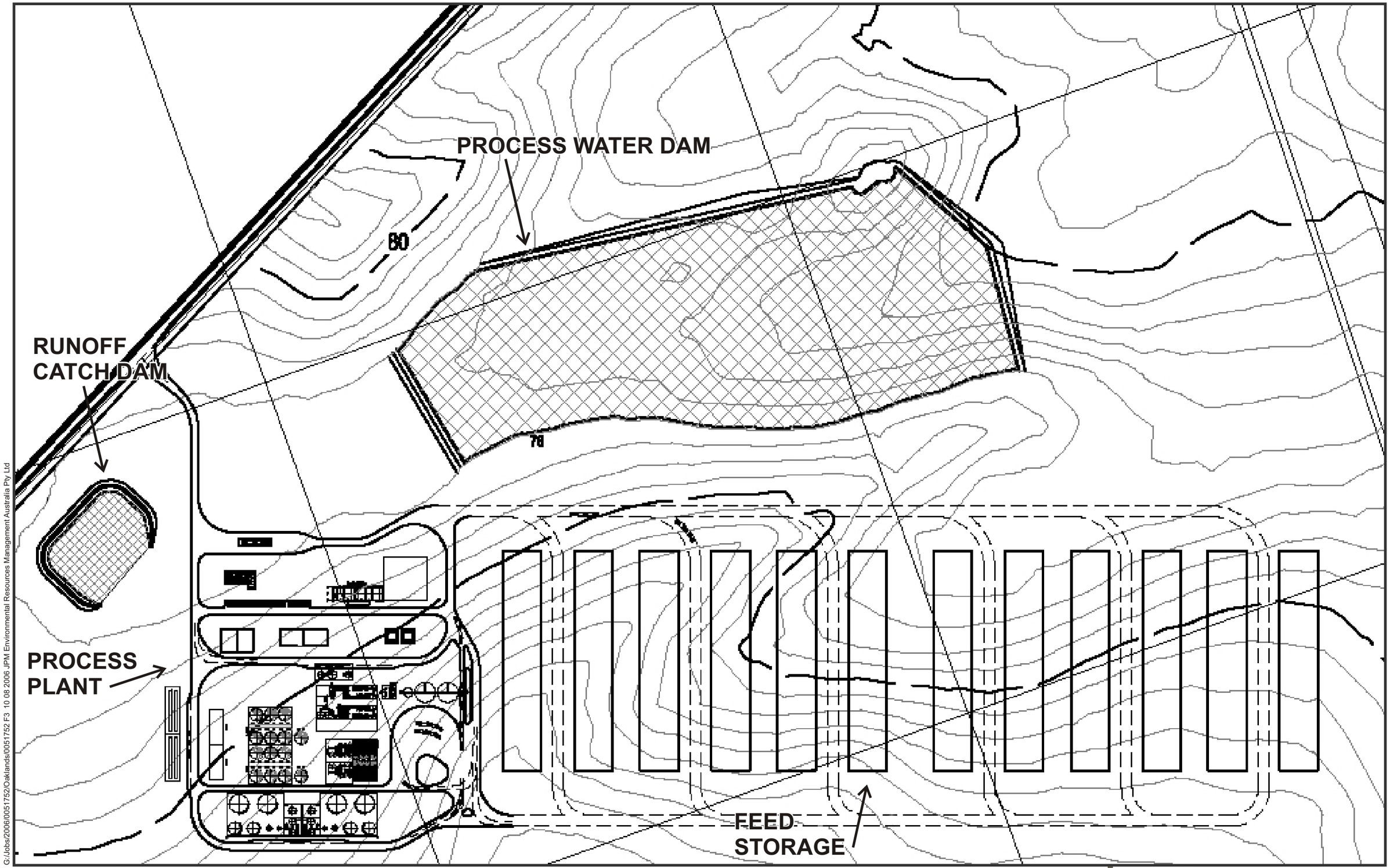

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Figure 3 **Indicative Ethanol Production Plant Layout (Swan Hill Plant)**

Photograph 7

Photograph of similar ethanol facility in United States, indicative of current proposal.

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 Daysdale Street.

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 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 plantation forming part of the ethanol facility provides three key opportunities:

- The carbon sequestration potential of the forestry plantation. 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 Oaklands area.

A buffer will be provided between the plantations and the surrounding site boundaries and between the plantations and adjoining native vegetation.

3.4 PROPOSED WATER RECYCLING

A significant component of the development of the ethanol facility at Oaklands 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 on-site 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 STATUTORY CONTEXT

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 Oaklands 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 Murray River via the O'Dwyer Main Channel. Water will be extracted from the channel via the construction of a pumping station and piped approximately 2 km to the site via a constructed pipeline.

During the winter months, between mid-May to mid-August, the O'Dwyer Main Channel is closed for maintenance and repair. Construction of a 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 has been created with the consent of the landowner to the west of the site. A 'high security' licence under the *Water Act 1912* is 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 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 Department of Natural Resources reported that Oaklands falls under the *Water Sharing Plan for the Murrumbidgee Regulated River Source 2003*. However, the area takes water from the Murray River at Corowa through the Corurgan Irrigation Scheme, and therefore may also fall under the *Water Sharing Plan for the Murray and Lower Darling Regulated Rivers Water 2003*. These both fall under Section 50 of the WM ACT.

Water Sharing Plan for the Murrumbidgee Regulated Rivers Water Sources 2003

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.

Water Sharing Plan for the Murray and Lower Darling Regulated Rivers Water Sources 2003

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 between the banks of all rivers, 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 extraction of 8ML of water per day 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 the above water sources.

There is some discrepancy as to which of these water sharing plans applies at Oaklands. The EAR will clarify which of the water sharing plans applies to the site.

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 entrance to the site from Daysdale Street may require upgrading and the provision of truck turning lanes. Daysdale Street is not a 'classified road' and is under the care and control of the Council such that concurrence from the RTA would not be required for any work carried out on this road.

4.2 LOCAL ENVIRONMENTAL PLANNING INSTRUMENTS

4.2.1 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). 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. Clause 12 of LEP 1990 states that "*the Council may consent to the creation of an allotment of land within Zone No 1 (a) of any size if the allotment is intended to be used for the purposes of agriculture.*"

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

The following objectives of the zone Rural 1 (a) of LEP 1990 are relevant to the project and will be considered as part of the environmental assessment:

> *(b) to preserve good agricultural land and to encourage the location of non-agricultural development in rural areas on less productive land, ……;*
>
> *(f) to encourage further development in the main villages in the Shire of Urana,……; and*
>
> *(i) to conserve the environmental heritage of the Shire of Urana, including the protection of Aboriginal relics and places'.*

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 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) under the POEO Act; and
- a 'high security' water licence will be sought from DNR under the *Water Act 1912*.

5 ENVIRONMENTAL ASSESSMENT

5.1 GEOLOGY, SOILS AND LANDFORM

5.1.1 Oaklands Topography

Interpretation of the *Oaklands 1:50 000 Topographic Series Sheet 8126-N (1st Edition)*, indicates that the site is located at an elevation of approximately 140 metres above the Australian Height Datum (AHD) and is generally flat. The surrounding local topography is also at 140 metres above the AHD.

The closest water body to the site, Nowranie Creek, is located approximately 1.5km to the north. Information from Urana Shire Council in the Section 149 (2) & (5) planning certificate states that the "Council has information that would indicate that the land or parts of the land are designated as prone to flooding in Council's LEP". The basis for this statement however is unknown, as no flood studies have been undertaken and the zoning map for this area does not identify the site as land prone to flooding. Similarly, there are no policies adopted by Council that restrict development on the site due to flooding.

The Section 149 planning certificate states that "interested persons should make their own enquiries and obtain expert advice as to the likelihood, frequency and depth of flooding, which may occur". As such, a preliminary assessment of catchment flows and flood levels will be undertaken to assess the risk of flooding as part of the EAR. Analysis of past hydrological events and flooding, catchment areas, local historical records and survey data for the site will be undertaken. If insufficient information is established through this process, hydrological (RAFTS) and hydraulic (HEC-RAS) modeling will be carried out to estimate the predicted flows and flood levels for the area, and calibrated with known flood events.

5.1.2 Oaklands Geology and Soil Landscapes

According to the *Jerilderie 1:250 000 Geological Series Sheet S1 55-14 (2nd Edition)*, the site geology comprises predominantly Tertiary residual and colluvial deposits derived from the underlying Tertiary ferricrete, silcrete, poorly consolidated pebbly sandstones and sandstones-mudstones and claystones. Subsurface information shows the presence of thin coaly bands. This landscape grades to Quaternary unconsolidated Riverine deposits of clay, silt, sand and gravel in the northern portion of the site, inclusive of floodplains and black soil plains. These Tertiary and Quaternary deposits are underlain by boulder and pebble clays, sandstone, claystones and shales, possibly of glacial origin and some minor coal bands.

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 may be affected by salinity and waterlogging due to intensive agriculture and irrigation.

Further assessment of soil quality may be required as part of the surface/groundwater assessment. No further specific soil investigations are required as part of the EAR.

5.2 SURFACE WATER

The site is located in the NSW Murray Catchment and is bounded by the Murray River to the south, the Murrumbidgee River catchment divide to the north and the Australian Alps to the east, spanning an area of 35,170 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.

Oaklands is part of the Urana Shire which is traversed by Billabong, Yanco, Columbo and Urana Creeks. Nowranie Creek lies approximately 1.5 km to the north of the site. The Oaklands district is supplied with water via the O'Dwyer Main Channel of the Corurgan Irrigation System from the Murray River at Corowa. The West Corurgan Irrigation Area is bordered by the townships of Corowa and Mulwala (south), Buraja-Lowesdale (east), Oaklands (north) and Berrigan (west).

The following structures are proposed as part of the project:

- A new run-off catchment dam adjacent to the production buildings which will store run-off from the buildings and hard surface areas.

- A new larger process water dam, with a capacity of up to 200 ML, adjacent to the production buildings. This dam will store water to be used in the ethanol production process.

- A new 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, which will also be used to irrigate the plantations.

- Potable and process water will be extracted from the Murray River via O'Dwyer Main Channel. The pipeline will run across the property in a westerly direction across private property and then to the channel where a pump will extract the water.

- A new additional 200ML process water storage dam for the winter months adjacent to the O'Dwyer Main Channel.

- A constructed water pipeline and pumping station adjacent to the O'Dwyer Main Channel.

The O'Dwyer Main channel is closed for maintenance and repair during the winter months (May to August). The 200ML dam will be required to store water for the production process over this period. The new dam will be constructed adjacent to the channel, approximately 2 km west of the proposed plant.

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 relevant water sharing plan. 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 Department of Land and Water Conservation (*Review of Groundwater Use and Groundwater Level Behaviour in the Lower Murrumbidgee Groundwater Management Area (2002))* indicated the following for groundwater in the Urana Shire:

- groundwater in Urana falls into the Lower Murrumbidgee Groundwater Management Area (LMGMA);

- the LMGMA area was identified as a high-risk groundwater system as part of a State wide program for Aquifer Risk Assessment (NSW Department of Land and Water Conservation, 1998). The major risks identified for the Lower Murrumbidgee were over-allocation, local drawdown and interference between bores, and invasion of aquifers by saline groundwater;

- 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 usage in Urana is one of the lowest in the region;

- salinity varies substantially throughout the catchments, therefore there is a potential for groundwater to be vulnerable to salinity and as such future land use changes or development should undertake groundwater investigations;

- 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 Murray region;

- water management planning in the LMGMA catchment needs to consider both the surface water and groundwater resources as a single resource;

- regional groundwater flow in the area generally flows from east to west; and

- 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 of the 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. The assessment will form part of the EAR.

5.4 AIR QUALITY AND ODOUR

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.

The nearest rural residence is located approximately 250 metres to the southwest of the site while the centre of the Oaklands township is located approximately 1 km to the southwest. 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.

5.5 TRAFFIC AND TRANSPORT

5.5.1 Surrounding Road Network

Trucks accessing and egressing the site will do so from Daysdale Street on the western boundary of the site. Daysdale Street is a sealed single-carriageway road with one lane in each direction and a speed limit of 100 kph. The surrounding road network consists of:

- Saffron-Oaklands Road which is a sealed two lane road approximately 1 kilometre south of the site. It connects to the Riverina Highway, a major highway that leads to Albury to the south-east and Deniliquin in the west;
- Urana Lockhart Road is sealed two land road approximately 10 kilometres to the north of the site via Daysdale Street leads to the Newell Highway in the west and the Sturt Highway in the east; and
- The Riverina, Sturt and Newell Highway's are major transport highways in the region.

Oaklands is the centre of a farming area where grain is stored in large quantities at the AWB facility. As such, the area is already subject to local traffic between the towns and rural areas and highway trucks and road-trains transporting grain to the town and goods and materials throughout the region.

The Benella-Oaklands Railway is an active railway line with a station in Oaklands. As this Railway line is in close proximity to the proposed plant, there is the potential for a siding to be constructed on the site which would allow another means of receival or dispatch of goods from the site to the Victorian market.

5.5.2 Vehicle Movements

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

It is estimated that traffic movements along Daysdale Street 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).

An assessment of the impact of traffic and transport associated with the development and operation of the ethanol facility will be undertaken as part of the environmental assessment. In particular, the capacity of Daysdale Street and the surrounding road networks to accommodate road-train and B-double trucks will be addressed.

5.6 HERITAGE

5.6.1 European Heritage

A preliminary search of the relevant heritage registers for the Urana LGA 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 Urana LEP 1990 was also searched for heritage items in the local area.

A total of seven heritage items were identified during these searches. None of these are located in the general vicinity of Oaklands and none have been recorded on or adjacent to the plant site. No further investigations of European heritage are required as part of the EAR.

5.6.2 Aboriginal Heritage

No indigenous places are listed in the Urana LEP 1990. The DEC Aboriginal Heritage Information Management System (AHIMS) was searched within an approximate area of 5 km surrounding the proposed plant. This search revealed two Aboriginal sites, one of which has been recorded 500m from the southern boundary of the property, a stone artefact scatter (55-5-0007). The other registered Aboriginal site is a stone artefact scatter (55-5-0006) located approximately 2 km south of the proposed facility (refer to *Figure 4*).

The National Native Tital Tribunal website was searched for Native Title applicants, and revealed one active compensation application, being for the Yorta Yorta clans. As the subject site is freehold land, Native Title is extinguished, but such claims in the area are useful for identifying Traditional Owner groups, regardless of land tenure.

An Aboriginal heritage assessment will be prepared as part of the EAR in light of the fact that an Aboriginal site is registered in close proximity to the property, and one other 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 an assessment in line with DEC Aboriginal Consultation Guidelines.