

Primary Energy Pty Limited

Gunnedah Ethanol Bio-Refinery Project Description Report

January 2006

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1.0 INTRODUCTION

Primary Energy Pty Limited proposes to establish a dry milling ethanol bio-refinery on a 39.8 hectare site on Lot 11 DP 1020147, 418 Quia Road, Gunnedah, approximately 7 kilometres north-west of Gunnedah in north-western NSW (**Figures 1.1** and **1.2**). The site has frontage to Quia Road (**Figure 1.3**), which connects to Kamilaroi Highway approximately 5 kilometres by road south-east of the site (**Figure 1.2**). The proposed site is located immediately to the west of the Gunnedah Waste Management Facility and immediately to the south of irrigation land owned by New Wave Leather. The site is located in an area that supports other industrial land uses, including New Wave Leather Tannery, Whitehaven Coal Mining coal washery and handling facility, Harris Earthmoving and Gunnedah Lawns and Gardens. The proposed site is located within the Namoi River catchment and Gunnedah Local Government Area.

The North Western Railway is located approximately 0.7 kilometres to the north of the site. It is proposed that a rail siding connecting to the North Western Railway will be constructed as a part of the project. It is proposed to construct the siding on Lot 11 DP 1020147 and Lot 111 DP 599624, as shown on **Figure 1.3**.

The proposed development will combine Delta-T ethanol plant technology with anaerobic digester technology and will process up to approximately 220,000 tonnes of wheat and sorghum per year to produce fuel grade ethanol, fertiliser, aqueous ammonia and green electricity.

Inclusion of an anaerobic digester to process by-products from the ethanol production process will enable the plant to be entirely self-powered following startup, and will allow the export of surplus green electricity back into the grid. Raw material (grain) and product will be transported to and from the site by road and rail. The proportion of raw material that is to be transported by road to the site is approximately 35% with the remainder being transported by rail. Grain will be sourced from areas within a 150 kilometre radius of the proposed site.

Water supply from the plant will be drawn from Gunnedah Shire Council's town water supply. The potential to treat and utilise water from Council's Wastewater Treatment Plant will also be explored.

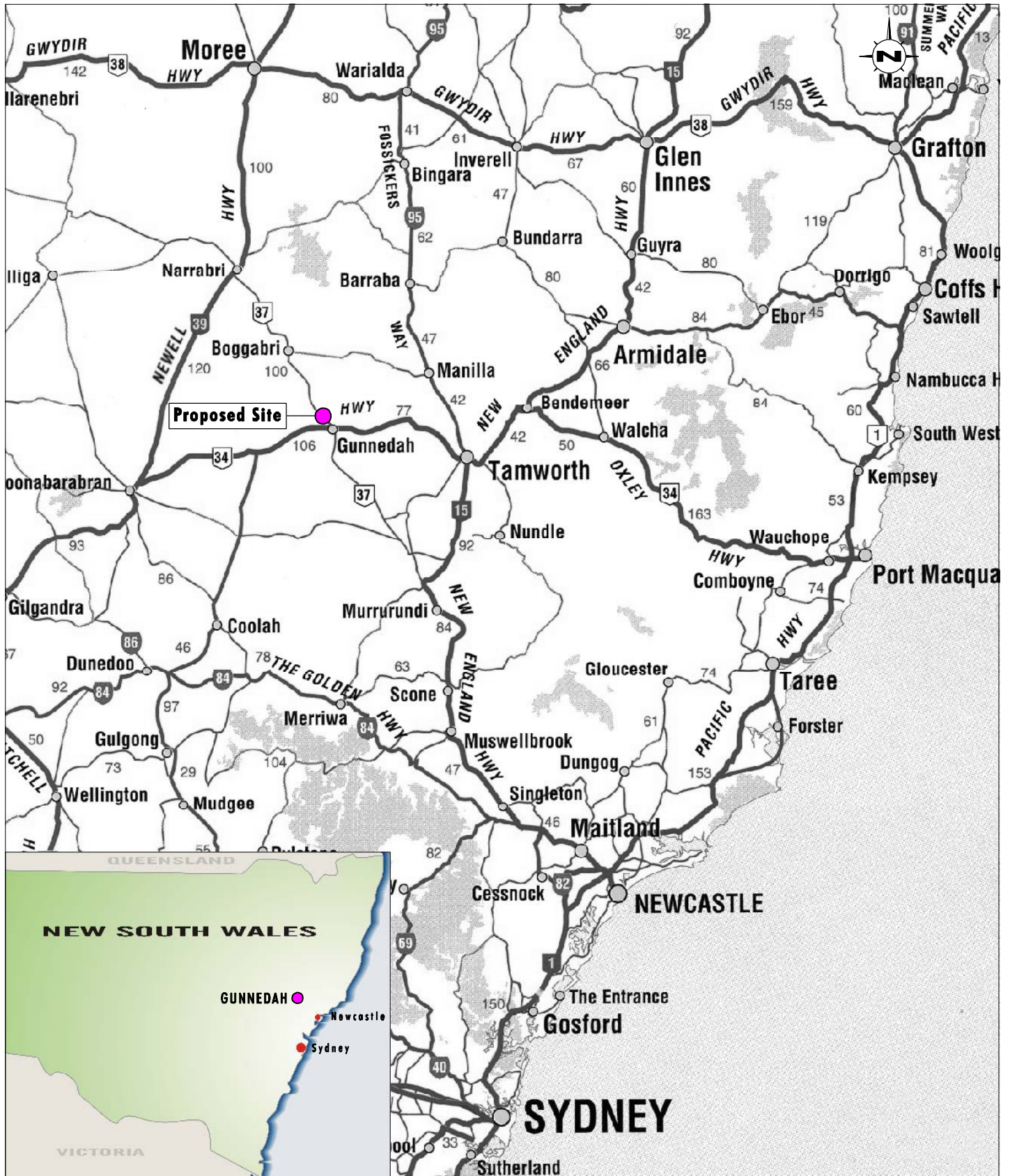
It is estimated that the project will require approximately \$70 million in capital expenditure to establish and will generate up to 500 construction jobs. During the operational phase of the development approximately 50 direct full-time jobs will be created and it is estimated that approximately 250 indirect jobs will be generated in the local region.

The project satisfies the criteria of a major project under State Environmental Planning Policy (Major Projects) 2005 and therefore should be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Gunnedah Ethanol Bio-Refinery falls under the category of "Agricultural Produce Industries and Food and Beverage Processing" (Schedule 1, Clause 3 of State Environmental Planning Policy (Major Projects) 2005) as it is an ethanol plant with a capital investment value of more than \$30 million. The proposed development will also require an Environment Protection Licence under the *Protection of the Environment Operations Act 1997*.

2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 SITE DESCRIPTION AND ACCESS TO SERVICES

The site for the proposed development is located approximately 7 kilometres to the north-west of Gunnedah (**Figure 1.2**) near a well serviced industrial area which supports other industrial land uses including Whitehaven Coal Mining Limited, Harris Earthmoving, New Wave Leather and

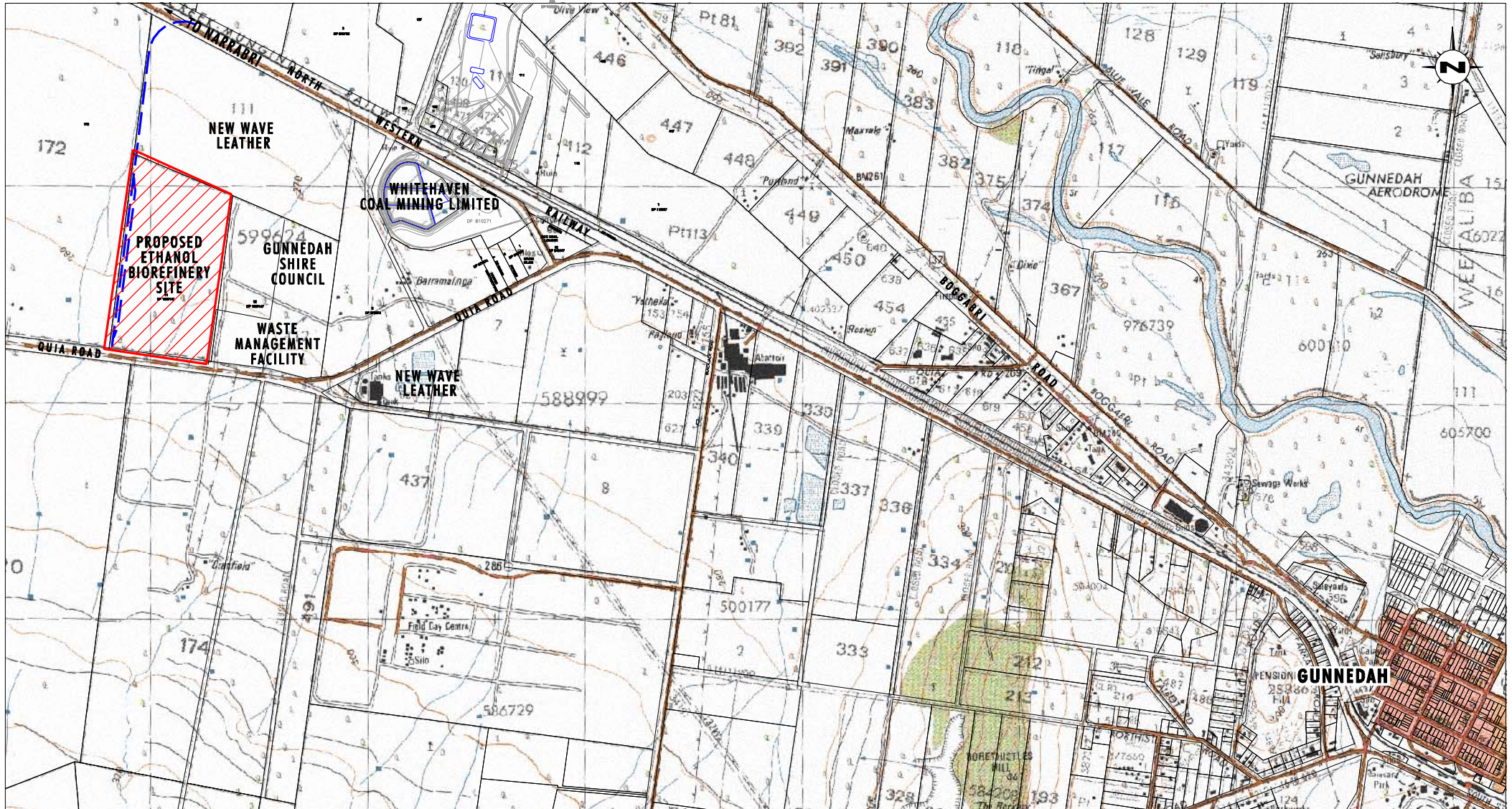


Source: Land Information Centre, NSW

0 25 50 100 km
1:2 000 000

FIGURE 1.1

Proposed Gunnedah Ethanol
Biorefinery Site Location



Source: Topo Graphic Map: LPI, NSW 2000, Cadastral: Dept. Lands 2005,
Whitehaven Coal Mining Infrastructure: Stewart Survey Consulting Surveyors 2005

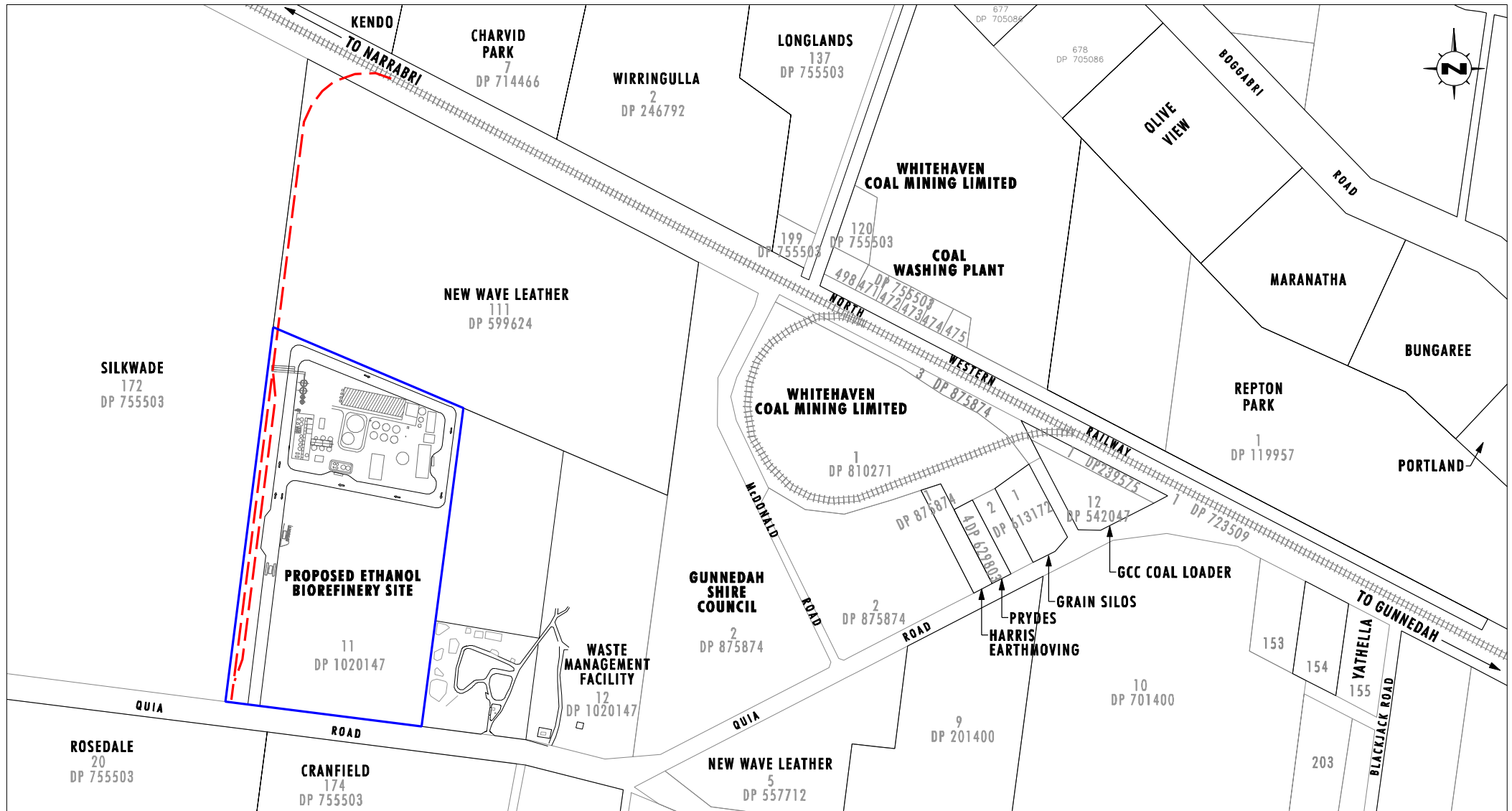
0 0.25 0.5 1km
1:25 000

Legend

- Proposed Gunnedah Ethanol Biorefinery Site
- Proposed Rail Siding

FIGURE 1.2

Proposed Development Site Context



Source: Cadastral & Railway Track Dept. Lands 2005, Landholding Names Gunnedah Shire Council 2005

Legend

- Proposed Site
- - - Proposed Rail Siding

FIGURE 1.3

**Proposed Development Site
and Surrounding Landuse**

Gunnedah Waste Management Facility (**Figure 1.3**). The 39.8 hectare site has an elevation of approximately 280 mAHN and has an average slope of approximately 1.5%. Road access to the site will be via Quia Road, and it is proposed that rail access from the North Western Railway will be available via a proposed rail siding, connecting to the main line to the north of the site. A preliminary site layout is shown on **Figure 2.1**.

Due to the location of the proposed site in proximity to a well serviced industrial area, the following services are easily accessible:

- Electricity – a 11,000 volt transmission line runs along the southern boundary of the site, with a 22,000 volt transmission line located 500 metres to the east of the proposed site;
- Water – 100 mm potable mains water supply is available at the gate of the site, and 150 mm water mains are also available within the industrial area;
- Gas – natural gas is to be connected to New Wave Leather to the south-east of the proposed ethanol bio-refinery site and can be extended to the proposed ethanol bio-refinery site;
- Telecommunications – readily accessible to the proposed site;
- Road – the proposed site has bitumen sealed road to the site entrance; and
- Rail – the North Western Railway is located approximately 700 metres to the north of the proposed site. Primary Energy Pty Limited proposes to construct a rail siding off the North Western Railway Line.

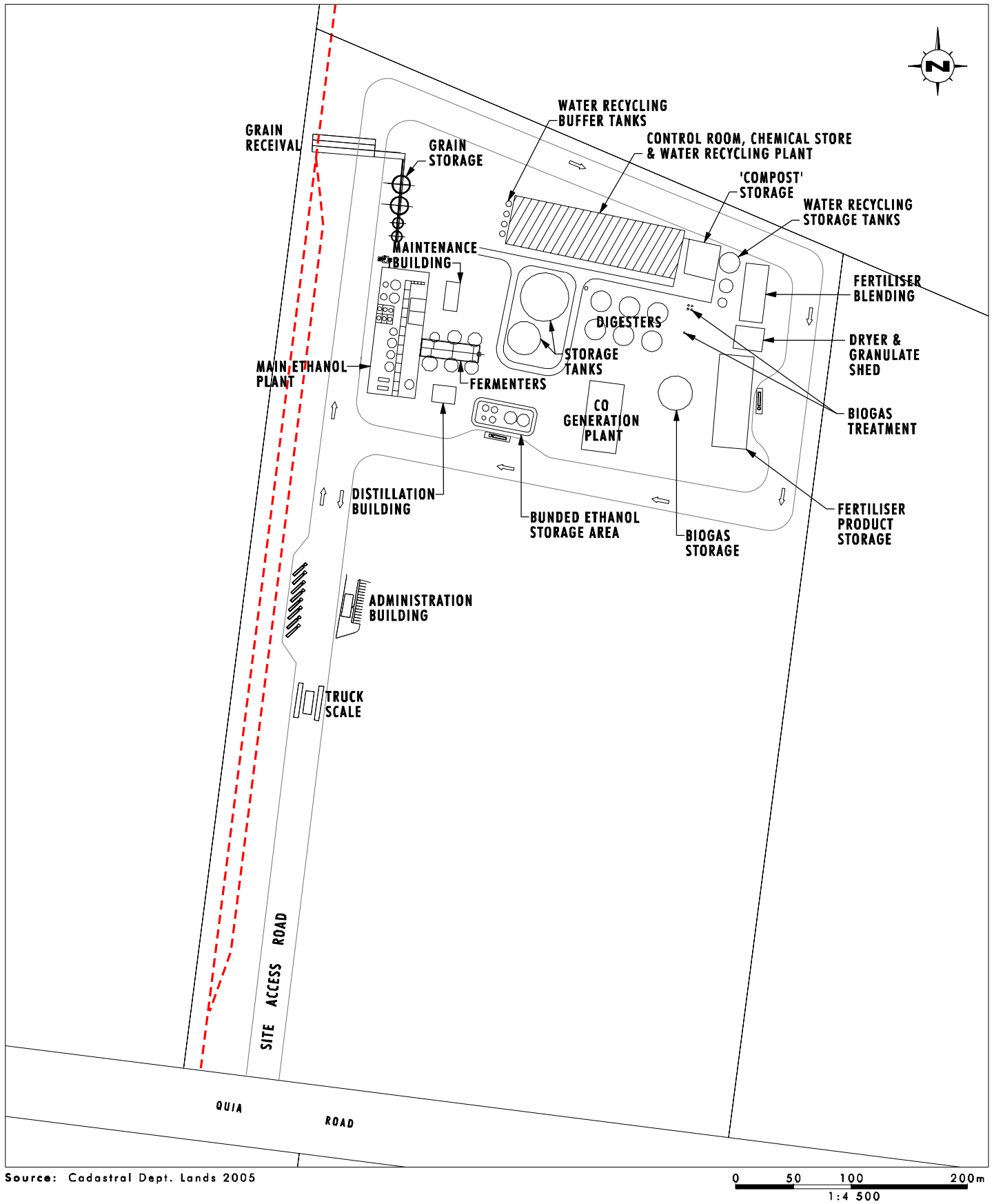
2.2 DESCRIPTION OF THE ETHANOL BIO-REFINERY PROCESS

The proposed development will process up to approximately 220,000 tonnes of wheat and sorghum per annum to produce up to 80 ML of ethanol per annum. It is proposed that the facility will initially operate at a production capacity of 60 ML per year, with production ultimately increasing to 80 ML per year. At a final production rate of 80 ML of ethanol per year a number of products will be manufactured onsite at the following yearly rates:

- 80 ML of fuel grade ethanol;
- approximately 43,000 tonnes of fertiliser;
- approximately 5,000 tonnes of aqueous ammonia; and
- approximately 100 GWh of green electricity.

A process flow diagram for the proposed bio-refinery is shown in **Figure 2.2**.

Grain will be transported to the site by road and rail, and will be stored onsite prior to grain cleaning and milling in hammer mills to a specified particle size. Milled grain will be mixed with hot process condensate to form a slurry which will be cooked, cooled and fed into fermentation tanks. The products of saccharification and fermentation in the fermentation tanks are a gaseous stream made up of carbon dioxide, ethanol vapour and trace gases and a 'beer' stream, made up of liquid ethanol, water and the remaining grain solids. The gaseous stream will be sent to the carbon dioxide scrubbers for ethanol recovery prior to carbon dioxide venting or recovery. The beer from the fermentation tanks will be concentrated to 95% ethanol in the distillation column. The final removal of water from the ethanol to produce fuel grade ethanol will be achieved in a molecular sieve dehydration system. Water will be adsorbed onto the sieve bed while ethanol passes through



Legend

--- Proposed Rail Siding

FIGURE 2.1

Preliminary Proposed Site layout

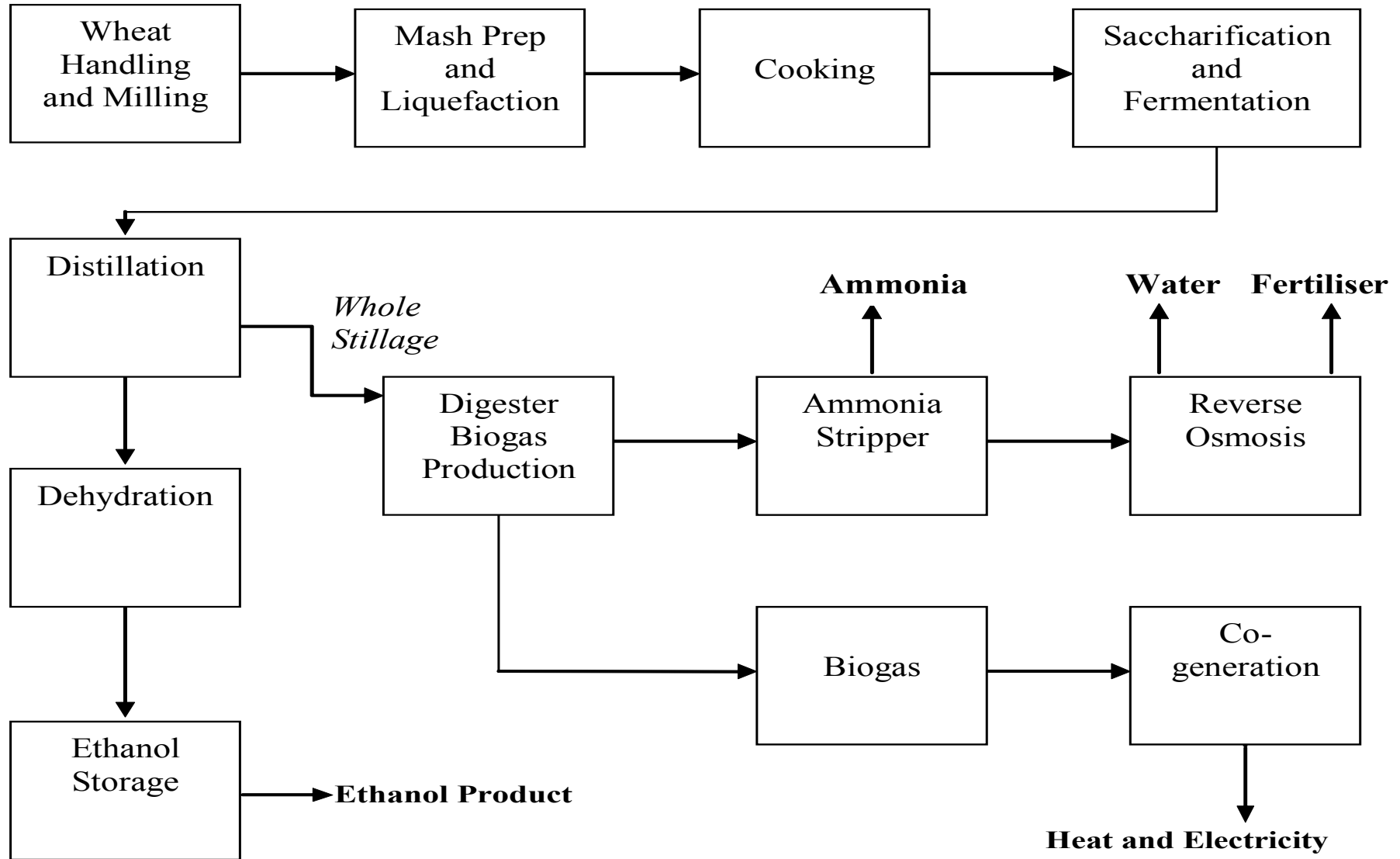


FIGURE 2.2
Process Flow Diagram

the bed. The adsorbed water will be removed during a re-generation step and will be routed back to the distillation system.

The remaining by-products from the distillation column (known as whole stillage) will be sent to the anaerobic digesters, where biogas will be produced, captured and stored for electricity and heat generation. Biomass from the anaerobic digesters will be separated into a thick 'compost' fraction for transport to a fertiliser manufacturing plant, and a thin fraction which then undergoes ultrafiltration and ammonia removal in the ammonia stripper. Ammonia will then be stored for transport offsite. The remaining ammonia-free product from the ammonia stripper will be filtered using reverse osmosis to produce fresh water for re-use as cooling water in the production process and a liquid, nutrient rich concentrate which will be stored for transport to a fertiliser manufacturing plant.

3.0 CONSULTATION

3.1 AUTHORITY CONSULTATION

The authority consultation process for the proposed development has commenced, with a Planning Focus Meeting held for the site on 24 May 2004. Director-General's requirements were issued in August 2004, pursuant to clause 73 of the *Environmental Planning and Assessment Regulation 2000* as it was at that time and prior to the commencement of Part 3A of the EP&A Act.

It is considered that the issues raised in the Director-General's requirements issued in August 2004 provide an indication of the views of government agencies regarding the proposed development. Issues of key importance raised by government agencies include:

- noise and air quality impacts;
- onsite water management and waste disposal;
- potential hazard and risk implications of the proposal; and
- rail and road traffic impacts.

It should be noted that while some modifications have been made to the proposed development subsequent to the Planning Focus Meeting and issue of Director-General's Requirements in 2004, verbal discussions with Joanna Bakopanos of the Department of Planning in January 2006 have indicated that the changes are not considered major and that it is appropriate to apply for the adoption of Director-General's Requirements issued in August 2004 under clause 8 of the *Environmental Planning and Assessment Regulation 2005*. Joanna Bakopanos of the Department of Planning has also indicated that a new Project Application is required as a part of this process.

3.2 COMMUNITY CONSULTATION

Community consultation will be undertaken throughout the Environmental Assessment period and will encompass residents, relevant community groups and the Local Aboriginal Land Council. Initial meetings with local residents and Gunnedah Council on 9 December 2005 indicate that the community supports the progress of ethanol and other biofuels, and that local groups such as Business Gunnedah are supportive of the project. Personal communication with the General Manager of Gunnedah Council and the Mayor of Gunnedah in December 2005 has further confirmed community and Council support for the proposed development.

4.0 PLANNING CONTEXT

4.1 GUNNEDAH LOCAL ENVIRONMENT PLAN

Gunnedah Local Environment Plan 1998, (Gunnedah LEP) covers the Gunnedah Local Government area. Under the Gunnedah LEP the proposed ethanol bio-refinery site is zoned 1(a) – Rural (Agricultural Protection) Zone. The objectives are as follows:

- (a) to protect the use and efficiency of prime agricultural land while permitting appropriate development subject to suitable subdivision controls,*
- (b) to permit other forms of development which are ancillary to rural land uses or that, as a result of their nature, require siting outside the urban area,*
- (c) to avoid further fragmentation and alienation of useable rural land,*
- (d) to retain the low density nature of settlement within the rural areas and ensure that any future development does not create unreasonable demands on the existing infrastructure or available services,*
- (e) to provide for the requirements of the rural community,*
- (f) to maintain safety and convenience along main roads by discouraging uses that are likely to generate traffic volumes which disrupt traffic flow,*
- (g) to ensure that the existing level of scenic amenity is maintained by requiring development to have regard for significant ridgelines and hilltops.*

Under the Gunnedah LEP development for the following purposes are prohibited in zone 1(a):

automotive businesses, bulk stores, bus stations, car repair stations, clubs, commercial premises, drive-in take-away food shops, exhibition homes, hotels, housing for aged or disabled persons, industries (other than rural, home, offensive or hazardous industries), junk yards, light industries, liquid fuel depots, manufactured home estates, medical centres, motels, motor showrooms, places of public worship, professional consulting rooms, recreation facilities, refreshment rooms, residential flat buildings (other than those used in conjunction with a coal mine or public utility undertaking), road transport terminals, service stations, shops, take-away food shops, urban entertainment facilities, warehouses.

Rural industries are defined under the Gunnedah LEP as:

handling, treating, processing or packing of primary products and includes the servicing in a workshop of plant or equipment used for rural purposes in the locality and also includes the processing, manufacture and distribution of products directly related to rural activities in the locality.

The proposed ethanol bio-refinery may therefore be classified as a rural industry as defined in Gunnedah LEP as it involves the handling, treating and processing of the primary products of wheat and sorghum. Consequently, the development is not prohibited in Zone 1(a), and may be carried out with development consent.

4.2 STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies (SEPPs) are relevant to the proposed development:

- SEPP 11 – Traffic Generating Developments;
- SEPP 33 – Hazardous and Offensive Development;

-
- SEPP 44 – Koala Habitat Protection; and
 - SEPP (Major Projects) 2005.

A further assessment of the project under the above listed SEPPs will be included in the Environmental Assessment for the project.

4.3 APPROVAL PROCESS

As discussed in **Section 1** above, the proposed development meets the criteria for a Major Project under Part 3A of the EP&A Act. If deemed a Major Project, the consent authority for the project will be the Minister for Planning.

In accordance with Part 3A of the EP&A Act, approvals under the eight acts listed in Section 75U Clause 1 of the EP&A Act are not required. However, the proposed development will require an Environment Protection Licence under the *Protection of the Environment Operations Act 1997* (POEO Act) as it is classified as an “*agricultural produce industry*” which will mill more than 30,000 tonnes of produce per annum. Additionally it is likely that an approval to undertake works within a road reserve under Section 138 of the *Roads Act 1993* will be required in relation to the proposed rail siding.

5.0 ENVIRONMENTAL CONSIDERATIONS

5.1 SITE DESCRIPTION AND SURROUNDING LANDUSE

The proposed development site is located approximately 700 metres west of an industrial area, and adjacent to the Gunnedah Waste Management Facility, approximately 7 kilometres north-west of Gunnedah and 2.5 kilometres to the south-west of the Namoi River, as shown on **Figure 1.2**. The site has an elevation of approximately 285 mAHD at the southern boundary, grading to approximately 274 mAHD at the northern site boundary, and has an average slope of approximately 1.5%. Based on observations during a recent site visit, the site is currently vacant. Approximately 95% of the site is cleared, with scattered remnant vegetation located in the east of the site surrounding a small farm dam. Gunnedah Council has advised that the site is located in an area of negligible risk from bushfires and flooding.

The site is located within rural area zoned 1(a) – Rural (Agricultural Protection) Zone. Surrounding the site, land is generally zoned 1(a) - Rural (Agricultural Protection) Zone, with the nearest residence being located 0.38 kilometres from the proposed site. An industrial area zoned 4(b) – Offensive Industry, is located approximately 0.7 kilometres to the east of the proposed site. Based on land ownership data provided by Gunnedah Council (**Figure 1.3**) and aerial photogrammetry sourced from the Department of Lands, residences surrounding the proposed development site have been identified. Distances to the nearest residences are shown in **Table 5.1** below.

Table 5.1 - Residences Surrounding the Proposed Development Site

Residence	Distance (km)*
'Silkwade'	0.38
'Rosedale'	0.61
'Charvid Park'	0.41
'Wilga Farm'	1.12
'Wirringulla'	0.94
'Cranfield'	0.94
'Karinya Park'	0.85
'Kendo'	0.91
'Daybreak'	1.16
'Bunyah Park'	1.31
'Longlands'	1.57
'Gidginbulla'	1.59

* Note: distances measured are to the closest site boundary or the rail spur

5.2 GREENHOUSE AND ENERGY

The CSIRO has undertaken a life cycle analysis of the greenhouse gas emissions associated with the production of ethanol, green electricity, fertiliser and ammonia from the proposed bio-refinery. The life cycle analysis included growth, harvest and transport of the grain required for the production of ethanol, manufacture of ethanol, green electricity, fertiliser and ammonia, transport of the products off-site and use of ethanol in a 10% fuel blend with petrol (known as E10).

The greenhouse assessment provided by the CSIRO indicates that the proposed development will be a negative greenhouse gas emitter. The proposed ethanol bio-refinery will result in a net greenhouse gas reduction in comparison to the use of regular unleaded petrol, of approximately 200,000 tonnes CO₂ equivalent per annum. This indicates that there will be negligible environmental risk associated with greenhouse and energy.

5.3 SOCIO-ECONOMIC

The proposed development will have significant beneficial socio-economic impacts for both the town of Gunnedah and the local region. As discussed in **Section 1.0** above, the proposed development will generate 500 construction jobs. During the operational phase of the development approximately 50 direct full-time jobs will be created and it is estimated that approximately 250 indirect jobs will be generated in the local region.

The production of 80 ML of fuel grade ethanol at the proposed development will require 220,000 tonnes of sorghum and wheat per annum. It is proposed to source grain from areas within a 150 kilometre radius of the proposed development site. Lower grade wheat is useable in the process giving farmers an additional market for a wide range of wheat and sorghum qualities. The proposed development is therefore likely to have a significant beneficial impact on the grain industry by providing an additional market for wheat and sorghum in NSW.

Gunnedah Council indicated their support for the project in a meeting between personnel from Umwelt and the General Manager, Environment and Development Manager, Engineering Services Manager and Strategic Planner of Gunnedah Council on Friday 9 December 2005 at Council

Chambers. Personal communication with the General Manager of Gunnedah Council and the Mayor of Gunnedah also confirmed their support in terms of the possible job opportunities the proposal will create and the socio-economic benefits of the proposal related to providing an additional, local market for a wide range of wheat and sorghum qualities.

A socio-economic assessment, including the potential issues of the employment base and construction phase accommodation for up to 500 employees will be included in the Environmental Assessment report. The Environmental Assessment report will also include further assessment of impacts on residents surrounding the proposed development.

5.4 WATER

The proposed development will require a water supply of in the order of 250 ML/year. Process and cooling water will be recycled in the facility and the proposed bio-refinery will be a no-discharge site. The water supply for the proposed development will be obtained from Gunnedah Shire Council's town water supply with the potential for reusing water from the wastewater treatment plant to be explored.

The possible environmental risk associated with water is potential spillage of chemicals associated with the production process. This risk is considered manageable through appropriate spill management procedures, surfacing of the site and stormwater management to reduce the risks of contamination of surface water in the event of a spill. Water management procedures will be addressed in the Environmental Assessment report.

It is considered that due to the lack of process and cooling water emissions from the plant and the inclusion of provisions for spill control and stormwater management at the facility, impacts upon adjacent surface and groundwater systems will be negligible.

5.5 ECOLOGY

The study area is located in a largely cleared woodland remnant which was mapped by DIPNR (Cannon et al. 2002) as Dry Scrub, a vegetation community consisting of white cypress pine (*Callitris glaucophylla*), belah (*Casuarina cristata*), silver-leaved ironbark (*Eucalyptus melanophloia*) and bumble box (*Eucalyptus populnea*). Remnant river red gum (*Eucalyptus camaldulensis*) stands may also be located in the area.

A search of the NPWS Atlas of NSW Wildlife indicates that three threatened flora species (listed in **Table 5.2** below) and 19 threatened fauna species (listed in **Table 5.3** below) may occur in similar habitats in the local area. Substantial populations of the koala (*Phascolarctos cinereus*) are also known to occur in the Gunnedah district. Furthermore, six endangered ecological communities (listed in **Table 5.2** below) occur in the local region, and their presence on the site and likely impacts of the proposed development will need to be assessed.

Table 5.2 – Threatened Flora Species Recorded Within a 10 Kilometre Radius of the Study Area (DEC Wildlife Atlas Database and EPBC Protected Matters Database)

SPECIES	STATUS
narrow goodenia (<i>Goodenia macbarronii</i>)	V (TSC) V (EPBC) * #
<i>Hakea pulvinifera</i>	E (EPBC) E (TSC) * #
<i>Cadellia pentasyllis</i>	V (EPBC) V (TSC) * #
Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Endangered Ecological Community (TSC)
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes Bioregions	Endangered Ecological Community (TSC)
Coolibah-Black Box Woodland of the northern riverine plains and Brigalow Belt South Bioregions	Endangered Ecological Community (TSC)
Native Vegetation on cracking clay soils of the Liverpool Plains	Endangered Ecological Community (TSC)
Grassy White Box Woodland	Endangered Ecological Community (EPBC)
White Box Yellow Box Blakely's Red Gum Woodland	Endangered Ecological Community (TSC)

* = record from DEC Wildlife Atlas Database

= record from the DEH Protected Matters Database

V = vulnerable

E = endangered

EPBC = *Environment Protection and Biodiversity Conservation Act 1999*

TSC = *Threatened Species Conservation Act 1995*

Table 5.3 - Threatened Fauna Species Recorded Within a 10 kilometre Radius of the Study Area (DEC Wildlife Atlas Database and EPBC Protected Matters Database)

SPECIES	STATUS
pale-headed snake (<i>Hoplocephalus bitorquatus</i>)	V (TSC) *
border thick-tailed gecko (<i>Underwoodisaurus sphyrurus</i>)	V (TSC) *
regent honeyeater (<i>Xanthomyza phrygia</i>)	E (EPBC) E (TSC) * #
painted honeyeater (<i>Grantiella picta</i>)	V (TSC) *

Table 5.3 - Threatened Fauna Species Recorded Within a 10 kilometre Radius of the Study Area (DEC Wildlife Atlas Database and EPBC Protected Matters Database) (cont)

SPECIES	STATUS
black-chinned honeyeater (eastern subspecies) (<i>Melithreptus gularis gularis</i>)	V (TSC) *
speckled warbler (<i>Pyrrholaemus sagittata</i>)	V (TSC) *
black-breasted buzzard (<i>Hamirostra melanosternon</i>)	V (TSC) *
square-tailed kite (<i>Lophoictinia isura</i>)	V (TSC) *
freckled duck (<i>Stictonetta naevosa</i>)	V (TSC) *
bush-stone curlew (<i>Burhinus grallarius</i>)	E (TSC) *
glossy black-cockatoo (<i>Calyptorhynchus lathami</i>)	V (TSC) *
turquoise parrot (<i>Neophema pulchella</i>)	V (TSC) *
brown treecreeper (<i>Climacteris picumnus</i>)	V (TSC) *
diamond firetail (<i>Stagonopleura guttata</i>)	V (TSC) *
hooded robin (<i>Melanodryas cucullata</i>)	V (TSC) *
grey-crowned babbler (eastern subspecies) (<i>Pomatostomus temporalis temporalis</i>)	V (TSC) *
malleefowl (<i>Leipoa ocellata</i>)	E (TSC) *
barking owl (<i>Ninox connivens</i>)	V (TSC) *
masked owl (<i>Tyto novaehollandiae</i>)	V (TSC) *
spotted-tailed quoll (<i>Dasyurus maculatus</i>)	E (EPBC) V (TSC) * #
koala (<i>Phascolarctos cinereus</i>)	V (TSC) *
black-striped wallaby (<i>Macropus dorsalis</i>)	E (TSC) *
squirrel glider (<i>Petaurus norfolcensis</i>)	V (TSC) *
Pilliga mouse (<i>Pseudomys pilligaensis</i>)	V (TSC) *
yellow-bellied sheath-tail-bat (<i>Saccolaimus flaviventris</i>)	V (TSC) *
eastern freetail-bat (<i>Mormopterus norfolkensis</i>)	V (TSC) *

Table 5.3 - Threatened Fauna Species Recorded Within a 10 kilometre Radius of the Study Area (DEC Wildlife Atlas Database and EPBC Protected Matters Database) (cont)

SPECIES	STATUS
large-eared pied bat (<i>Chalinolobus dwyeri</i>)	V (TSC) V (EPBC) * #
little pied bat (<i>Chalinolobus picatus</i>)	V (TSC) *
greater long-eared bat (<i>Nyctophilus timoriensis</i>)	V (TSC) *

* = record from DEC Atlas of NSW Wildlife Database

= record from the DEH Protected Matters Database

V = vulnerable

E = endangered

EPBC = *Environment Protection and Biodiversity Conservation Act 1999*.

TSC = *Threatened Species Conservation Act 1995*

The major risks of the proposed development in relation to ecology are the possible presence of threatened species or threatened ecological communities onsite. Ecological risks will be quantified through an ecological assessment of the site, and can be managed through careful management planning and if necessary the formulation of offset strategies. If required, potential offset areas will be considered as a part of the Environmental Assessment report.

5.6 HERITAGE

5.6.1 Cultural Heritage

The Cultural Heritage assessment for the proposed development is being undertaken in consultation with the Red Chief Local Aboriginal Land Council and the Local Elders Committee. A survey of the site will be undertaken by an archaeologist, who will be accompanied during the survey by members of the interested Aboriginal groups.

The major risk of the proposed development in relation to heritage is the possible presence of significant cultural heritage resources onsite. Possible cultural heritage risks will be quantified in a cultural heritage assessment and addressed in the Environmental Assessment report.

5.6.2 Historic Heritage

Initial inquiries regarding site history indicate that the proposed development is unlikely to impact on any historic heritage resources.

An assessment of the historical archaeology of the area and its historical heritage constraints will be undertaken and documented in the Environmental Assessment report. This process will enable the identification of any known or potential heritage sites in the area and will provide information on which a preliminary constraints assessment will be based. The assessment will also include the formulation of recommendations for heritage management, if and where required.

5.7 NOISE

Heggies Australia Pty Limited (Heggies) is currently completing the noise impact assessment for the proposed development. The impact assessment will include an assessment of noise impacts at the nearest residential receptors to the proposed development in accordance with the DEC's Industrial Noise Policy and an assessment of cumulative impacts associated with other operations within the industrial precinct. Noise impacts will be minimised where possible through efficient design and will aim to comply with the relevant noise guidelines at the nearest residential receivers.

Noise is a potential environmental risk at the site given the industrial nature of the proposed development. However, the operations will be carried out primarily within an enclosed shed, minimising the risk of unacceptable noise associated with the development. The proposed development site is also located in proximity to an industrial area and is approximately 380 metres from the nearest residence. It is considered that with the provision of appropriate noise controls, noise impacts can be mitigated to achieve appropriate noise levels at the nearest residential receptors. Noise impacts will be addressed in the Environmental Assessment report.

5.8 AIR QUALITY AND ODOUR

An Air Quality and Odour Impact Assessment for the project is currently being undertaken by Heggies. The assessment will include air quality and odour modelling for the ethanol plant, anaerobic digesters and fertiliser manufacturing facility.

Air pollutant and odorous emissions are a potential environmental risk at the site due to the industrial nature of the development. It is proposed that air emission streams from the proposed facility be fitted with wet scrubbers to manage continuous emission of odour from the facility. It is considered that there is a risk of fugitive, short term emissions such as emissions from ammonia storage tanks. This issue will be addressed with appropriate control strategies in the Air Quality and Odour Impact Assessment for the proposed development.

5.9 VISUAL AMENITY

During December 2005, personnel from Umwelt visited residences surrounding the proposed development site. These site visits, in combination with preliminary investigation of a digital terrain model of the area, indicate that the proposed bio-refinery is unlikely to have a significant visual impact. Visual impacts as a result of the proposal can be managed through enclosure of operations within buildings onsite and visual screening. It should be noted that it is proposed to locate the ethanol bio-refinery adjacent to an industrial area and in the vicinity to a coal handling facility, waste management facility and the North Western Railway, thus providing some screening in the north and east of the proposed development site. However, the proposed development site falls within the Siding Spring Observatory Dark Skies Region, indicating that consideration and careful design of lighting at the facility will be required.

The impact of the proposed development on visual amenity is a possible environmental risk due to the location of the facility within the Siding Springs Observatory Dark Skies Region. This issue will be addressed in a visual assessment in the Environmental Assessment report.

5.10 TRAFFIC AND TRANSPORT

Traffic generation associated with the proposed development is likely to be significant during both the construction and operational phases of the development, with the generation of up to 500 jobs during the construction phase of the development and up to 50 full-time positions during the operational phase of the development.

Additionally, at full production capacity, approximately 220,000 tonnes of sorghum and wheat will be sourced from areas within a 150 kilometre radius of the site and transported to the proposed bio-refinery by road and rail. It is proposed that approximately 77,000 tonnes of grain will be transported to the site by road, with the remainder being transported by rail. At this stage the proportion of products to be transferred offsite by road is unknown but will be addressed as a part of the traffic assessment to be undertaken by Umwelt and included in the Environmental Assessment report for the project.

The major environmental risk associated with traffic and transport for the proposed development is the generation of significant volumes of road traffic during the construction period, with a significant workforce being required in this phase of the development. In the operational phase of the development, up to 77,000 tonnes of grain per year will be transported to the facility by road, with the remainder being transported by rail. Risks associated with traffic and transport are considered manageable and will be addressed in the Environmental Assessment report.

5.11 HAZARD

The Gunnedah Ethanol Bio-refinery proposal encompasses the production, handling, storage and transport of chemicals, indicating a potentially significant environmental risk. The risks associated with these activities will be managed through appropriate management planning, training and reporting procedures. A SEPP 33 screening and Preliminary Hazard Analysis (if required) will be undertaken by Advitech Pty Limited and included in the Environmental Assessment report for the project.

5.12 CUMULATIVE IMPACT

The potential cumulative impacts of the proposed development include traffic, noise, air quality, hazard, ecology, cultural heritage, visual, and socio-economics. Cumulative impacts will be addressed as a part of the Environmental Assessment for the proposed development.

6.0 REFERENCES

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Gunnedah Shire Council, 2004, *Gunnedah celebrates passing of 'Ethanol Bill'*, http://www.infogunnedah.com.au/hot_topics_display.php?id=48 [accessed 15/11/2005]

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