.9.3 *Potential Visual Impacts*

Following inspections of the site and surrounds two locations were identified as potentially sensitive viewer locations. These include the rural dwellings to the south and southeast and areas that are exposed or elevated above the proposed site. Two main sensitive locations are identified as follows:

- Viewer Location 1: Three residential residences between 800m and 1 km south, north-west and south-east respectively of the site and;
- Viewer Location 2: Vehicles using Kidman Way located approximately 750m to the east of the site.

Retention of the original vegetation and landscape features will be included wherever possible in the facility design to minimise potential impacts on the visual amenity of the locality.

Moderate to low visual impacts are expected to occur during the construction of the facility and establishment of the plantations. The following mitigation measures will be implemented to further minimise the extent of impacts upon visual amenity for the proposed construction works:

- plant and equipment will be kept to designated areas; and
- stockpiling will be carried out within the areas specified, i.e. no stockpiling outside of designated areas;
- the contractor will maintain the site in an orderly manner and will minimise the spread of materials stockpiles, waste and vehicle parking.

Moderate to low visual impacts are expected during the operation of the plant however, there are a limited number of sensitive visual receptors. The following mitigation measures may be implemented to further minimise the extent of impacts upon visual amenity for the operation of the proposed plant:

- clearing of vegetation will be kept to a minimum, with trees along the boundaries of the site maintained wherever possible and in particular along the south-eastern boundary of the site where the most sensitive receptors are located; and
- additional planting and maintenance of trees is proposed in the view shed of the operation in the south of the site.

In addition, the proposed silos and grain storage bunkers will be similar to those on the adjoining properties and common throughout the Murrumbidgee Region.

Due to the above factors the proposal is expected to have a low visual impact on the surrounding area. A brief visual analysis will be completed as part of the EAR.

5.10 *INFRASTRUCTURE*

The proposed development is serviced with all necessary infrastructure as detailed below.

- Potable water will be pumped from the Murrumbidgee River via Tubbo Channel which runs across the site. The water will be pumped from the dam/weir on site.
- Process water will be provided for the plant by the same pipeline. The plant will require approximately 8ML per day. Process water will be pumped to a holding dam on-site, from which it will be used to fire the boiler, and for the process plant. The majority of process water is expected to be recycled back onto the production process via treated waste water reuse.
- A high security water licence will be sought for the plant from DNR. This will ensure an adequate supply of water for the production process and may at a later stage be converted to an industrial water licence.
- Country Energy supplies electricity to the region. Two power lines cross the site at present.
- The site will be connected to the local telecommunications network.
- Reticulated sewerage is not currently available to the site.

An assessment of the capacity of the above infrastructure to service the project will be completed as part of the EAR.

5.11 *HAZARDS AND RISKS*

The proposed project will involve the production and storage of flammable substances including 10ML of ethanol, 400,000L petrol fuel and LPG fuel. The potential risks posed by these activities along with the proposed mitigation measures and emergency response protocols will be addressed in the EAR.

As the proposed project may be considered a 'potentially offensive industry' under SEPP 33, a preliminary hazard analysis will also be prepared as part of the EAR.

5.12 *CUMULATIVE IMPACTS*

Cumulative aspects of the proposed project are those aspects that should be considered in conjunction with other developments in the local area. The Coleambally area and Murrumbidgee Region is dominated by large-scale agricultural operations.

A Part 3A application has been lodged with the Department by Four Arrows Limited for the proposed establishment of an ethanol plant and an intensive dairy. This project is proposed on Tubbo Station, immediately to the south-east of the Australian Ethanol Limited site adjacent to the Tubbo Channel, and proposes the production of 200ML of ethanol per annum and management of up to 6,000 dairy cows on the site.

The cumulative aspects of both projects may include cumulative increases in noise, dust or odour, cumulative decreases in surface and groundwater quality or quantity, a cumulative increase in traffic and a potential reduction in visual amenity.

The studies to be completed for the EA for the current project will consider other industries in the area including the proposed Four Arrows project in their assessment of impact. The operation of this neighbouring operation will be factored into models for noise and air quality via the use of background environmental data and predicted emissions from the adjoining site.

5.13 *SOCIO-ECONOMIC IMPACTS*

Socio-economic benefits of the proposal include direct and indirect employment of local staff contractors, increased demand for locally grown grain (wheat, barley, corn) and a supply of wet distiller's grain as feed to farmers in the region. Approximately 40 full-time staff will be employed during the operation of the proposed plant. There will also be continued economic multiplier effects to local and regional businesses and industries over the longer term. The proposal will not reduce rural lands to an extent which would compromise local agricultural activity or production and will instead provide a valuable feed source for the intensive agriculture feedlots in the region.

Potential negative socio-economic impacts associated with the proposed ethanol production facility may relate to the acoustic amenity, water and air quality and ecological impacts which without mitigation measures could have the potential to affect nearby residents and regional resources. Changed traffic conditions are expected in the local area during the operation of the plant and trucks entering and leaving the site may have an impact on nearby residents. These potential impacts will be addressed in the land use, acoustic and traffic assessments completed as part of the EAR.

Community consultation will be undertaken during the preparation of the EAR, targeting key community groups in Coleambally and the surrounding area and is likely to involve the following components:

- preparation of information newsletters that will be distributed to key community groups and adjacent residents to provide information and updates relevant to the project and invite comment; and
- organisation of a community information session to provide information and field questions from the local community.

If significant issues are raised, targeted consultation with relevant groups or residents would be conducted.

5.14

ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Australia's National Strategy for Ecologically Sustainable Development (NSED) 1992 (NSED) defines ecologically sustainable development (ESD) as:

“using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased”.

Bio-fuels, such as ethanol, produced from cereal grains, wood or sugarcane can be a greenhouse-neutral, renewable energy source for use in transport vehicles, stationary engines, and small electricity generators. Ethanol also lowers vehicle exhaust emissions that are ozone damaging, degrade air quality and represent a threat to human health.

Bio-fuels have the potential to be greenhouse-gas neutral (depending on the feedstock), as atmospheric carbon is recycled into biomass through the carbon cycle. The proposed production of ethanol for Australia therefore has the potential to be environmentally sustainable.

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.

The four principles of ESD as they relate to the proposed activity will be addressed within the environmental assessment. These principles include:

- i. Conservation of Biological Diversity and Ecological Integrity - addresses the need to maintain ecosystem diversity, species diversity and genetic diversity within species.
- ii. The Precautionary Principle - where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- iii. Intergenerational and Intragenerational Equity (between generations) - the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. Intra-generational equity (within generations) requires that the economic and social benefits of development be distributed appropriately among all members of the community.
- iv. Improved Valuation and Pricing of Environmental Resources - refers to the need to include environmental factors in the valuation of assets and services.

These principles have been paraphrased from the *Protection of the Environment Administration Act 1991*.

CONCLUSION

Australian Ethanol Limited proposes to establish an ethanol production facility at Coleambally in the Murrumbidgee region of NSW with a production capacity of 200ML/year.

The development of an ethanol production facility and the associated plantations will result in an environmentally sustainable development that utilises local produce and will have significant economic flow on effects to the Murrumbidgee Region.

The proposed hardwood plantations, the re-use of effluent to irrigate the plantations, and the sale of wet distiller's grain all demonstrate the environmentally sustainable approach incorporated into the project.

All measures will be taken to ensure minimal amenity impacts as a result of noise, air emissions, traffic and/or visual appearance.

This report sets out the proposed project, provides an overview of potential key issues and outlines the approach to the assessment of the issues in the EAR.

In summary the key environmental considerations identified in this preliminary assessment for the proposed facility at Coleambally are:

- surface and groundwater quality;
- traffic and transport;
- cumulative noise and air quality impacts; and
- Aboriginal heritage.

These issues will therefore be addressed in greater detail in the EAR. The potential impacts of the proposed facility on visual, ecology and infrastructure issues will be addressed to a lesser extent in the EAR.

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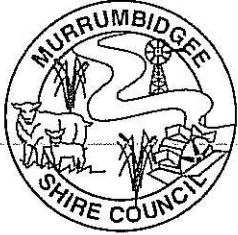
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Annex A

Letter from MSC



Murrumbidgee Shire Council

Council Chambers - 21 Carrington Street, Darlington Point NSW 2706
ABN 61 072 078 726

Your Ref:

Telephone: (02) 6968 4166

Our Ref:

PJG:TC/R-11

Fax: (02) 6968 4252

Email: mail@murrumbidgeeshire.com.au

Contact Person:

Paul Goodsall

31st May, 2006



RECEIVED
07/06/2006

Chairman and CEO
Australian Ethanol Ltd
PO Box 1792
PERTH WA 6872

Dear Peter,

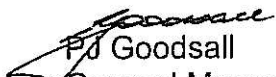
Coleambally Ethanol/Biodiesel Project

Thank you for your letter of 24th April advising of the Board's decision to proceed with the approvals process for the Coleambally facility.

Council would like to confirm total support for the proposal and assure you that any assistance required that is within Council's capacity will be provided to your company. The Council Chambers or other meeting venues will be made available for the kick-off meeting, if required.

I look forward to your advice of requirements for the meeting and of any other assistance that may be provided to advance the approvals process.

Yours faithfully,


PJ Goodsall
General Manager

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