



ABN 29 057 616 896

**ENVIRONMENTAL ASSESSMENT REPORT
MAJOR PROJECT – PART 3A
ENVIRONMENTAL PLANNING
AND ASSESSMENT ACT 1979**

PROPOSED FLOUR MILL

**SHOALHAVEN STARCHES (MANILDRA GROUP)
BOLONG ROAD, BOMADERRY**

Prepared for:
SHOALHAVEN STARCHES PTY LTD

MAY 2007

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CERTIFICATION OF ENVIRONMENTAL ASSESSMENT
PREPARED PURSUANT TO PART 3A OF THE *ENVIRONMENTAL PLANNING*
AND ASSESSMENT ACT 1979

**ENVIRONMENTAL ASSESSMENT
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in respect of

PROJECT TO WHICH PART 3A APPLIES

Proponent Name: Shoalhaven Starches Pty Ltd

Proponent Address:

Land to be developed: Address Bolong Road, Bomaderry

Lot No. DP/MPS, Vol/Fol etc. Various parcels

Proposed Development: Proposed Flour Mill

Environmental Assessment An Environmental Assessment is attached

Certification

I certify that I have prepared this environmental assessment and to the best of our knowledge

- It has been prepared in accordance with Section 75E of the *Environmental Planning and Assessment Act 1979*,
- The information contained in the environmental Assessment is neither false nor misleading.

Signature: _____

Name: S. D. Richardson

Date: April, 2007

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EXECUTIVE SUMMARY

The Manildra Group is a wholly Australian Owned manufacturer of a variety of flour, starch, gluten and ethanol based products. The Manildra Group owns and operates flour mills at Manildra, Gunnedah and Narrandera, all within NSW.

Shoalhaven Starches, is a member of the Manildra Group of Companies, and produces a range of products including starch, glucose and ethanol.

At present flour used in the production process at Shoalhaven Starches is supplied by the Company's flour mills at Manildra, Gunnedah and Narrandera.

Shoalhaven Starches proposes to establish a flour mill at the existing Bomaderry factory site. It is proposed that wheat will be transported directly to the site by train and processed in the proposed Flour Mill into industrial grade flour for use in the production of starch and gluten at the Bomaderry factory.

The husk (mill feed) material from the processing of wheat on the site will then be used in the DDG dryers, that forms part of the stillage recovery process on the site. This process assists with the treatment of waste waters generated by the production processes on the site.

As a result the equivalent amount of flour and mill feed will no longer need to be transported to the site. The amount of material transported to the site by train will not change.

The benefit for the company of relocating part of the industrial grade flour production to the Bomaderry plant, will be the subsequent spare capacity at the Manildra flour mills can be devoted to the production of higher grade flour; therefore increasing export opportunities for the company (and therefore the State and Nation).

It is anticipated that the proposed Flour Mill at the Bomaderry site will process approximately 890 tonnes of wheat per day, producing 715 tonnes of industrial grade flour per day. The total flour processed on the site will however not exceed the previously approved amount of 10,000 tpw. Consequently there will not be any increase in the overall amount of flour processed on the site; and the wastewater volumes generated from the site will remain unchanged.

The Flour Mill is proposed to be sited entirely within the existing factory site. The site is zoned Industrial 4(e) Restricted Development under Shoalhaven Local Environmental Plan 1985 and is therefore permissible with consent.

The application is one subject to Part 3A of the Environmental Planning and Assessment Act. The project has been deemed to be a Major Project for the purposes of Part 3A of the

EP & A Act. The Director-General of Planning has issued requirements for the preparation of this Environmental Assessment.

In addition to the above, the preparation of this Environmental Assessment has been undertaken following consultation with relevant Government agencies, including:

- The Department of Environmental Conservation.
- The Department of Natural Resources and
- Shoalhaven City Council.

Local resident representatives have also been consulted.

This Environmental Assessment has been prepared to address the issues raised by the Director-General's requirements, as well as the issues raised by government agencies and the local community.

The Environmental Assessment:

- Considers relevant statutory and non-statutory requirements including the provisions of State, Regional and Local planning provisions and strategies. The Environmental Assessment concludes the proposal is consistent with these planning strategies and provisions.
- Provides an assessment of the impacts of the proposed Flour Mill of local air quality focussing on particulate emissions; odours; and greenhouse gas emissions. The Environmental Assessment concludes the proposal will not adversely impact local air quality or the generation of odours.
- Identifies likely construction and operational noise generated by the proposal and its cumulative contribution to noise from the site. The Environmental Assessment concludes that the proposed Flour Mill will not result in noise levels generated from the overall site exceeding existing Environmental Protection Licence requirements for the site.
- Addresses water management issues with respect to the identification of water supply, consumption and waste streams. The proposal does not require any significant increase in water consumption within the existing processes on the site; nor will it increase the amount of waste water generated from the site. The Environmental Assessment includes a Water Management Strategy to minimise adverse impact arising during the construction process; and Stormwater Management following the commissioning of the Plant.
- Addresses the proposal in terms of flood behaviour. The Environmental Assessment includes a qualitative assessment of the proposal, carried out by Webb McKeown &

Associates that confirms the hydraulic impacts and cumulative flooding impacts of the proposed works are insignificant.

- Provides a Preliminary Hazard Analysis (PMA) having regard to the provisions of State Environmental Planning Policy No. 33. The PMA recommends management procedures and design considerations be implemented to incorporate practices that would prevent risk scenarios occurring.
- Identifies that there will be no change to the frequency of train movements to and from the site; although the time tabling of train movements may be altered.
- Identifies potential cumulative impacts particularly in terms of air, noise, stormwater and flooding impacts of the Flour Mill and the surrounding Shoalhaven Starches production process. The Environmental Assessment concludes that the proposal will not result in cumulative impacts that would create adverse impacts on the locality.
- Provides an assessment of the proposed works on the scenic qualities of the locality.
- Outlines waste management measures incorporated within the site.
- Addresses riverbank stability and includes recommendations to preserve the integrity of the adjoining banks of the Shoalhaven River.
- Examines the likelihood of occurrence of acid sulphate soils; and incorporates measures to mitigate the affects associated with disturbing such soils.
- Examines Indigenous cultural heritage issues.

Following an assessment of the key issues associated with this proposal, this Environmental Assessment concludes that the proposal is suitable for the site and this locality. The Environmental Assessment includes a Statement of Commitments outlining environmental management, mitigation and monitoring measures that should be implemented to minimise potential impacts associated with the proposal.

The Minister's approval is sought for the proposal.

1.0 INTRODUCTION

1.1 BACKGROUND TO PROJECT

The Manildra Group is a wholly Australian owned manufacturer of a variety of flour, starch, gluten, glucose and ethanol based products.

The Manildra Group has been in flour milling since 1952 when the first flour mill was purchased in the NSW country town of Manildra.

The Manildra Group owns and operates flour mills at three locations within New South Wales.

- Manildra
- Gunnedah
- Narrandera

The Manildra mills use state of the art equipment and technology to produce a full range of wheat flours and mixes for domestic and international markets. The Manildra Group has extensive milling capabilities with the Manildra mill ranking amongst the 10 largest mills in the world. The three mills actually compromise a total of six separate milling systems that allow the Company to produce an extensive range of flours, semolinas and specialty products.

The Company is vertically integrated with the majority of the flour produced at the Manildra mill being further processed at Manildra Group's main manufacturing facility at Bomaderry within the Shoalhaven local government area.

The Shoalhaven Starches Factory (which forms part of the Manildra Group of Companies) located on Bolong Road, Bomaderry produces a range of products for the food, beverage, confectionary and paper producing industries including: starch, glucose and ethanol.

At present flour used in the production process at the Bomaderry plant is supplied by the Company's flour mills at Manildra, Gunnedah and Narrandera. The train loads are brought to the plant via the switching yard at Bomaderry.

During these processes, reclaimed water is produced and disposed by spray irrigation onto pastures of the Company's Environmental Farm, which comprises over 1000 ha of land situated to the north of the factory site.

In 2003 the Department of Planning approved a development application (DA223) for the Company's Pollution Reduction Program (PRP) No. 7 and which included the extension

of the company's irrigation of effluent onto additional lands. This approval also enables ethanol production at the plant to increase from 90 million litres per year to 126 million litres per year.

1.2 THE PROPOSAL

At present industrial grade flour is milled at the Company's Manildra Flour Mill and transported to the site by train for use as a raw material in the production of gluten and starch.

In addition mill feed (essentially the husk material from processed grain) is also transported to the site for use in the DDG dryers (constructed as part of PRP No. 7) which form part of the ethanol production processes at the plant.

Shoalhaven Starches plans to establish a Flour Mill within the existing factory site. It is proposed that wheat will be transported directly to the site by train and processed in the proposed Flour Mill into industrial grade flour for use in the production of starch and gluten at the Bomaderry Plant.

The husk (mill feed) material from the processing of this wheat will then be able to be used in the DDG dryers.

As a result the equivalent amount of flour and mill feed will no longer need to be transported to the site. The overall amount of material transported to the site by train will not change.

The benefit for the Company of relocating part of the industrial grade flour production to the Bomaderry Plant will be that subsequent spare capacity at the Manildra Plant can be devoted to the production of higher grade flour therefore increasing export opportunities for the Company.

It is anticipated that the proposed Flour Mill at the Bomaderry site will process approximately 890 tonnes per day of wheat, producing 715 tonnes of industrial grade flour per day. Overall it is anticipated that the Flour Mill will produce approximately 265,000 tonnes of industrial grade flour per annum for use in the Bomaderry Plant.

The total flour processed on site will however not exceed the previously approved amount of 10,000 tpw from both sources. Consequently, the wastewater volumes will remain unchanged.

The proposed Flour Mill will be housed within a new building to be sited within the existing factory site. The new building will comprise a plan area of around 240 m² and have a height above natural ground level of 25 metres. Two additional silos with a total

capacity of 3600 tonnes will be sited within the vicinity of this new building and adjacent to the existing flour unloading facility. One silo will have a diameter of 11 metres while the other will have a smaller 10 metre diameter.

The siting of the 10 metre silo associated with the Flour Mill will require the slight relocation of an approved (however yet to be erected) 11 metre diameter grain silo from its approved position adjacent to an existing grain silo, in a southerly direction to enable the siting of the proposed wheat silo in this location of the site. The approved 11 metre grain silo was part of the approved works associated with the PRP No. 7 project that was approved by the Minister for Planning in 2003.

Figure 1 is a site locality plan.

1.3 PART 3A OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979

The proposed development is a project within the terms of Part 3A of the Environmental Planning & Assessment Act 1979. It comes within Item 1 to Schedule 2 of the State Environmental Planning Policy (Major Projects) 2005. In this regard, it is a designated development (agricultural produce industry) that will grind in excess of 30,000 tonnes of grain per annum and the site is situated partly within a sensitive coastal location as mapped by State Environmental Planning Policy No.71 - Coastal Protection.

The estimated cost of the expansion of the plant is in excess of \$10 million.

The project will create an estimated construction workforce of 20 jobs during the 9 month construction phase; will sustainably maintain the existing workforce at the plant currently comprising 225 employees; and may increase employment on the site by up to an additional 8 employees.

2.0 BACKGROUND

2.1 HISTORY OF DEVELOPMENT ON THE SITE

Shoalhaven Starches Pty Ltd is a member of the Manildra Group of Companies, which is the largest user of wheat for industrial purposes in Australia. The Manildra Group originated from the NSW Country town of Manildra where a single flour mill was purchased in 1952.

The Shoalhaven Starches wheat starch and gluten plant at Nowra was originally constructed in 1970. The Manildra Flour Mills, at Manildra, Gunnedah and Narrandera, supply the Shoalhaven Starches Plant. This factory now produces wheat starch, gluten, syrups and ethanol (industrial and fuel grades). The Shoalhaven Starches facility creates direct on-site employment for 225 employees. Through the use of local contractors and local industry it also indirectly creates employment for many more.

In order to address the issue of wastewater disposal, in 1984 Shoalhaven Starches installed a spray irrigation system, using farmland it owned on the northern side of Bolong Road at Bomaderry.

In June 1991, two storage ponds were built (Ponds No. 1 and 2) resulting in the cessation of effluent discharge to the Shoalhaven River. To further reduce wastage, Shoalhaven Starches sought to use excess starch for the production of ethanol. Ethanol production began at the Shoalhaven site in June 1992.

In 1994, the State Government approved the installation of a larger ethanol distillery within the existing site. The new distillery and its associated facilities enabled production of ethanol to increase from 20 million litres per annum to a production capacity of 100 million litres per year. To date the works associated with this approval have not been fully completed.

When completed the facilities associated with those approvals will include:

- an ethanol distillery;
- four fermentation tanks;
- a new office and laboratory;
- an intake and discharge wharf on the Shoalhaven River;
- a salt water cooling pumping station;
- expanded agricultural activities;

- waste disposal and management.

Subsequent to this approval Shoalhaven City Council issued development consent for;

- Protein Isolate plant and DDG Dryer;
- Sorghum grinding plant.

Shoalhaven City Council issued development approval for the construction of a wet weather storage pond (Pond No. 6) on the 27th April 2001. At present, with the recent completion of Pond No. 6, Shoalhaven Starches has a combined effluent storage capacity within the existing ponds of 925 ML.

On the 1st June, 2001 the Minister for Urban Affairs & Planning, Dr Andrew Refshauge MP, declared both the Shoalhaven Starches factory and Environmental Farm as being State Significant Development for the purposes of Section 76A(7) of the Environmental Planning & Assessment Act. Under the provisions of this declaration, all development except *“alterations and additions to existing development which, in the opinion of the Minister in consultation with Council, are of minor nature and do not to any significant extent change the scale, size, design or environmental impact of the existing development”* requires the Minister’s consent.

In 2003 the Minister for Planning issued development consent (DA223) for Shoalhaven Starches Pollution Reduction Program (PRP) No. 7. This approval enabled the implementation of the Company’s Wastewater Management Strategy, which sought to remove solids (suspended and soluble) from the Company’s effluent, prior to its irrigation on the Environmental Farm.

This process, known as Stillage Recovery, essentially involves the introduction of additional decanters, the installation of an evaporation plant and additional dryers, to remove solids from the effluent. It is the solids in the effluent that when sprayed onto the Environmental Farm, or stored in the wet weather storage ponds, which result in the generation of odours.

The recovery of the suspended and soluble solids from the effluent can not be undertaken by the dryers in this process, without firstly providing additional coarse solids. Additional coarse solids (ie. mill feed) were required to be imported to the site.

As a consequence of the additional grain, the starch contained in the grain resulted in a need to increase ethanol production. This increase in ethanol production required the installation of additional fermenters, associated cooling towers and molecular sieves.

The increase in ethanol production also resulted in an increase in effluent which was required to be disposed on the Company's Environmental Farm. This proposal also included an increase in effluent disposal area.

Much of the plant associated with this approval has now been installed and commissioned.

All of the wastewater treatment equipment is installed and commissioned.

2.2 PRODUCTION PROCESSES

The production process at the Shoalhaven Starches plant has developed over a number of years. Originally it was primarily concerned with the production of starch and gluten from flour. However the Company has pursued a number of technological innovations particularly with respect to reducing the environmental impacts of the Company's operations. As a result Shoalhaven Starches has been moving towards a "closed" system of production. Essentially this entails the efficient use of end products to ensure wastage is reduced to a minimum.

The first step in the production process is the delivery of flour and grain, by rail, from the Company's flourmills at Manildra, Gunnedah and Narrandera. The trainloads are brought into the plant via the switching yard at Bomaderry. Flour is transferred via storage to the "wet end" of the plant where fresh water is added. The subsequent mixing and separation process produces starch and gluten.

This proposal will essentially involve a reduction by half in the amount of flour transported to the factory. The proposal will enable approximately 50% of the Company's flour requirements to be produced on the site directly.

Gluten is dried to enable it to be packaged and distributed as a high protein food additive for human consumption. This product is then taken from the site after packaging for both local and export markets. The lower grade product from the starch process is used for fermentation and distillation to produce ethanol:

Starch that is separated from the flour is either dried or remains in liquid form. The dried and liquid starch is sold to the paper and food industries. The starch is used for food, cardboard, paper and industrial purposes. The lower grade product from the liquid starch process is used in the ethanol production process.

Starch is also used in the production of syrups on the site. The syrups plant products include glucose and brewer's syrup. These are used for foods, chocolates, confectionery, beer, soft drinks and fruit juice. The syrups plant also has some lower grade product that is used in the ethanol process.

The lower grade product from the starch, gluten and syrup production processes are combined to feed the fermentation and distillation stage of ethanol production. The outputs are fuel and industrial grade ethanol as well as products for pharmaceuticals, printer's ink and methylated spirits.

The ethanol production process results in the creation of some lower grade product which is further processed in the Stillage Recovery Plant to produce animal feed (DDGs). The effluent resulting from the Stillage Recovery Plant is pumped to holding tanks and pH corrected, before being irrigated onto Shoalhaven Starches Environmental Farm to the north of Bolong Road. This land is used for fodder crops, pasture and cattle grazing.

The efficiency of using reclaimed water for irrigation is usually determined by the hydraulic load. The hydraulic load is the volume of water applied per hectare per specific time period. During wet weather periods when irrigation is not possible, the hydraulic loading rate is effectively zero. Under these circumstances, the reclaimed water must be stored and used at other times. At present the Shoalhaven Starches Environmental Farm has 6 wet weather storage ponds used for the storage of waste waters during wet weather periods. These ponds have a combined capacity of 925 ML.

As this proposal essentially involves the milling of flour on site rather than importing all the Company's flour requirements to the site; the proposal will not result in any impacts to the production of starch, gluten or syrups.

Likewise, the proposal will not result in any changes to wastewater volumes generated from the site. As a result the proposal will not have any implications in terms of the wastewater management process at the site or the adjoining Environmental Farm.

3.0 THE SUBJECT SITE AND SURROUNDS

The Shoalhaven Starches Factory site is situated on various allotments of land on Bolong Road, Bomaderry within the City of Shoalhaven. The factory site is located on the south side of Bolong Road on the northern bank of the Shoalhaven River. The factory site has an area of approximately 12.5 hectares. **Figure 1** is a Site Locality Plan.

The factory site is situated over the following parcels of land:

Lot	Deposited Plan (DP) No.
A	FP 334511
B	FP 334511
B	FP 376494
1	385145
1	838753
62	1078788
201	1062668
A	371386
Part 142	1069758

The town of Bomaderry is located 0.5 km (approx.) to the west of the factory site, and the Nowra urban area is situated 2.0 km to the south west of the site. Although the “Riverview Road” area of the Nowra Township is situated approximately 600 metres immediately opposite the factory site across the Shoalhaven River.

The village of Terara is situated approximately 1.5 kilometres to the south east of the site, across the Shoalhaven River. Pig Island is situated between the factory site and the village of Terara and is currently used for dairy cattle grazing.

There are a number of industrial land uses which have developed on the strip of land between Bolong Road and the Shoalhaven River. Industrial activities include a metal fabrication factory, the Shoalhaven Starches site, Shoalhaven Dairy Co-op (Australian Co-operative Foods Ltd) (now closing down) and the Shoalhaven Paper Mill (Australian Papers). The industrial area is serviced by a privately owned spur railway line that runs from just north of the Nowra-Bomaderry station via the starch plant and Dairy Co-op to the Paper Mill.

The state railway terminates at Bomaderry with a separate, privately owned spur line to the factory site. Shoalhaven City Council sewerage treatment works is situated between the railway line and the factory.

The Company also carries out irrigation activities on the Company's Environmental Farm located over 1000 hectares on the northern side of Bolong Road. This area is cleared grazing land and also contains spray irrigation lines and wet weather storage ponds (total capacity 925 Megalitres). There are at present 6 wet weather storage ponds on the farm that form part of the irrigation management system for the factory.

The Environmental Farm stretches over a broad area of the northern floodplain of the Shoalhaven River stretching from Bolong Road in the south towards Jaspers Brush in the north. Apart from the Environmental Farm this broad area is mainly used for grazing (dairy cattle). The area mainly comprises large rural properties with isolated dwellings, although there are clustering of rural residential development along Jennings Lane (approximately 1 kilometre away), Back Forest Road (approximately between 500 metres to 1.2 kilometres away) to the west of the environmental farm; and Jaspers Brush Road, approximately 1.2 kilometres to the north of the Environmental Farm.

The subject proposal is to be situated entirely within the factory site located on the southern side of Bolong Road.

The proposal will enable industrial grade flour to be produced on the site for use in the production processes carried out at the factory. The husk from the milled wheat will also be used in the DDG dryers on the site. As a result the equivalent amount of flour and mill feed will no longer be transported to the site. The amount of material transported to the site will not change. Consequently, waste water volumes will remain unchanged.

4.0 CONSULTATION

4.1 DIRECTOR GENERAL OF DEPARTMENT OF PLANNING'S REQUIREMENTS

In accordance with the provisions of Part 3A of the Environmental Planning & Assessment (EP&A) Act the Director-General of the Department of Planning has provided requirements for the preparation of this EA. A copy of these requirements forms **Annexure A** to this EA.

In summary the key issues for consideration identified by these requirements are summarised as follows:

- **Air Quality** - including an air quality assessment focusing on particulate emissions and odour.
- **Greenhouse Gas Emissions**
- **Noise** - including identification of construction and operational noise generated by the proposal.
- **Soil and Water Management** - including:
 - identification of water sources, water consumption, water recycling, the quantity and quality of waste water streams and the impact on any water release from the site on surface water and groundwater;
 - proposed erosion and sediment controls (during construction) and the proposed stormwater management system (during operations); and
 - assessment of the proposal on flood behaviour;
 - identification and management of acid sulphate soils;
 - identification and management of contaminated soils; and
 - assessment of the impact of the proposal on riverbank stability and proposed management measures.
- **Hazards and Risk** - including a Preliminary Hazard Analysis (PHA) in accordance with *Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis and Multi-Level Risk Assessment* and details fire / emergency measures and procedures.
- **Transport** - including identification of any increases in train movements to the site and assessment of associated impacts.

- **Cumulative** - including identification of potential cumulative impacts that may arise from the combined operation of the Flour Mill and existing activities.
- **Visual**; and
- **Waste Management**.

During the preparation of the Environmental Assessment, Shoalhaven Starches was required to consult with the relevant local, State or Commonwealth government authorities, service providers, community groups or affected landowners. The consultation process and the issues raised are described in this Environmental Assessment.

In particular the following agencies were required to be consulted:

- Department of Environment and Conservation;
- Department of Natural Resources;
- Shoalhaven City Council; and
- Shoalhaven Water.

4.2 PLANNING FOCUS MEETING

A Planning Focus Meeting was held with respect to the proposed development on the 14th March 2007. The meeting commenced at the Shoalhaven City Council administrative centre and included an inspection of the site of the proposed Flour Mill at the Shoalhaven Starches factory site.

Representatives from the following government agencies attended:

- Department of Planning
- Department of Environment & Conservation
- Department of Natural Resources
- Shoalhaven City Council.

The following is a summary of the main issues raised during the course of the Planning Focus Meeting:

Department of Environment & Conservation

- Noise - construction and operational phases. Proponent's noise consultant should liaise with the Department's acoustic experts to ascertain specific requirements.
- Air Impact Assessment - construction and operational phases.

- Stormwater Management - particularly during construction. The area of the site associated with the proposal is constrained in terms of the proximity of the river, and details will need to be provided to demonstrate how stormwater management particularly during construction will be managed.
- Indigenous cultural heritage issues.

Department of Natural Resources

- Flooding aspects - agrees with position outlined in Preliminary Assessment document prepared by Cowman Stoddart Pty Ltd.
- River bank stability - There is a need to review the stability of the river bank within the vicinity of the proposed works given recent slumping within the vicinity of the area of the proposed works. If necessary, river bank stabilisation may be required. The existing Coral Trees along the bank are probably not appropriate for stabilisation and riverbank stabilisation works could include revegetation screening measures.
- Acid sulphate soils - an assessment needs to be undertaken of the potential for acid sulphate soils and the mitigation measures that will be required if these soils are to be disturbed.

Shoalhaven City Council

- Further clarification is required in terms of train movements and water usage.
- The geotechnical stability of the river bank given the proximity of the proposed works to the river bank.
- Acid sulphate soil management
- Generally support Manildra development of the ethanol industry and Council is an advocate for the use of ethanol in fuel.

4.3 GOVERNMENT AGENCIES

Following the Planning Focus Meeting, the government agencies were invited to make written submissions in relation to the proposal. Submissions have been received from:

- The Department of Environment & Conservation.
- The Department of Natural Resources.
- Shoalhaven City Council.

Copies of these written submissions are included in **Annexure B** to this EA.

The following is a summary of the issues raised by the submissions from the above government agencies.

Department of Environment & Conservation

Environmental impacts of the project

The following environmental impacts of the project need to be assessed, quantified and reported on:

- Water quality
- Air quality
- Contaminated land
- Noise
- Threatened species
- Aboriginal cultural heritage

Details are required on the location of the proposed development, including the affected environment, to place the proposal in its local and regional environmental context including surrounding land uses, planning zonings and potential sensitive receptors.

Describe mitigation and management options that will be used to prevent, control, abate or mitigate identified environmental impacts associated with the project and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

Water quality

The environmental outcomes for the project in relation to water should be:

- There is no pollution of waters (including surface and groundwater) during construction or occupation of the site by the final users;
- There is no inconsistency with any relevant Statement of Joint Intent established by the Healthy Rivers Commission; and
- It is acceptable in terms of the achievement or protection of the River Flow Objectives and Water Quality Objectives.

The EA should document the measures that will achieve the above outcomes. In addition, the EA must:

- Take into account and complement Shoalhaven City Council's Integrated Water Cycle Management Plan which is currently being developed.
- Demonstrate that there is sufficient capacity to convey, treat and manage the sewage that is generated by this development. Evidence must be sought from Shoalhaven City Council that demonstrates capacity exists within the Council's sewerage infrastructure to support this development.

Comment

These matters are addressed in Section 8.3 of the EA.

Air quality

Particulate emissions are the primary air quality concern for the proposal. Details must be provided on proposed dust management strategies for all potential sources of particulates.

The environmental assessment must be conducted in accordance with the DEC publication "*Approved Methods for Modelling and Assessment of Pollutants in New South Wales*". The environmental assessment must assess PM₁₀ (24-hour and annual average), total suspended particulates and deposited dust impacts.

The environmental assessment must include a cumulative assessment that examines the impacts of the proposal combined with all existing and approved dust generating activities in the area.

Comment

These issues are addressed in Section 8.1 of the EA.

Contaminated Land

The EA must document the assessment and management of any land contamination to ensure that the land is not allowed to be put to a use that is inappropriate because of the presence of contamination. Under the Contaminated Land Management Act there is a responsibility to notify the DEC of sites that pose a significant risk of harm to human health or the environment.

Comment

This issue is addressed in Section 8.10 of the EA.

Noise

The proposal must be designed, constructed, operated and maintained so that there are no adverse impacts from noise (including traffic noise) and that limits contained in Environment Protection Licence No. 883 are met.

Comment

This issue is dealt with in Section 8.2 of the EA.

Impacts of the project on threatened species and their habitat

The EA must describe what actions will be undertaken to avoid or mitigate impacts caused by the development on all threatened species described at the site.

Comment

This matter is addressed in Section 6.2.2 of the EA.

Impacts of the project on Aboriginal cultural heritage values

The EA should address and document the information requirements set out in the draft *"Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation"* involving surveys and consultation with the Aboriginal community.

The EA must identify the nature and extent of impacts on Aboriginal cultural heritage values across the project area.

Should the site be found to have significant Aboriginal cultural heritage values, the EA must describe the actions that will be taken to avoid or mitigate impacts or compensate to prevent unavoidable impacts of the project on Aboriginal cultural heritage values. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

The EA needs to clearly demonstrate that effective community consultation with Aboriginal communities has been undertaken in determining and assessing impacts, developing options and making final recommendations.

Comment

This issue is addressed in Section 8.12.1 of the EA.

Department of Natural Resources

Shoalhaven River Bank Stability

The bank of the Shoalhaven River adjacent to the Shoalhaven Starches factory site has a known history of recession. In addition, the development of the Shoalhaven Starches

has occurred over many years without the provision of an appropriate foreshore setback and riparian buffer. The river bank is reasonably high and dominated by exotic vegetation and weeds, predominantly coral trees and lantana. Recent bank collapse has occurred immediately downstream of the proposed Flour Mill site and is currently being addressed by Manildra. Such events present risks to existing substantial infrastructure on the site and generally require substantial bank restoration and protection works to restore bank stability.

Given the above, DNR recommends that an assessment of the bank stability in the vicinity of the proposed new Flour Mill be undertaken and options for any necessary remediation/bank enhancements should be determined.

Whilst understanding that the site is physically constrained, any bank stabilisation options should endeavour to be sympathetic to the geomorphic and ecological functions of the riverbank in addition to providing any necessary bank stability function. Options should also allow for the removal of exotic vegetation and weeds and incorporate the re-establishment of appropriate native vegetation. In addition to ecological and stability functions, native vegetation may assist the screening of both the existing and proposed infrastructure.

Undertaking bank stabilisation/enhancement works requires good access and so if necessary, appropriate works should be undertaken prior to the construction of any additional infrastructure before access is further impeded and to ensure that the riverbank/shoreline will be stable in the longer term, thereby enhancing protection for both existing and new infrastructure.

Comment

Riverbank stability is addressed in Section 8.7 of the EA.

Acid Sulphate Soils

The Department's Acid Sulfate Soils Risk maps indicate that the site has a low probability of acid sulphate soil (ASS) risk with localised occurrences of ASS likely at depths generally below 3 metres of the ground surface. In considering this proposal, activities such as excavations for piling, etc. in areas of ASS risk should be identified and if necessary an ASS management plan prepared. The Department recommends that the level of assessment is consistent with the NSW Government guidelines regarding assessing and managing sulfate soils from the *Acid Sulfate Soil Manual* by ASSMAC.

Comment

The issue of acid sulphate soils is addressed in Section 8.8 of the EA.

Shoalhaven City Council

The submission by Shoalhaven City Council raised several issues. The main point of concern however raised by Council's submission relates to the compliance status of past consent conditions with specific reference to vehicle access points to the site. These concerns however do not relate directly to the proposed Flour Mill proposal. These issues rather need to be addressed separately by the relevant consent authorities. Apart from this matter the submission from Council raised the following issues:

- Need for further information about actual flour mill process.

Comments

Section 5.2 of the EA provides detailed information concerning the Flour Mill process.

- Additional water consumption

Comments

Section 8.3.1 of the EA addresses water consumption

- By-products other than mill feed

Comments

As outlined in Section 1.2 there are no other significant by-products associated with the flour mill process, other than the "mill feed".

- Impacts associated with milling equipment

Comments

Section 8.1 and 8.2 deal with the air quality and acoustic impacts associated with the proposed Flour Mill including the specific plant associated with the proposal.

- Train movements

Comments

Section 8.5 of the EA addresses train movements associated with the proposal.

- Odour

Comments

Odours are addressed in Section 8.1.1 of the EA.

- Noise

Comments

The acoustic impacts of the proposal are addressed in Section 8.2 of the EA.

- Waste water

Comments

Waste water issues are addressed in Section 8.3.3 of the EA.

- Bank stabilisation

Due to the proximity of the structures to the river bank, it is strongly recommended that a Geotechnical Engineer be consulted to design the footings to ensure no likelihood of bank destabilisation occurs, either during construction or as a result of vibration or loading after completion. DNR should be consulted in this regard and their recommendations for suitable tree planting followed.

Comments

River bank stability is addressed in Section 8.7 of the EA.

- Acid sulphate (AS) soils

The area is designated by the DNR (DLWC) as having a high probability of being affected by AS Soils. As such soil samples should be taken for analysis prior to excavation works for footings, etc. taking place. If AS Soil encountered, a plan of management is to be prepared and submitted to Council and DNR for approval prior to proceeding. Such plan is to address environmental control measures necessary to mitigate any pollution of waters and acid damage to structures.

Comments

Contrary to the assertion made by Council that the subject site is identified as having a high probability of being affected by Acid Sulphate Soils, the site rather is identified as having a low probability. This is confirmed by the Department of Natural Resources' submission referred above. The Acid Sulphate Soil issue is addressed in Section 8.8 of this EA.

- Traffic

Whilst the actual increased traffic and transport usage as a direct result of this DA may be relatively minor, Council is concerned with the cumulative impacts of Manildra DA's over time, together with increasing traffic volumes on Bolong Road,

and uncompleted (outstanding) conditions of consent requiring Manildra to upgrade their access points and rail level crossing to minimum safe standards.

Council believes these factors have led to present day situation where maintenance and safety issues have arisen along Bolong Road relating to Manildra activities.

Council is seeking assistance from the Department of Planning through its development control powers to ensure Manildra complete all outstanding conditions of consent prior to issue of any further development approvals (previous consent conditions requiring Manildra to complete all outstanding conditions of consent prior commencement of any further works have not proved successful).

Additional information and details relating to outstanding conditions of consent can be found below in this report.

Council supports the Director-General's Requirements (General Requirement to undertake an assessment of potential impacts of the project including potential cumulative impacts that may arise from the combined operation of the project and existing activities) and believes this will reinforce the need for Manildra to undertake all upgrade works in accordance with previous conditions of consent.

Further – Council is concerned with road safety relating to the behaviour of Manildra workers in Bolong Road reserve (primarily parking and pedestrian behaviour) and believe Manildra should be doing more under its OH&S responsibilities to minimise pedestrian crossings, parking activity, and other unsafe practices in Bolong Road relating to its activities.

Ongoing use of Bomaderry local streets by heavy vehicle transport remains of concern to Council and Council have outlined its concerns below in this report.

Comments

Council acknowledges that this proposal will not result in a significant increase in traffic and transport usage. This is confirmed in Section 8.5 of this EA.

As stated at the outset of this section of the EA Council's submission is mainly concerned with past compliance with conditions of consent with respect to vehicle access to the factory site.

As the proposal does not involve any significant increase in vehicle traffic to the site; this concern does not relate specifically to this proposal. These compliance issues may be addressed separately by the relevant compliance authorities.

4.4 COMMUNITY CONSULTATION

A meeting was held at the Shoalhaven Starches administrative offices on the 21st March 2007 with the Shoalhaven Starches Community Consultative Committee. This Committee comprises representatives of local community groups and residents. The Committee was formed as part of the requirements of the PRP No. 7 approval issued by the Minister for Planning in 2003. The Committee includes resident representatives from Bomaderry, Terara and Nowra.

The Community Consultative Committee was originally formed pursuant to Condition 5.2 of the approval for the PRP No. 7 project. This condition required:

“The Applicant shall establish and maintain a Community Consultative Committee for the duration of the development unless otherwise approved by the Director-General to oversee the environmental performance of the development. This committee shall be comprised of three representatives from Shoalhaven Starches and five representatives from the local community, whose appointment have been approved by the Director-General in consultation with Council and the EPA. The Applicant shall seek expressions of interest from the community for membership on the committee. The Applicant’s appointment of an independent chairperson shall be to the satisfaction of the Director-General in consultation with the EPA and Council. The Committee may invite representatives from relevant government agencies (including PlanningNSW) and specialists if specific relevant issues arise as agenda items. The Committee shall meet at least twice per year. Meetings must include at least the following items on the agenda:

- (a) reports from the Applicant on monitoring of implementation;*
- (b) reviewing and commenting on draft protocols and environmental management plans;*
- (c) reviewing monitoring results and audit reports;*
- (d) comments and suggestions from the community on the environmental performance of the development;*
- (e) review of community complaints;*
- (f) proposals for achieving mutually satisfactory solutions; and*
- (g) any issues arising from the annual environmental audit.”*

Given the brief of the Community Consultative Committee it was considered the Committee provided a suitable community consultation forum for the Flour Mill proposal.

The meeting was chaired by Peter Courtney (Dean of Studies, General Education, TAFE Illawarra).

The meeting was attended by the following representatives:

- Rhod McGhee (Terara)
- Warren Priest (Terara)
- Fred Mance (Nowra)
- Phil McKenzie (Far Meadow)
- Tony Rizzuto (Bomaderry)

The issues raised in relation to the Flour Mill proposal by the above representatives were as follows:

- *What will happen to washdown waters?* (Response – No washdown waters used in process as it is a ‘dry process’; with the use of vacuum equipment.)
- *Is additional water required to be used?* (Response – A small amount of water is required to condition the wheat before processing, (refer Section 8.3.1)).
- *Does the type of wheat brought to the site contain chemical residues?* (Response – The wheat brought to the site would not contain different chemical residues when compared to the existing flour that is already brought to site.)
- *Will the proposal involve an increase in odours?* (Response – The Flour Mill will not increase odours generated by the factory site. Odours will need to be addressed by the EA in a separate Air Quality Assessment as part of the Director-General’s requirements for the EA).
- *Will there be changes to the number of trains arriving to load/unload produce?* (Response – The proposed Flour Mill will not result in any change in frequency of train movements to the site, only the timetable may be altered. This is outside the Company’s control as it is controlled by the State rail authorities.)
- *With the general community concerns about carbon emissions and greenhouse emissions what effects will this proposal have in relation to greenhouse gas emissions?* (Response – Proposal will be required to undertake an assessment of greenhouse gas emissions as part of the Air Quality Assessment. This is an issue raised by the Director-General requirements that is required to be addressed as part of the EA.
- *In terms of the use of energy, has consideration been given to recycling heat energy through plant?* (Response – The use of energy is a significant cost burden in terms of the manufacturing processes at the Shoalhaven Starches factory site. As a result

Shoalhaven Starches has introduced a number of processes throughout the plant to improve its efficiency in terms of energy consumption.)

The Committee discussed other issues during the meeting not directly relevant to the Flour Mill proposal. Only those matters relevant to the Flour Mill proposal have been outlined above.

5.0 THE PROPOSED DEVELOPMENT

5.1 OBJECTIVES OF PROJECT

At present industrial grade flour is milled at the Company's Manildra, Gunnedah and Narrandera Flour Mills and transported to the site by train for use as a raw material in the production of gluten and starch.

In addition mill feed (essentially the husk material from processed grain) is also transported to the site for use in the DDG dryers which form part of the ethanol production process at the plant.

Shoalhaven Starches plans to establish a Flour Mill within the existing factory site. It is proposed that wheat will be transported directly to the site by train and processed in the proposed Flour Mill into industrial grade flour for use in the production of starch and gluten at the Bomaderry Plant.

The husk (mill feed) material from the processing of this wheat will then be able to be used in the DDG dryers.

As a result the equivalent amount of flour and mill feed will no longer need to be transported to the site. There will be no change to the frequency of train movements to and from the site; although the time tabling of train movements may be altered.

The objective for the Company of relocating part of the industrial grade flour production to the Bomaderry Plant will be that subsequent spare capacity at the Manildra Plant can be devoted to the production of higher grade flour therefore increasing export opportunities for the Company.

It is anticipated that the proposed Flour Mill at the Bomaderry site will process approximately 890 tonnes per day of wheat, producing 715 tonnes of industrial grade flour per day. Overall it is anticipated that the Flour Mill will produce approximately 265,000 tonnes of industrial grade flour per annum for use in the Bomaderry Plant.

The total flour processed on site will not exceed the previously approved amount of 10,000 tpw from both sources.

Consequently, the wastewater volumes will remain unchanged.

The proposed Flour Mill will be housed within a new building to be sited within the existing factory site. The new building will comprise a plan area of around 240 m² and have a height above natural ground level of 25 metres. Two additional silos with a total capacity of 3600 tonnes will be sited adjacent to this new building.

Figure 2 is a site plan depicting the locations of the proposed works on the site.

Figure 3 is a site layout plan.

Figures 4 and 5 are elevation details of the proposed works.

5.2 THE PROPOSED FLOUR MILL

The proposed Flour Mill will involve the construction of a building with a plan area of about 240 m². This building will be constructed using tilt up concrete panel construction and will have a height above ground level of 25 metres. This will approximately match the height of the existing adjacent structures. The Flour Mill is proposed to be sited within an existing storage area adjacent the existing unloading facility and partly replace the slurry plant (**Plate 1**).



Plate 1: View of location of proposed Flour Mill.

In addition, the Company proposes to erect two storage silos to store wheat to be used in the flour production process. One of these silos has already been approved as part of the PRP No. 7 approval issued by the Minister in 2003. The other silo will be situated within proximity of the mill and will comprise an overall storage capacity of 1800 tonnes. The additional silos with a total capacity of 3600 tonnes will be sited within the vicinity of this new building and adjacent to the existing flour unloading facility (**Plate 2**). One silo will have a diameter of 11 metres while the other will have a smaller 10 metre diameter.



Plate 2: View of location of proposed silo (and relocated approved silo).

The siting of one of the silos associated with the Flour Mill will require the slight relocation of the approved (however yet to be erected) 11 metre diameter grain silo from its approved position adjacent to an existing grain silo, in a southerly direction to enable the siting of the proposed wheat silo in this location of the site. The 11 metre grain silo was part of the approved works associated with the PRP No. 7 project that was approved by the Minister for Planning in 2003.

The proposed facility would produce 5,000 tonnes per week of industrial grade wheat flour. The flour produced by the proposed plant would be combined with an additional 5,000 tonnes per week of flour supplied by rail from Manildra's flour mills at Narrandera, Gunnedah and Manildra. The flour would then be used in the existing Shoalhaven Starch plant to produce starch, gluten, glucose and ethanol. All remaining mill feed/offal would be processed through the Dried Distiller's Grain (DDG) dryers for sale as stock feed.

The new plant would be located at the existing Shoalhaven Starches premises at Bomaderry, within an existing storage area located between the grain processing, flour unloading and boiler house structures, on the banks of the Shoalhaven River, as detailed in **Figure 1**. The Flour Mill would require the construction of an additional silo (to that previously approved) and flour processing building.

Wheat would be delivered to the site twice per week in rail hopper cars nominally of 60 tonne capacity. Each train would deliver approximately 3000 tonnes of wheat. The proposal would not alter the current number or frequency of train movements to the site.

Wheat delivered to the site by train would discharge through a grid below the hopper outlet, and would be transported via drag chains and a bucket elevator system into two silos each of 1600 tonne capacity.

Wheat would be taken from the raw wheat silos, weighed and then passed through various cleaning operations as follows:

- ▶ sieves for the removal of impurities larger or smaller than wheat;
- ▶ gravity separators for the removal of heavy impurities such as stone;
- ▶ magnetic separators for the removal of ferrous metal impurities; and
- ▶ aspirators, using air currents, for the removal of lighter impurities.

The moisture content of wheat received at the site would typically be in the range of 8% - 10%, which is too dry for milling. Water would therefore be added to the wheat in a carefully controlled manner to increase the moisture content of the grain to around 15%. The damped wheat would then be stored in a conditioning or tempering bin where it would be allowed to remain for a period of time to allow the added moisture to be fully absorbed into the grain.

Conditioning of grain would be necessary to:

- ▶ assist in the separation of the component parts of the grain by toughening the bran to ensure a clean separation of the endosperm from the bran and germ; and
- ▶ allow the reduction rollers to grind the endosperm into flour with the minimum power consumption, and ensure accurate and easy sifting on the following sieving machines.

When the grain is at the optimum milling condition it would be taken from the conditioning bins and passed through final scouring, weighing and separation stages before being passed to the mill.

Milling would be carried out on roller mills which would mill the grain into progressively finer fractions. Each milling process would be followed by coarse sieving to separate large flakes of bran and chunks of endosperm, which would then be passed to the next milling cycle. The finer starchy material would be passed over a series of progressively finer sieves to remove any flour, and to grade the remaining particles into various sizes for further grinding.

Flours from the various grinding operations would be collected and blended together before passing through final treatment and weighing operations to bulk storage bins. Flour would be taken from these bins for use in existing site production processes.

The coarse particles left at the end of the reduction system, known as pollard, and the bran from the end of the break system, would be combined into a single by-product (DDG) for sale as animal feed.

All air extracted from the mill would be passed through Buhler Airjet bag houses prior to being discharged to the atmosphere.

The proposal would be powered by electrical energy, would not require any additional gas supply, and would use compressed air only for instrument use.

Figure 6 provides a flow diagram delineating how the proposed Flour Mill fits into the overall Shoalhaven Starches production process.

5.3 THE EXISTING GRAIN PLANT

Waste product from the starch, gluten and syrup production processes at the factory are combined to feed the fermentation and distillation stage in the ethanol production process. The outputs of the process are fuel and industrial grade ethanol. The residue from the ethanol process is directed to stillage recovery plant, the reclaimed water from the stillage recovery plant is then irrigated.

The distillery at Shoalhaven Starches is supplied feed material from 2 sources on the site:

- starch from the starch plant; and
- crushed grain from the grain processing plant.

These feed streams are fermented and distilled in the distillery. The product from the distillery is ethanol. The by-products from this process are the remaining grain husks and “unfermentables” from the feed stream; carried by water.

Grain is also used as a coarse fibre in the feed to the DDG dryers as part of the stillage recovery process to dry soluble solids recovered from wastewater by evaporation. If insufficient fibre is fed into the dryers, the moist syrup fed into the dryers cannot be adequately absorbed and the product becomes “sticky”. After a period the syrup sticks to the heating surface of the dryer resulting in a loss of drying capability.

There is therefore a need to mix grain fibre into the syrup to ensure that the mixture is sufficiently friable to enable the DDG Dryers to operate efficiently.

The processing of wheat in the proposed Flour Mill will also create husk material (in effect the waste material from the milled wheat grains) from the milled wheat. This husk material or “mill feed” will be able to be used with the grain fibre in the DDG dryers. As a result the amount of mill feed transported to the site to feed the grain plant will be able to be reduced.

The only other implication that this proposal has in relation to the grain plant operations is the need to slightly relocate the approved 11 metre diameter grain silo (that is yet to be erected) so as to enable the siting of one of the proposed wheat silos in this same area.

This proposal will have no other implications for the grain plant on the site.

5.4 THE STARCH PLANT

The proposal will enable a reduction in the amount of flour transported to the site, as up to 50% of the flour used to produce the starch and gluten will be able to be processed on the site.

Overall production rates will remain as approved. The total flour processed on site within the existing starch plant will not exceed the previously approved amount of 10,000 tonnes per week from both the proposed Flour Mill on the site, and that transported to the site by rail.

As the proposal merely relates to a change in the manner by which flour is supplied to the production process, no modifications are proposed for the starch plant.

5.5 ETHANOL PLANT

The ethanol plant utilises waste from the starch, gluten and syrups components of the plant to feed fermentation and distillation of ethanol production. In effect the ethanol production comprises an integral component of the Company’s waste treatment process. As this proposal does not seek to increase overall production rates at the site; and as the proposal will not result in any net increase in wastewaters processed on the site; the proposal will have no impact on the existing ethanol plant and its associated processes.

5.6 WASTEWATER TREATMENT AND DISPOSAL

5.6.1 Stillage Recovery

The 2003 approval by the Minister of the Company’s Pollution Reduction Program No. 7 introduced a Stillage Recovery process into the production process at the plant. The

objective of stillage recovery seeks to improve the system for the removal of suspended and soluble solids within the Company's wastewater system.

This process includes the use of decanters, evaporators and DDG dryers.

Decanters are essentially mechanical separation devices which operate by centrifugal separation process that separates out the unfermented suspended solids in stillage, ie. the waste liquid left over from the distillation of ethanol.

Evaporators are designed to reduce the water content of "overflow" stillage (after it passes through the decanters). The evaporators operate by mechanical vapour recompression. The overflow from the decanters is fed into tubes within the evaporator and heated by steam. The liquid within the overflow is heated to a point where it evaporates and is separated from the remaining solids, which remain as syrup. The liquid (ie. condensate) is captured and directed to the environmental farm for irrigation ie the reclaimed water.

The syrup product is directed to DDG dryers for further drying. The DDG dryer is essentially a casing in which a bundle of steam tubes are rotated at low speed. Evaporator concentrate (syrup) and decanter concentrate (wet insoluble solids) are fed into one end of the casing and transferred through to the other end by shovels. Heat from the tubes removes moisture.

Dried DDG is removed from the barrel and conveyed to the storage room for further loading into trucks.

The wheat processed at the Flour Mill will produce flour and residue husk material or "mill feed". The mill feed produced on site will be able to be fed into the DDG dryers in place of mill feed transported by rail.

The proposal however will have no other implications for ethanol production on the site.

5.6.2 Effluent Irrigation

As outlined the total amount of flour processed at the site will not exceed the previously approved amount of 10,000 tpw. Whilst there will be a minor increase in water consumption from the site associated with the conditioning of the wheat; this will result in the commensurate amount of moisture in the flour produced on-site compared to the amount of moisture that would have been found in the flour that is currently transported to the site. The moisture required to condition the wheat will therefore not result in increases in wastewaters through the process. Consequently wastewater volumes

required to be irrigated onto the Company's Environmental Farm will remain unchanged following the establishment of a flour mill on the site.

5.7 ENERGY AND UTILITIES

The existing plant has the capacity to produce 145 t/h of process steam by four boilers. The boilers are primarily fuelled by coal. The current operations however produce about 120 t/h.

The site currently has an electricity supply of 20 MVA.

The Company also currently utilises 180 Terajoules of Natural Gas.

The total requirements for the plant resulting from the proposed Flour Mill are estimated at additional 1.5 MVA of power.

6.0 STATUTORY APPROVAL CONTEXT

6.1 COMMONWEALTH LEGISLATION

6.1.1 Environment Protection & Biodiversity Conservation Act

The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* specifies that approval is required from the Commonwealth Minister for the Environment for actions that have, will have or are likely to have a significant impact on a matter of “*national environmental significance*”, including:

- (i) declared World Heritage Areas;
- (ii) declared RAMSAR wetlands;
- (iii) listed threatened species and ecological communities;
- (iv) listed migratory species;
- (v) nuclear actions; and
- (vi) the environment of Commonwealth marine areas.

Actions on or outside Commonwealth land that have, will have or are likely to have a significant impact on the environment on or outside Commonwealth land must also be referred to the Commonwealth Minister for assessment and approval.

The Department of Environment and Heritage (2005) has published guidelines to assist in determining whether an action will have or is likely to have a significant impact on a matter of national environmental significance and, hence, whether a referral should be submitted to the Department for a decision by the Minister on whether assessment and approval is required under the EPBC Act.

The Guidelines state that, to make a decision as to whether or not to refer an action to the Minister, you should consider the following questions:

1. *Are there matters of national environmental significance located in the area of the proposed action?*
2. *Considering the proposed action at its broadest scope, is there potential for impacts on matters of national environmental significance?*
3. *Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?*
4. *Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts?*

The Guidelines provide the following important definitions:

"A *significant impact* is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance."

"To be *likely*, it is not necessary for a significant impact to have a greater than 50% chance of happening, it is sufficient if a significant impact on a matter of national environmental significance is a real or not remote chance or possibility."

"*Population*, in relation to critically endangered, endangered or vulnerable, threatened species, means:

- a geographically distinct regional population, or collection of local populations; or
- a regional population, or collection of local populations occurring within a particular bioregion."

"An *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species' range.

"*Habitat critical to the survival of a species* refers to:

- habitat identified in a recovery plan for the species as habitat critical for those species or communities; and/or
- habitat listed on the Register of Critical Habitat maintained by the Minister under the Act; and/or
- areas that are necessary:
 - for activities such as foraging, breeding, roosting, or dispersal,
 - for succession,
 - to maintain genetic diversity and long term evolutionary development, or
 - for the reintroduction of populations or recovery of the species."

A Flora and Fauna Assessment undertaken by Kevin Mills & Associates as part of the previous PRP No. 7 proposal approved by the Minister in 2003, and which included the same land as that associated current project, also included an assessment under the requirements of this legislation. This assessment concluded:

“The proposed upgrade and expansion of the Environmental Farm are not likely to have a significant effect on any species or communities listed under the Environmental Protection and Biodiversity Conservation Act. It is therefore not necessary to refer the matter to the Commonwealth Environment Minister for approval.”

The Flour Mill is proposed to be sited within the confines of the existing factory site within a heavily developed part of the site. No native vegetation will be disturbed. Under these circumstances it is considered the proposal will not instigate the provisions of this legislation.

6.2 STATE LEGISLATION

6.2.1 Environmental Planning & Assessment Act 1979 - Part 3A Major Projects

The introduction of Part 3A to the Environmental Planning & Assessment Act 1979; and the introduction of State Environmental Planning Policy (Major Projects); brought about a change in the regime concerning the assessment of state significant development. Pursuant to Section 75B of the Act, development subject to the provisions of Part 3A of the Act includes development referred to within a State Environmental Planning Policy. The Minister for Planning is the consent authority for such development.

State Environmental Planning Policy (Major Projects) supports the introduction of Part 3A to the Act. Schedules 1 and 2 of this SEPP outline those developments that are essentially subject to the provisions of Part 3A of the Act.

Schedule 1 SEPP (Major Projects)

Schedule 1 of SEPP (Major Projects) outlines classes of development that, if in the opinion of the Minister, are declared to be projects to which Part 3A of the Act apply. Group 1 within this schedule outlines criteria for agricultural, timber and related industries and includes:

3 Agricultural produce industries and food and beverage processing

Development that employs 100 or more people or has a capital investment value of more than \$30 million for any of the following purposes:

- (a) abattoirs or meat packing, boning or products plants; milk or butter factories; fish packing, processing, canning or marketing facilities;*

animal or pet feed; gelatine plants; tanneries; wool scouring or topping; rendering plants, or

- (b) *cotton gins; cotton seed mills; sugar mills; sugar refineries; grain mills or silo complexes; edible or essential oils processing; breweries; distilleries; **ethanol plants**; soft drink manufacture; fruit juice works; canning or bottling works; bakeries; small goods manufacture, cereal processing or margarine manufacturing, or*
- (c) *organic fertiliser plants or composting facilities or works.*

This proposal includes alterations and additions to a factory that currently employs around 225 people. The proposed Flour Mill is estimated to involve a capital investment of \$10 million.

Schedule 2 SEPP (Major Projects)

Schedule 2 of SEPP (Major Projects) also outlines those classes situated within the coastal zone that are also deemed to be state significant development. This Schedule includes:

1 Coastal areas

- (1) *Development within the coastal zone for any of the following purposes:*

- (a) *extractive industries,*
- (b) *landfill facilities,*
- (c) *mining that is designated development and that is wholly or partly in a sensitive coastal location,*
- (d) *marinas that are designated development and that are wholly or partly in a sensitive coastal location,*
- (e) *the following types of industries (other than mining or extractive industries) but only if they are:*
 - (i) *designated development, and*
 - (ii) *in the case of the metropolitan coastal zone—wholly or partly in a sensitive coastal location:*

agricultural produce industries, bitumen pre-mix industries, breweries or distilleries, cement works, ceramic or glass industries, chemical industries or works, chemical storage facilities, composting facilities or works, contaminated soil treatment works, crushing, grinding or separating works, drum or container reconditioning works, electricity generating stations, livestock intensive industries, livestock processing industries, mineral processing or

metallurgical works, paper, pulp or pulp products industries, petroleum works, wood or timber milling or processing works, or wood preservation works,

The subject site is situated within the Coastal zone.

The proposed Flour Mill would be defined as an “*agricultural produce industry*”. For the purposes of Schedule 3 of the Environmental Planning & Assessment Regulations, agricultural produce industries are designated developments which:

“...process agricultural produce, including dairy products, seeds, fruit, vegetables or other plant material):

- (a) that crush, juice, grind, mill, gin, mix or separate more than 30,000 tonnes of agricultural produce per year, or*
- (b) that release effluent, sludge or other waste:*
 - (i) in or within 100 metres of a natural waterbody or wetland, or*
 - (ii) in an area of high watertable, highly permeable soils or acid sulphate, sodic or saline soils*

The proposed Flour Mill will process approximately 182,500 tonnes of grain per annum. Under these circumstances the proposal triggers the provisions of Part 3A of the EP&A Act. The Director-General has declared that this project is a Major Project for the purposes of this legislation; and has issued requirements for the preparation of this EA (**Annexure A**).

Relevant legislation and other approvals

Approvals under the eight Acts listed under Section 75U Clause 1 of the EP&A Act are not required for developments identified as Major Projects. These Acts include:

- a) the concurrence under Part 3 of the Coastal Protection Act 1979 of the Minister administering that Part of the Act,*
- (b) a permit under section 201, 205 or 219 of the Fisheries Management Act 1994,*
- (c) an approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977,*
- (d) a permit under section 87 or a consent under section 90 of the National Parks and Wildlife Act 1974,*
- (e) an authorisation referred to in section 12 of the Native Vegetation Act 2003 (or under any Act to be repealed by that Act) to clear native vegetation,*

- (f) *a permit under Part 3A of the Rivers and Foreshores Improvement Act 1948,*
- (g) *a bush fire safety authority under section 100B of the Rural Fires Act 1997,*
- (h) *a water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the Water Management Act 2000.*

6.2.2 Threatened Species Conservation Act

The New South Wales *Environmental Planning and Assessment Act 1979*, as amended by the *Threatened Species Conservation Act 1995* and *Threatened Species Conservation Amendment Act 2002*, requires that various factors be taken into account in deciding whether a proposed action, development or activity is likely to have a significant effect on threatened species, populations or communities, or their habitats and, hence, whether the preparation of a Species Impact Statement (SIS) is warranted.

The TSC Amendment Act also specifies that any assessment guidelines issued by the Minister for the Environment be taken into account when making an assessment of significance. The Department of Environment and Conservation published the guidelines in August 2005. Referred to as the *Assessment of Significance Guidelines*, they clarify technical terms and assist in the interpretation and application of the various factors.

The Guidelines state that:

"the revised factors maintain the same intent [as the Eight Part Test] but focus consideration of the likely impacts in the context of the local rather than the regional environment as the long-term loss of biodiversity at all levels arises primarily from the accumulation of losses and depletions of populations at a local level. This is the broad principle underpinning the TSC Act, State and Federal biodiversity strategies and national agreements. The consideration of impacts at a local level is designed to make it easier for local government to assess, and easier for applicants and consultants to undertake the Assessment of Significance because there is no longer a need to research regional and statewide information in considering potential impacts. Further consideration is required when a significant effect is likely and is more appropriately considered when preparing a Species Impact Statement."

"When applying each factor, consideration must be given to all of the likely direct and indirect impacts of the proposal. Direct impacts are those that directly affect habitat and individuals and include but are not limited to acute death through predation, trampling, poisoning of the animal/plant itself and removal of suitable habitat. Indirect impacts occur when project-related activities affect resources in a manner other than a direct loss of the resource. A broad range of impacts need to be considered, for example,

killing of species through starvation, exposure, predation, by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious changes in the water table, increased soil salinity, promotion of erosion, inhibition of nitrogen fixation, provision of suitable seed bed for exotic weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas."

"Mitigating, ameliorative or compensatory measures propose as part of the action, development or activity should not be considered in determining the degree of effect on threatened species, populations, or ecological communities, unless the measure has been proven successful for that species in a similar situation."

"In determining the nature and magnitude of an impact, it is important to consider matters such as:

- Pre-construction, construction and occupation/maintenance phases,*
- All on-site and off-site impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones,*
- All direct and indirect impacts,*
- The frequency and duration of each known or likely impact/action,*
- The total impact which can be attributed to that action over the entire geographic area affected, and over time,*
- The sensitivity of the receiving environment, and*
- The degree of confidence with which the impacts of the action are known and understood."*

"Application of the precautionary principle requires that a lack of scientific certainty about the potential impacts of an action does not in itself justify a decision that the action is not likely to have a significant impact. If the information is not available to conclusively determine that there will not be a significant impact on the threatened species, population or ecological community, or its habitat then it should be assumed that a significant impact is likely."

The factors to be considered are as follows:

- (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;*
- (b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;*

- (c) *in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;*
- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction;*
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its occurrence is likely to be placed at risk of extinction;*
- (d) *in relation to the habitat of a threatened species, population or ecological community;*
 - (i) *the extent to which habitat is likely to be removed or modified as a result of the action proposed;*
 - (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;*
 - (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;*
- (e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);*
- (f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;*
- (g) *whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Flour Mill is proposed to be sited within the confines of the existing factory site within a developed part of the site. No native vegetation will be disturbed. Under these circumstances it is considered the proposal will not instigate the provisions of this legislation.

6.2.3 Protection of the Environment Operations Act

The existing development has an Environmental Protection Licence (EPL) under the Protection of the Environment Operations Act 1997 (POEO Act) (EPL No. 883). The licence imposes requirements in terms of:

- discharges to air, water and land;
- irrigation controls;
- management of irrigation;

- maintenance of irrigation reticulation;
- odour control.

Following discussions with staff from the Department of Environment & Conservation it is understood that this proposal will not require any modifications to the existing EPL for this site. The proposal will however need to demonstrate that the proposal will be able to continue to satisfy the requirements of the Company's EPL.

6.2.4 Rivers and Foreshores Improvement (R & FI) Act

The R & FI Act makes provisions for the carrying out of excavation works or the removal of obstructions for the improvement of rivers and foreshores and the prevention of erosion of lands by tidal and non-tidal waters.

In particular Part 3A requires that excavation works proposed within 40 metres of protected land (that includes a "river") be required to obtain a permit from the relevant authority (DNR).

The development proposal does seek works that may in part involve excavation works within 40 metres of the banks of the Shoalhaven River. Given the provisions of Section 75U of the EP & A Act (as outlined in Section 6.2.2 of this EA) however as the subject proposal constitutes a Major Project the need to obtain a permit under Part 3A of this legislation is not required.

6.2.5 Native Vegetation Act 2003

The objectives of the Native Vegetation Conservation Act essentially relate to the conservation and management of native vegetation. The definition of "native vegetation" under the Act is quite broad, it includes; trees, understorey plants, groundcovers and plants occurring in a wetland. Under the provisions of Section 12 of the Act, the clearing of native vegetation (except under certain exemption and exclusion circumstances) requires to obtain an approval under this legislation from the relevant Catchment Management Authority.

The subject proposal does not seek to clear any native vegetation although two introduced Coral Trees situated along the southern boundary of the site (and within the riverbank of the Shoalhaven River) will need to be removed in order to relocate the approved (although yet to be erected) grain silo; so as to enable the siting of the proposed wheat silo also in this area of the site.

Pursuant to Section 5 of this Act certain land is excluded from the provisions of this legislation including land within a zone designated "residential" (but not "rural-

residential”), “village”, “township”, “industrial” or “business” under an environmental planning instrument. The subject land is zoned Industrial 4(e) and is therefore excluded from the provisions of this legislation.

Notwithstanding the above, pursuant to Section 75U(e) of the EP & A Act, an approval under Section 12 of this Act is not required to be obtained for a project affected by Part 3A of the EP & A Act.

Under these circumstances this legislation does not apply to this proposal.

6.3 STATE ENVIRONMENTAL PLANNING POLICIES

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

6.3.1 SEPP No. 11 - Traffic Generating Developments

The objective of this SEPP is to ensure the Roads and Traffic Authority is made aware of and given an opportunity to make representations in respect of developments that are likely to have an impact on traffic volumes and road networks in the locality.

The formal notification process is undertaken either through the regional or local traffic committees. The SEPP includes two schedules, which outline those developments that the RTA is required to be notified.

In terms of this project, Schedule 2 (local traffic committee) identifies those developments that propose:

- f) The erection of a building for the purposes of industry where the gross floor area of the building is or exceeds 5 000 square metres, or the enlargement or extension of a building used for the purposes of industry where the gross floor area of that enlargement or extension is or exceeds 5 000 square metres.*

The proposed additional floor space created by the proposed Flour Mill building will comprise an overall floor area of 1440 m². The proposal will therefore not trigger the referral requirements under this policy.

6.3.2 SEPP No. 14 - Coastal Wetlands

The aim of this policy is to “ensure that coastal wetlands are preserved and protected in the environmental and economic interest of the state”.

In respect of land to which this policy applies, development consent is required to:

- (a) clear that land;*
- (b) construct a levee on that land;*

- (c) *drain that land; or*
- (d) *fill that land.*

One SEPP No. 14 wetland (No. 369) is located within the Company's Environmental Farm land located across Bolong Road to the north of the factory site. The works associated with this proposal however are not sited within the vicinity of this wetland. The provisions of this SEPP will therefore not apply to this proposal.

6.3.3 SEPP No. 33 - Hazardous and Offensive Development

The Shoalhaven factory site comprises a "*potentially hazardous industry*" and "*potentially offensive industry*" under the provisions of this SEPP. "Potential hazardous industry" as defined by clause 3 of the SEPP means:

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

- (a) to human health, life or property, or*
- (b) to the biophysical environment,*

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

Under the provisions of clause 12 of this SEPP any proposal involving a potentially hazardous industry must prepare a Preliminary Hazard Analysis in accordance with the relevant Circulars and Guidelines published by the Department of Planning. A Preliminary Hazard Analysis has been prepared for this project by GHD Pty Ltd and forms **Annexure C** to this EA. This matter is further addressed in Section 8.4 of this EA.

6.3.4 SEPP No. 71 - Coastal Protection

On the 1st November 2002 the State Government gazetted SEPP No. 71. This policy

- *“identifies State significant development in the coastal zone, and*
- *requires development applications to carry out development in sensitive coastal locations to be referred to the Director-General for comment, and*
- *identifies master plan requirements for certain development in the coastal zone.”*

The coastal zone has the same meaning as in the Coastal Protection Act 1979. This Act essentially maps the area of land and waters that lie to the west of coastal waters. From a perusal of this mapping it is evident that the coastal zone covers the subject land.

Under these circumstances, the subject site would be affected by the provisions of this Policy.

The proposal is consistent with the objectives of the Policy and the matters for consideration, as detailed in clause 8 of the Policy for the following reasons:

- The proposal does not affect or impinge on public access to or along the coastal foreshore. Given the nature of the bank of the Shoalhaven River which adjoins the subject site there is little opportunity to provide public access along this foreshore.
- The proposed Four Mill and its associated silos are situated within an industrial zoned area within the vicinity of industrial plant of a similar purpose, scale and height as that which is proposed and is therefore considered to be suitable development given its type, location and design.
- The development will not result in any additional overshadowing of foreshore areas compared to that which currently occurs. The proposed works are of a height and scale that matches existing development on the site.
- The scenic qualities of the area will not diminish (refer Section 8.9 of this EA).
- The proposal will not lead to adverse impacts on threatened fauna and flora (refer Section 6.2.2 of this EA).
- The proposal does not propose any structures that are likely to impact on fish, marine vegetation or their habitats.
- The site is not identified as a wildlife corridor.
- It is considered that the proposal will not lead to conflict between land based and water based coastal activities.
- It is not anticipated that the proposal will impact on Aboriginal heritage (refer Section 8.11.1 of this EA).

In terms of the provisions of Part 4 of the SEPP (clauses 13 – 16) the following comments are made:

- The proposed development will not impede or diminish public access to coastal foreshore areas. As outlined above given the nature of the bank of the Shoalhaven River which adjoins the subject site there is little opportunity to provide new public access along this foreshore
- The development will not result in any increase in the quantity of effluent generated by the development that will need to be treated and disposed.

- The development will not impact upon local stormwater quality (refer Section 8.3.2 of this EA).

The development is also not subject to the provisions of Part 5 (Master Plans) of the SEPP as the proposal does not seek to subdivide land.

6.3.5 SEPP - Major Projects 2005

The aims of this Policy are as follows:

- (a) to identify development to which the development assessment and approval process under Part 3A of the Act applies;*
- (b) to identify any such development that is a critical infrastructure project for the purposes of Part 3A of the Act;*
- (c) to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant sites for the benefit of the State;*
- (d) to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes;*
- (e) to rationalise and clarify the provisions making the Minister the approval authority for development and sites of State significance, and to keep those provisions under review so that the approval process is devolved to Councils when State planning objectives have been achieved.*

This SEPP is addressed in Section 4.2 of this report. Essentially the Minister has declared that this project is a major project pursuant to the provisions of Part 3A of the EP&A Act and SEPP (Major Projects) 2005. The provisions of this policy therefore apply to this project.

6.3.6 NSW Coastal Policy

The State Coastal Policy applies generally to:

- three nautical miles seaward of the mainland and offshore islands;
- one kilometre landward of the open coast high water mark;
- a distance of one kilometre around:
 - ⇒ all bays, estuaries, coastal lakes, lagoons and islands;

- ⇒ tidal waters of coastal rivers to the limit of mangroves as defined by NSW Fisheries (1985) maps or the tidal limit whichever is closer to the sea;
- within the line on the maps being taken to the nearest cadastral boundary and/or easily recognisable physical boundary, in consultation with coastal councils.

The relevant objectives of the State Coastal Policy in terms of this proposal are:

- *To give the impacts of natural processes and hazards a high priority in the planning and management of coastal areas;*
- *To identify and protect areas of high natural or built aesthetic quality.*
- *To design and locate development to complement the surrounding environment and to recognise good aesthetic qualities.*
- *To effectively manage and conserve cultural heritage places, items and landscapes.*
- *To identify and facilitate opportunities for the sustainable development and use of resources.*
- *To develop land use and management plans which ensure the sustainable development and use of resources.*

Annexure D to this EA includes a checklist addressing how the provisions of the Coastal Policy apply to this proposal.

6.4 REGIONAL ENVIRONMENTAL PLANS AND STRATEGIES

6.4.1 Illawarra Regional Environmental Plan

The subject site is affected by the provisions of the Illawarra Regional Environmental Plan (IREP). The IREP was gazetted on 11 April 1986 and provides a statutory framework that ensures that regional needs and interests are taken into account in local and state planning activities.

The main purpose of the IREP is to provide a framework for the coordination of responsibilities between State and local government agencies, to ensure that:

- the best use of land resources is achieved;
- the quality of life, especially as it is affected by land use is maintained and where possible improved;
- regional needs and interests are taken into account in local and state planning;
- a stable and attractive climate exists for public and private investment.

From a perusal of the plans which accompany the IREP it is evident that the subject land has been identified as part of a large area of land in the Nowra / Bomaderry district with landscape or environmental attributes.

Part VI of the IREP is concerned with industry. Industrial objectives relevant to this proposal are:

48. The objective relating to industry are:

- (a) To ensure that there is sufficient industrially zoned land to meet industrial needs.*
- (b) To encourage industries and other enterprises to locate within the region to diversify the economic base or act as stimuli to the local economy or both and so provide new employment opportunities; and*
- (c) To locate industrial land where it will meet the particular requirements of industry while having a minimal adverse impact on the natural environment and the amenity of living areas.*

The IREP also states that adequate services must be available to meet the demands of any industrial development, which may be permissible under the provisions of the Council's Local Environmental Plan

Under clause 139 of the IREP, provisions relating to high rise buildings are addressed:

139(2) The consent authority shall not consent to a development application to erect a building or to alter an existing building by increasing its height, where the building after erection or alteration will have a height:

- (a) in the case of land shown on the map as regional commercial centre and land zoned 2(c) Residential "C" under Wollongong Local Environmental Plan No. 38 (other than that north of Bourke Street or Corrimal Street) of more than 20 metres; or*
- (b) in the case of other land in the Wollongong sub region and the Shoalhaven sub region of more than 11 metres,*

without the concurrence of the Director.

The IREP makes provision for the control of building heights. Specifically clause 139(2)(b) requires the concurrence of the Director-General for consent to erect a building where the building will have a height of more than 11 metres. The proposal includes components of the development, which are over 20 metres in height, and the Director-General's concurrence is therefore required prior to the issuing of any consent for these aspects of this project.

Clause 139(3) sets out the matters for consideration that the Director-General must take into consideration in granting concurrence under this clause, including:

- a) *the height, scale, bulk and density of the proposed building;*
- b) *the external appearance and materials used on the exterior of the proposed building;*
- c) *the relationship of the proposed building to the streetscape or landscape;*
- d) *the effect of the proposed building on public amenity, including pedestrian amenity;*
- e) *the effect of the proposed development on wind patterns and wind velocity in public places;*
- f) *the effect of the proposed building on overshadowing of public places;*
- g) *the effect of the proposed building on views from public places;*
- h) *the effect of the proposed building on any items of the environmental heritage in the vicinity; and*
- i) *the effect of reflections from the exterior of the proposed building on roads, public places and buildings in the vicinity.*

The scenic qualities of the site and visual impact of the proposed development are dealt with in Section 8.9 of the EA.

The construction and operation of the proposed development would not conflict with the relevant stated aims and provisions contained in the IREP and similarly, there are no further provisions of the IREP that affect the application.

6.4.2 South Coast Regional Strategy

The primary purpose of the South Coast Regional Strategy is to ensure that adequate land is available and appropriately located to sustainably accommodate projected housing and employment needs for the South Coast Region for the next 25 years.

In summary the aims of the strategy include:

- *Protect high value environments including pristine coastal lakes, estuaries, aquifers, threatened species, vegetation communities and habitat corridors by ensuring that no new urban development occurs in these important areas and their catchments.*
- *Cater for a housing demand of up to 45,600 new dwellings by 2031 to accommodate the additional 60,000 people expected in the Region over the next 25 years.*

- *Increase the amount of housing in existing centres to ensure the needs of future households are better met, in particular the needs of smaller households and an ageing population.*
- *Prioritise and manage the release of future urban lands to ensure that new development occurs in and around existing well serviced centres and towns.*
- *Use the recommendations of the Sensitive Urban Lands Panel to guide the finalisation of the development form and environmental management of the 17 'sensitive urban lands'.*
- *Manage the environmental impact of settlement by focusing new urban development in existing identified growth areas such as Nowra-Bomaderry, Milton-Ulladulla, Batemans Bay and Bega.*
- *Only consider additional development sites if it can be demonstrated that they satisfy the Sustainability Criteria (Appendix 1).*
- *No new towns or villages will be supported unless compelling reasons are presented and they can satisfy the Sustainability Criteria.*
- *No new rural residential zones will be supported unless as part of an agreed structure plan or settlement strategy.*
- *Ensure an adequate supply of land to support economic growth and provide capacity to accommodate a projected 25,800 new jobs, particularly in the areas of finance, administration, business services, health, aged care and tourism.*
- *Limit development in places constrained by coastal processes, flooding, wetlands, important primary industry resources and significant scenic and cultural landscapes.*
- *Protect the cultural and Aboriginal heritage values and visual character of rural and coastal towns and villages and surrounding landscapes.*

Where development or rezoning increases the need for State infrastructure, the Minister for Planning may require a contribution to the provision of such infrastructure, having regard to the State Infrastructure Strategy and equity considerations.

Section 7 of the Strategy relates to “*Economic development and employment growth*”. This section of the strategy concerns in part the need to identify sufficient employment and land capacity to provide for a projected 25,800 new jobs in the region and specifically 14,400 within the Shoalhaven.

The identified “Actions” under the strategy deal essentially with the preparation of local environmental plans and the need for monitoring the supply of employment lands in the region. The Strategy does not make any specific recommendations in terms of the development of industrial sites – such as that proposed by this application.

6.5 SHOALHAVEN LOCAL ENVIRONMENTAL PLAN 1985

The Main Factory Site

The majority of the existing Shoalhaven Starches Factory Site within which the ethanol, glucose, starch and grain plants are sited is zoned 4(e) Industrial (Restricted Development) under the provisions of Shoalhaven Local Environmental Plan 1985. All works associated with this proposal are sited within that portion of the site that is zoned 4(e).

The objective of this zone is to:

“...identify locations in existing industrial areas with development problems where special consideration will be required before development can be approved.”

Industrial development is permissible under the provisions of this zoning.

Environmental Management Provisions

The following environmental management provisions of SLEP 1985 have relevance to the proposal.

Clause 26 (2) & (3) Soil, water and effluent management

26 (2) In deciding whether arrangements for drainage of stormwater and other surface water and the treatment and disposal of effluent are satisfactory, the Council must take into account whether the proposed systems can be accomplished in a manner which meets the following objectives:

- (a) economical feasibility and practicality in terms of design, installation and maintenance,*
- (b) protection of public health,*
- (c) protection of surface water,*
- (d) protection of ground water,*
- (e) encouragement of the utilisation of wastewaters as a resource rather than a waste for disposal, and*
- (f) protection of community amenity.*

(3) Despite any other provision of this plan, except clauses 2, 9 (3) and 21 and the objectives of the zone in which development the subject of this clause is proposed, the Council may consent to the construction of devices which, in the opinion of the Council, are to be used principally for the purpose of soil and water management or water pollution control.

Comment

Stormwater management issues are discussed further in Section 8.3.2 of this EA.

Clause 27 Development on acid sulfate soils

- 26(1) *This clause applies to land identified as having high probability to be affected by acid sulfate soils on the map prepared by the Department of Land and Water Conservation entitled " Acid Sulfate Soil Risk Map " dated December 1997 and available for public inspection at the office of the Council.*
- (2) *Despite any other provision of this plan, the consent of the Council is required for any development which involves or is likely to involve, through drainage, earthworks, or any other means, the exposure to the atmosphere of any part of soil which contains iron pyrites within land to which this clause applies.*
- (3) *The Council must not consent to development described in subclause (2) unless it is satisfied that measures can and will be taken to avoid or mitigate the actual or potential contamination of waterways in the vicinity of the land concerned by acid from acid sulfate soils.*

Comment

Acid Sulphate Soil mapping indicates the subject site is subject to a low probability for the presence of acid sulphate soils. The provisions of this clause therefore do not apply to this proposal.

The EA is supported by an Acid Sulphate Soil Assessment carried out by Coffey Geotechnics Pty Ltd and which forms **Annexure E** to this EA. This matter is further discussed in Section 8.8 of this EA.

Clause 28 Danger of bush fire

- (1) *The Council must not grant consent to the carrying out of development on bush fire prone land if it is of the opinion that:*
 - (a) *the development may have a significant adverse effect on the implementation of:*
 - (i) *any strategies for bush fire hazard reduction or risk management adopted by the Council, or*
 - (ii) *any relevant provisions of the Act or the Rural Fires Act 1997, and*
 - (b) *the development, including the arrangements for access to and from the development, may constitute a significant threat to the lives of residents, visitors or emergency services personnel, and*
 - (c) *the development may give rise to an increased demand for emergency services during bush fire events that will result in a*

significant decrease in the ability of the emergency services to effectively control major bush fires.

Note: Section 146 of the Act provides that bush fire prone land is land recorded by the Council as such on a map certified by the Commissioner of the NSW Rural Fire Service as a bush fire prone land map for the area of the Council.

- (2) *The Council must not grant consent to the carrying out of development on bush fire prone land unless it is satisfied that adequate measures are proposed to avoid or mitigate the threat from bush fire, having regard to:*
 - (a) *the siting of the development, and*
 - (b) *the design of, and the materials used in, any structures involved in the development, and*
 - (c) *the clearing of vegetation, and*
 - (d) *the provision of asset protection zones, landscaping and fire control aids (such as roads and water supplies).*
- (3) *Before deciding to grant consent to any development on bush fire prone land, the Council:*
 - (a) *must have regard to the requirements set out in Planning for Bushfire Protection (ISBN 0 9585987 8 9) , prepared by Planning & Environment Services, NSW Rural Fire Service in co-operation with the Department of Planning (as it then was), and published in December 2001, and*
 - (b) *must be satisfied that those requirements will be met as far as is practicable in the circumstances.*

Comment

The subject site is not mapped as being bushfire prone by mapping prepared by Shoalhaven City Council. Given; the site is not mapped as being bushfire prone; and is a developed industrial site that adjoins the Shoalhaven River; this clause would not apply to this proposal.

29 Development of flood liable land

- (1) *Subject to subclause (2), the Council must not consent to the carrying out of development on land which, in its opinion, is flood liable.*
- (2) *The Council may consent to the carrying out of development on flood liable land if:*
 - (a) *the development is for a purpose ancillary or incidental to the use of land for the purpose of agriculture, or*

- (b) the development comprises the extension or alteration of an existing dwelling-house, or*
 - (c) the land is in any urban zone under this plan, or*
 - (d) the Council has received a flood assessment report, in relation to the land, that addresses each of the matters referred to in subclause (3), and the Council is of the opinion that the development is feasible despite the land being flood liable.*
- (3) In considering an application to which subclause (2) applies, the Council must make an assessment of:*
- (a) the likely levels, velocity, sedimentation and debris carrying effects of flooding,*
 - (b) the structural sufficiency of any building the subject of the application and its ability to withstand flooding,*
 - (c) the effect which the development, if carried out, will or is likely to have on the flow characteristics of floodwaters,*
 - (d) whether or not access to the site will be possible during a flood, and*
 - (e) the likely increased demand for assistance from emergency services during a flood.*
- (4) In granting consent to a development application made pursuant to subclause (2), the Council may impose conditions that set floor levels, require filling, structural changes or additions or require other measures to mitigate the effects of flooding or assist in emergency situations.*

Comment

The EA is supported by a flood assessment report prepared by Webb McKeown Pty Ltd which forms **Annexure F** to this EA. Flooding issues are further discussed in Section 8.6 of this EA.

6.6 DEVELOPMENT CONTROL PLANS (DCP)

DCP No. 18 – Car Parking Guidelines

Council's Car Parking Guidelines, DCP 18, provides the requirements for on-site car parking for developments. In relation to this proposal, the Guidelines require parking at the following rates outlined in **Table 1**.

Table 1
Car Parking Requirements under DCP 18

Land Use	Council Requirement
General Industry - Factories	1 space per 100 m ² gross floor area.

Based on this requirement, the proposed Flour Mill would be required to provide an additional 14 car spaces within the site.

As outlined in Section 1.3, the proposed Flour Mill development may involve the employment of an additional 8 employees. As a result 8 additional employees are likely to work on the site.

As identified by the Traffic Impact Assessment prepared by Christopher Stapleton Consulting in relation to PRP No. 7 project, the Shoalhaven Starches factory site provides in total over 185 parking spaces. Given the site employs 225 people (on a two shift basis) there would be more than adequate parking available on-site to accommodate an additional 8 employees associated with this proposal.

6.7 APPROVAL REGIME FOR PROJECT

As outlined above in Section 4.2, the proposed development meets the criteria for a Major Project under Part 3A of the EP&A Act and SEPP (Major Project) 2005. The consent authority for the project will be the Minister for Planning.

In accordance with Part 3A of the EP&A Act, approvals listed under eight Acts listed under Section 75U Clause 1 of the EP&A Act are not required.

The existing development has an Environmental Protection Licence (EPL) under the Protection of the Environment Operations Act 1997 (POEO Act) (EPL No. 883). The proposal is required to demonstrate that the proposal will be able to satisfy the existing requirements of this licence.

7.0 THE EXISTING ENVIRONMENT

7.1 THE FACTORY SITE

The Shoalhaven Starches factory site is located on the northern banks of the Shoalhaven River in flat to gently undulating terrain. Abernethy's Creek flows through the subject land, while Bomaderry Creek forms the western boundary of the property.

7.1.1 Climate

Rainfall

Bureau of Meteorology rainfall records, taken from the RAN base (Albatross) to the south west of Nowra (Station No. 068076) over a 60 year period, indicate that the mean monthly total rainfall is relatively non-seasonal and varies widely from year to year. The months of March (130.4 mm) and July (55.7 mm) have the highest and lowest averages respectively. The driest months are July, August, September, while February and March are the wettest. It should be noted that there are considerable variations in local conditions within the Nowra area. **Table 2** shows the mean monthly total rainfall for the period 1942 to 2002.

Table 2
Mean Monthly Rainfall
(RAN Air Station)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Mean Rainfall (mm)	95.8	125.7	130.4	100.6	92.5	110.9	55.7	67.7	68.0	113.3	100.4	73.7

Evaporation

Pan evaporation records have been taken from the RAN (Albatross) Air Station south west of Nowra (No. 068076) from 1942 to 1992. **Table 3** represents the median monthly evaporation data from 1942 to 2002. The median annual pan evaporation is 1747.5 mm.

Table 3
Median Monthly Rainfall
(RAN Air Station)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Mean Rainfall (mm)	195.3	159.6	145.7	120	96.1	87	96.1	127.1	150	176.7	180	213.9

Temperature

The average mean daily temperatures were taken from the RAN (Albatross) Air Station south west of Nowra and are based on the mean daily minimum and maximum temperatures (refer **Tables 4** and **5**) from 1942 to 1992. These figures indicate a typical warm temperate climate with warm summers and cool winters, ranging from 25.8°C in January and February to 6.2°C in July.

Table 4
Mean Daily Temperature (Maximum)
RAN Albatross

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Mean Rainfall (mm)	25.8	25.8	24.5	22.1	19.0	16.4	15.8	17.1	19.4	21.5	23.1	25.1

Table 5
Mean Daily Temperature (Minimum)
RAN Albatross

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Mean Rainfall (mm)	15.9	16.3	19.8	12.1	9.7	7.5	6.2	6.7	8.3	10.6	12.6	14.6

Wind Data

Site Specific Wind Data

Wind data was collected on the site during June 2001 to May 2002 as part of the PRP No. 7 project. The data included measurements of wind speed, wind direction and temperature. On an annual basis the predominant winds are from the west with winds also from the west-north-west, north-west, west-south-west and east. This pattern is seen in autumn in spring. In summer the easterlies and westerlies are dominant. In winter the westerlies are the most common.

Synthetic Wind Data

A synthetic, site-specific meteorological data set was created by Holmes Air Sciences using The Air Pollution Model (TAPM) developed by CSIRO as part of the PRP No. 7 project. TAPM is a prognostic model which includes synoptic information determined from the six hourly Limited Area Prediction System (LAPS). On an annual basis the

dominant winds are the west and west-north-west. This is true of all seasons except summer where winds from the northeast and southeast are most common. These data show a similar pattern from the on-site data although the occurrence of easterlies which would carry the odour from the ponds to the town under poor dispersion conditions is not as dominant.

Gerroa Wind Data

Data collected in 2000 at the Gerroa tip by Vivendi Water were also reviewed by Holmes Air Sciences as part of the PRP No. 7 project, and it was considered that these provided a more representative dataset (in terms of similarity to the on-site data) than the TAPM data.

Atmospheric Stability

The rate at which an emission disperses depends on the wind speed and the prevailing atmospheric stability class.

Katabatic Drift

Local terrain can affect the movement of air by generating so-called katabatic, or drainage flows. These are usually generated at night when the wind is light and skies are clear. Under these conditions the ground will cool by radiating heat to space. The cooled ground will then chill the air close to it making that air denser than the air further from the ground. If the ground is sloping then the air close to the ground will be denser than the nearby air at the same height above sea level, but a different height above the ground. The result will be that the dense air close to the surface will begin to drift down the slope. Katabatic drift often follows the same direction of the watercourses.

In the case of the subject site, the general direction of the katabatic drift will be towards the east along the course of the river. This is reflected in the meteorological data which show a high frequency of westerly winds in winter, when drainage flows are most common.

7.1.2 Topography

The factory site is located on the southern part of the northern Shoalhaven floodplain approximately 500 metres east of Bomaderry. The site is developed for industrial purposes. The Environmental Farm is flat to gently undulating with slightly elevated areas representing current and former banks of streams, with low lying areas mainly swampy. The floodplain is dissected by drainage lines and depressions.

7.1.3 Geology

The site consists of quaternary alluvium eroded and deposited by the Shoalhaven drainage system. The soils are derived mainly from eroded sandstone and shale overlying buried estuarine sediments. This part of the alluvium system, east of Bomaderry, was drowned during rises in sea level in the recent geological past. The Permian geological sequence is found adjacent to the west of the township of Bomaderry and at Coolangatta Mountain and consists of Trachytic fill with pebbly band and siltstone, shale and sandstone. The rock sequence has been dissected by the Shoalhaven drainage system.

7.1.4 Soils and Subsurface Conditions

The Shoalhaven Starches' plant site is located within a broad floodplain environment and is underlain by deep alluvial and marine deposits associated with the adjacent Shoalhaven River. The river is likely to have meandered from its present position, resulting in a complex depositional consisting of back swamps, levee banks and erosional channels. In addition, the confluence of Bomaderry Creek with the Shoalhaven River may have developed a complex sedimentary history.

The 1:250,000 Wollongong Geological Sheet indicates the site is underlain by transported material comprising alluvium, gravel, swamp deposits or sand dunes underlain by the Berry Formation (Siltstone, Shale or Sandstone), a member of the Shoalhaven Group of Rocks.

Coffey Geotechnics (**Annexure E**) have undertaken an investigation of the subsurface conditions of the subject site.

According to Coffey Geotechnics the generalised subsurface conditions encountered within the portion of the plant being assessed from

the test pits are summarised below:

ASPHALT	Typically within the depth interval between 0 to 0.2m at sampling locations CTP1 to CTP6.
CONCRETE SLAB	Typically within the depth interval between 0.1 to 0.55m at sampling locations CTP1 to CTP6.
FILL – BEDDING SAND	SAND: fine to medium grained, yellow-brown, encountered at sampling locations CTP2, CTP3 and CTP4 typically between the concrete slab and alluvium to depth interval between 0.4 to 0.6m.

**FILL – DISTURBED
ALLUVIUM**

Silty SAND/Gravelly Silty SAND/Gravelly SAND: fine to medium grained, dark brown, yellow brown, dark brown-grey, with fine to medium grained gravel, encountered at each test pit location (except CTP4) to depths between 0.5m to 0.75m. Typically encountered below the fill and on the surface where the natural sands have been disturbed and partially mixed through fill placement activities, surface disturbances such as trafficking and the recent removal of asphalt and concrete slabs for test pitting purposes.

ALLUVIUM

Silty SAND: fine to medium grained, dark brown, pale brown, brown, brown grey-orange, brown-dark brown, brown-dark brown-grey, encountered at all sample locations to depths between 0.6 to 2.15m.

The surface samples (SS1 to SS6) comprised of similar materials as that described for the 'Disturbed Alluvium' layer. No unusual odours were noted in soils during the sampling. No groundwater was encountered within the sampling locations.

Apart from the fill, the subsurface conditions encountered are consistent with the published geological information.

7.1.5 Acid Sulphate Soils

Potential acid sulphate soils are characterised by the presence of iron sulphide and jarosite. The sulphides are maintained in a stable state when completely waterlogged, ie. below the water table. If the water table falls however, air can penetrate the sulphide material, oxidising eventually to sulphuric acid.

Under the "*Acid Sulphate Soils Advisory Circular*" (Circular No. F11, Department of Planning) a number of options are outlined to manage areas containing acid sulphate as potential acid sulphate soils. Areas with this potential should select compatible land use techniques that do not result in a lowering of the water table. A high water table should be monitored and maintained. Better drainage management should also be included to prevent the formation of acid sulphate soils and prevent affected sites being over drained. Ameliorating acidity can also be achieved by neutralising the pH of the soil, traditionally achieved with the use of lime.

A review has been undertaken of the Department of Land and Water Conservation Acid Sulphate Soil Risk Map for Burrier/Berry (Map No. 2 Edition 2) as it relates to the subject site. The site is shown as comprising "AI4" (Alluvial Levee Elevation 4 metres) characteristics.

The site is mapped as having a low probability of occurrence of acid sulphate soils within the soil profile. The maps indicate that the environment of deposition is generally not suitable for the formation of acid sulphate soil materials. Soil materials are often Pleistocene in age. If acid sulphate soils are present, mapping indicates that they would be sporadic and may be buried by alluvium and windblown sediments, and would be at depths greater than 3 metres below ground surface.

In terms of environmental risk, the mapping indicates that this type of landform is not expected to contain acid sulphate soil materials, therefore land management is generally not affected by acid sulphate soils.

There is the potential for highly localised occurrence of acid sulphate soil materials to be found, especially near boundaries with environments with high probability of occurrence. Disturbance of these soil materials will result in an environmental risk that will vary with elevation and depth of disturbance.

Estuarine bottom sediments of the Shoalhaven River lie within about 50 m to 80 m south of both sites and these sediments are mapped as having a high probability of occurrence of acid sulphate soils. This high probability zone is described as posing a severe environmental risk if acid sulphate soil materials are disturbed by activities such as dredging.

Coffey's undertook ASS Screening Tests for the Flour Mill site. The results of the ASS Screening Tests are included in their report titled "Geotechnical and Acid Sulphate Soil Assessment" which forms **Annexure E**. This matter is further addressed in Section 8.8 of this EA.

7.2 WATER ENVIRONMENT

7.2.1 Catchments

The subject site is located within the Shoalhaven River floodplain which has an overall catchment of 7000 km². The majority of the catchment is upstream of the site, with the headwater about 50 km inland of Moruya. These waters flow in a northerly direction, turning east and discharging into the Pacific Ocean at either Shoalhaven Heads, or

through the Crookhaven River via Berry's Canal when the river opening at Shoalhaven Heads is closed.

7.2.2 Drainage

The existing Shoalhaven Starches plant is situated on the northern bank of the Shoalhaven River adjacent to Pig Island. The plant is approximately 15 km from the mouth of the river and 6 km upstream of Broughton Creek's confluence. Abernethy's Creek is located on the western edge of the plant and Bomaderry Creek is approximately 500 m upstream both flowing into the Shoalhaven River.

The Shoalhaven River catchment covers a large area rising from the tablelands region around Canberra and Goulburn and flowing approximately 250 km to reach the Crookhaven River and the Shoalhaven Bight. The Tallowa Dam provides a large water storage and is located about 70 km upstream. The dam results in a reduction of river flow of approximately 200 ML/day (GHD, 1993).

Saline ocean water intrudes about 30 km upstream from the coast. The extent of saline intrusion depends on the river flow rate, tidal conditions and whether the Shoalhaven Heads entrance is open or closed.

The Shoalhaven River has a permanent mouth at Crookhaven Heads, just downstream of the confluence of the Shoalhaven and Crookhaven Rivers and an ephemeral opening at Shoalhaven Heads which is normally open after major floods but then becomes closed by sand pushed up by ocean waves.

The Shoalhaven River between Nowra and the coast flows through a flat coastal plain.

Originally, there were extensive freshwater and brackish swamps to the north and south of the estuary. These have been cleared and drained to establish agriculture (principally dairy farms). Two creeks (Broughton Creek and Bomaderry Creek) flow into the river below Nowra, as well as numerous small drains.

The depth and width of the river determine the volume of water at different stages of the tide, and also the proportion of saline water in the estuary. In turn, these factors have a strong influence on mixing and water quality in the estuary. The physical characteristics of the river are discussed below. The volume increases almost linearly with distance downstream. The total volume for this stretch of the river varies between 37,500,000 m³ at low water and 48,000,000 m³ at high water. This means that over 10,500,000 m³ of seawater enters and leaves the river each tide cycle, creating a flushing effect.

Freshwater flows sufficient to cause flushing of the river can occur from once to seven times per year. The fluctuating pattern of releases of freshwater from the Tallowa Dam to the Shoalhaven River and flushing and mixing rates changes the estuarine water quality and effects on biota. Consequently, the Shoalhaven River is constantly in a state of change.

A wetland is located adjacent to Broughton Creek on the Company's Environmental Farm located opposite the subject site. It covers an area of 5 – 10 ha and has been identified as a SEPP No. 14 wetland (No. 369).

The factory site is divided by Abernethy's Creek which drains into the Shoalhaven River at the site, and has a catchment which drains from Cambewarra Mountain approximately 6.5 kilometres to the north west. The western boundary of the development site comprises Bomaderry Creek which also drains into the Shoalhaven River at the site. The catchment of Bomaderry Creek also extends to Cambewarra.

7.3 FLOODING

The Shoalhaven floodplain has a history of significant flooding. The largest recent flood in March 1978 had a flood level estimated at 4.2 metres AHD adjacent to the subject site.

The Lower Shoalhaven River Flood Study undertaken on behalf of the Public Works Department (PWD) in 1990 provides estimates of design flood levels adjacent to the plant. Results from that study were used in a flood study undertaken by BHP Engineering (1989) to address location of alternative floodways. In that report (BHP 1989) the twenty-year average recurrence interval (ARI) (5% annual exceedance probability) flood level in the Shoalhaven River was estimated to be approximately 4.2 m AHD at the site. The 50 year ARI was estimated to be 4.8 m AHD while the 100 year ARI was estimated to be 5.3 m AHD.

Flooding generally within this area occurs initially as a result of a breakout from the Shoalhaven River via Broughton Creek and an unnamed drain. As the water level in the Shoalhaven River rises, the flow discharging through Broughton Creek and the drain increases. It has been previously estimated (BHP Engineering 1989) that flows past the Shoalhaven Starches' factory site for instance are in the order of 83 m³/s for the 20 year ARI event, 257 m³/s for the 50 year ARI event and 490 m³/s for the 100 year ARI event.

The Shoalhaven floodplain has a history of significant flooding: floods considered to be of significant magnitude in the area during the past 20 years were recorded in August 1974; June 1974; October 1976; March 1978; April 1988; and August 1990. Of these

floods several would have flowed onto the northern floodplain of the Shoalhaven River within the vicinity of the site. The largest recent flood, in March 1978, had a water level estimated to be 4.2 m AHD within the vicinity of the site.

A flood history at Nowra Bridge for the period from 1860 to 1980 (PWD) indicates 8 floods exceeded a level of 4.9 m AHD at the Nowra Bridge, and these floods were highlighted in the EIS prepared by GHD (1994) for the Ethanol Stage 3 Project approved by the Minister in 1994.

Water discharges from the river and spreads out onto the northern floodplain of the Shoalhaven River. The flow velocity on the floodplain decreases significantly as the water spreads over the floodplain. The Shoalhaven River Flood Study (PWD 1990) indicated that for the 100 year ARI event a flow velocity in the order of 0.2 m/s would occur in the area of the existing effluent holding ponds, the flow velocity would be reduced to about 0.1 m/s for the 50 year ARI event and that there would be no flow in the area adjacent to the effluent ponds for a 20 year ARI.

This EA is supported by an assessment of the flooding impacts associated with this proposal and this is included as **Annexure F** to this EA. This matter is further discussed in Section 8.6 of this EA.

7.4 MORPHOLOGY, BANK STABILITY AND GEOTECHNICAL INVESTIGATIONS

A bank erosion and morphology study of the Shoalhaven River was undertaken by the Public Works Department (PWD) in 1988. In the area of the Shoalhaven River adjacent to the site it was found that the banks have been relatively stable. Between the period of 1949 to 1984, it was estimated that the bank retreated by some 10 m (*i.e.* 0.27 m/yr). If bank movement continued to a point where property damage is a concern then bank protection works would be required to be designed and constructed in consultation with Council and the DLWC.

In terms of construction of the proposal, Coffey's have undertaken a geotechnical investigation of the construction site in terms of the stability of the northern bank of the Shoalhaven River. The details of these investigations are included in **Annexure J** to this EA.

8.0 KEY ISSUES

The following section of the EA addresses those key issues as outlined in the requirements of the Director-General of the Department of Planning Requirements for the Environmental Assessment for this proposal. A copy of these requirements is held in **Annexure A** to this EA.

8.1 AIR QUALITY

GHD's air impact assessment is contained in their report titled "*Air Quality & Environmental Management Report*" which forms **Annexure G** to this EA. This section of the Environmental Assessment is based upon the findings of the assessment undertaken by GHD.

GHD was commissioned by Shoalhaven Starches to undertake an air quality assessment of the proposed Flour Mill. GHD's scope of work addresses:

- Odour emissions;
- Particulate matter emissions;
- Greenhouse gas emissions;

8.1.1 Odour Emission Assessment

GHD was commissioned to undertake a screening level impact assessment for odour emissions associated with the operation of the proposed Flour Mill. Emission points to air associated with the proposed Flour Mill are detailed in **Table 6**.

Table 6
Emission Points – Flour Mill

No.	Description	Air Pollution Control System	Air flow (m ³ /min)
1.	Pneumatic fan and filter used to transport the milled wheat/flour from the roller mills	Cyclone and fabric filter	450
2.	As above.	Cyclone and fabric filter	170
3.	Aspiration points on each roller mill, flour collection conveyors, and filter flow collection conveyor.	Cyclone and fabric filter	150
4.	Cleaning section for incoming wheat.	Cyclone and fabric filter	400

Odour Emission Rate

A comprehensive odour audit is currently being conducted by GHD for the overall Shoalhaven Starches operations to identify odour sources and recommend mitigation actions where required.

GHD indicate that odour emissions associated with the existing on-site flour handling process would be representative of the odour emissions expected from the proposed Flour Mill, with the exception being that the mill might be slightly more odorous as it would be operated under warmer process conditions than the existing system. Consequently, a conservative approach has been taken to account for this potential increase in volatile odour emissions, by doubling the odour emission rate associated with the existing flour handling processes.

The significant sources of odour associated with the existing flour handling process include exhaust points for the flour bin motor drive, flour bin aspirators and the flour day bins. Odour emission rates from the existing grain silo were also included as part of this assessment as the proposed Flour Mill would include the addition of two smaller grain silos.

Table 7 details the measured odour emission rates associated with the existing flour handling processes.

Table 7
Odour emission inventory – existing flour handling processes

Odour Source	Measured Odour Emission Rate (OU/s)
Grain silo	180
Flour day bin (5 of)	680
Flour bin motor drive	280
Flour bin aspirator (2 of)	1000
Total	2140

The total odour emission rate detailed in **Table 7** represents the odour emissions associated with the handling of flour currently received on site.

To better represent the odour emission rates anticipated for the proposed Flour Mill, the emission rate detailed in **Table 7** (2140 OU/s) was doubled to account for the potential increase in volatile odour emissions as a result of warmer operating conditions at the

Flour Mill. This equates to a total odour emission rate for the Flour Mill of 4,300 OU/second.

Odour Emission Impact Assessment

The total odour emission rate for the Flour Mill of 4,300 OU/second equates to <0.1% of the existing total odour emission rate for the Shoalhaven Starches facility (excluding emissions from the Environmental Farm).

In addition to being a negligible odour source in terms of odour emission rate, emissions from the Flour Mill would be likely to have a neutral hedonic tone, which is to say that the odour would be regarded as being neither unpleasant nor pleasant.

Even with consideration given to potential future reductions in odour emissions from Shoalhaven Starches as a result of the implementation of various mitigation measures, the contribution from the Flour Mill would still according to GHD, be likely to be a negligible odour source. For example, if the overall odour emission rate at the site were reduced by 90% the contribution from the Flour Mill would still be <1% of total site emissions. Although the emissions from the Flour Mill would be negligible in the context of the existing site operations, the emissions could be considered for inclusion in any future collective treatment process developed for the site, although the benefits would be marginal.

GHD conclude that odour emissions from the proposed Flour Mill would not have a significant incremental or cumulative odour impact at the Shoalhaven Starches site. This conclusion is further supported by the fact that other Flour Mills operated in NSW (including three operated by the Manildra Group) are not specifically regulated for odour emissions associated with the flour production process.

8.1.2 Particulate Matter Assessment

GHD was also commissioned to undertake a screening level impact assessment of particulate matter emissions associated with the operation of the proposed Flour Mill.

According to GHD all exhaust discharge points (refer to **Table 6**) on the proposed development would be equipped with Buhler Airjet filters, which are capable of achieving an in-stack particulate concentration of substantially less than 50 mg/m³ when operated in accordance with the manufacturer's instructions. The removal efficiency of the fabric filters would also be dependent on site-specific factors such as particle size, particle characteristics, electrostatic charging, mass rates and filter loading.

The *Protection of the Environment Operations (Clean Air) Regulation 2002* prescribes an in-stack standard of concentration for solid particles (or total suspended particulates) of 20 mg/m^3 . The *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (2005) prescribes environmental impact assessment criteria for total suspended particulates of $90 \text{ } \mu\text{g/m}^3$ (annual average) and fine particulates of $50 \text{ } \mu\text{g/m}^3$ (24hour average) and $30 \text{ } \mu\text{g/m}^3$ (annual average), which must not be exceeded at the nearest sensitive receptors. The proposed short Flour Mill emissions would be required to comply with these standards.

Existing Particulate Emissions

Existing particulate emission sources at the site were identified through discussion between GHD representatives and Manildra staff. The significant sources, and their emissions of fine particulate matter (PM_{10}) and total suspended particulates (TSP), are identified in **Table 8**.

Table 8
Existing Particulate Emissions

Significant Emission Source	Year	PM_{10}		TSP	
		Concentration (mg/m^3)	Mass Emission Rate (g/s)	Concentration (mg/m^3)	Mass Emission Rate (g/s)
Coal-fired boiler No. 2	2002	144	0.43^1 0.86^2	498	1.47^1 2.94^2
	2007	80.9	0.40	365	1.81
Coal-fired boiler No. 4	2002	–	1.20	–	4.12
	2007	61.1	0.53	136.3	1.21
Coal-fired boilers No. 5 & 6	2002	–	1.62	58.75	1.62
	2005	10.0	0.22	20	0.44
	2006	9.3	0.26	37	1.04
Total (minimum)	–	–	1.15	–	3.12

Notes: 2002 data obtained from Proposed Pollution Reduction Program No 7, Environmental Impact Statement, Air Quality Impact Statement (2002); 2005 data is mean data from the 2005 Environment Protection Licence Annual Return; 2006 data is mean data from the 2006 Environment Protection Licence Annual Return; 2007 data obtained from monitoring undertaken by Stephenson Environmental Management Australia on 20 April 2007; 1 – Annual average; 2 – Short term average.

The Air Quality Impact Statement from the Proposed Pollution Reduction Program No 7 (PRP7) Environmental Impact Statement (EIS) concluded that the maximum predicted ground level concentrations for TSP and PM₁₀ would comply with the relevant impact assessment criteria, as detailed in **Table 9**.

Table 9
Maximum Predicted Ground Level Particulate Concentrations

Pollutant	Averaging Period	Air Quality Goal	Maximum Predicted Ground Level Concentration – Incremental	Maximum Predicted Ground Level Concentration – Cumulative ¹	Compliance
PM ₁₀	24 hour	50 µg/m ³	32.6 µg/m ³	46.8 µg/m ³	Complies
PM ₁₀	Annual	30 µg/m ³	10.0 µg/m ³	24.2 µg/m ³	Complies
TSP	Annual	90 µg/m ³	25.6 µg/m ³	–	Complies

Source: Proposed Pollution Reduction Program No 7, Environmental Impact Statement, Air Quality Impact Statement (2002).

Notes: 1 Including background data obtained from PM₁₀ monitoring at Albion Park of 14.2 µg/m³

Anticipated Flour Mill Emissions

Particulate emissions from Manildra's existing flour mill at Manildra, NSW, were measured by Stephenson Environmental Management Australia (SEMA) on 16 April 2007, to provide data on which to base the impact assessment. Measurements were taken from the cleaning, pneumatic and mill baghouses. The baghouses are considered to be representative of the baghouse specifications proposed for the short Flour Mill at the Shoalhaven Starches site. The results of the monitoring are summarised in **Table 10**.

Table 10
PM₁₀ and TSP In-stack Emissions, Manildra Flour Mill

Source	PM ₁₀		TSP	
	Concentration (mg/m ³)	Mass Emission Rate (g/s)	Concentration (mg/m ³)	Mass Emission Rate (g/s)
Cleaning Baghouse Run 1	1.0	0.011	0.9	0.009
Cleaning Baghouse Run 2	0.1	0.002	0.8	0.009
<i>Mean</i>	<i>0.55</i>	<i>0.007</i>	<i>0.85</i>	<i>0.009</i>
Pneumatic Baghouse Run 1	0.1	0.001	2.0	0.0189
Pneumatic Baghouse Run 2	0.2	0.002	0.5	0.0045
<i>Mean</i>	<i>0.15</i>	<i>0.0015</i>	<i>1.25</i>	<i>0.012</i>
Mill Baghouse Run 1	< 0.02	< 0.0004	0.7	0.003
Mill Baghouse Run 2	< 0.02	< 0.0004	0.04	0.0002
<i>Mean</i>	<i>< 0.02</i>	<i>< 0.004</i>	<i>0.37</i>	<i>0.0016</i>

According to GHD, it is apparent from **Table 10** that emission concentrations and mass emission rates from the existing flour mill at Manildra are low for both PM₁₀ and TSP. Mean PM₁₀ emissions were highest from the cleaning baghouse (0.55mg/m³), while mean TSP emissions were highest from the pneumatic baghouse (1.25mg/m³).

The proposed short Flour Mill development would have four baghouses to control emissions to air. The worst-case emissions scenario has been based on an assumption that all four baghouses would have the same performance as the worst-performing baghouse at the Manildra site (as detailed in **Table 10**). Consequently, the total anticipated worst-case emissions from the short Flour Mill have been calculated as being four times the worst case mean level detailed in Table 5, and would be:

- ▶ PM₁₀ – 0.028 g/s; and
- ▶ TSP – 0.048 g/s.

Particulate Emission Impact Assessment

In Stack Concentration

The monitoring data obtained from the existing flour mill at Manildra, NSW (detailed in Table 10) shows a maximum mean in-stack TSP emission concentration of 1.25 mg/m³. As this emission data is considered by GHD to be representative of the emissions

expected from the proposed short Flour Mill at Shoalhaven Starches, GHD conclude that the TSP emissions from the development would comply with the in-stack standard of concentration (20 mg/m³) prescribed by the *Protection of the Environment Operations (Clean Air) Regulation 2002*.

Environmental Impact

Comparing the worst-case emissions against the existing site total particulate emissions (detailed in **Table 8**), GHD state it is apparent that the proposed Flour Mill emissions would represent an additional:

- ▶ 2.4% of the existing PM₁₀ mass emission rate; and
- ▶ 1.5% of the existing TSP mass emission rate.

Maximum predicted ground level particulate concentrations would, at worst, be expected to increase in direct proportion to the additional emissions. According to GHD this a highly conservative assumption given that the location of the maximum incremental impact associated with the boilers and proposed Flour Mill is likely to be different due to the difference in the emission source release parameters. The maximum predicted ground level particulate concentrations during operation of the short Flour Mill are detailed in **Table 11**.

Table 11
Maximum Predicted Ground Level Particulate Concentrations

Pollutant	Averaging Period	Air Quality Goal	Maximum Predicted Ground Level Concentration – Incremental	Maximum Predicted Ground Level Concentration – Cumulative ¹	Compliance
PM ₁₀	24 hour	50 µg/m ³	32.6 µg/m ³	46.8 µg/m ³	Complies
PM ₁₀	Annual	30 µg/m ³	10.0 µg/m ³	24.2 µg/m ³	Complies
TSP	Annual	90 µg/m ³	25.6 µg/m ³	–	Complies

Conclusion

It is apparent that the dominant particulate emission sources at the Shoalhaven Starches facility are the coal fired boilers, and particularly boilers No 2 and 4.

The proposed short Flour Mill would only marginally increase PM₁₀ and TSP emissions above existing levels, and the associated maximum predicted ground level concentrations would still comply with the relevant air quality goals. Consequently, it is

considered that the proposed development would have a negligible impact on particulate emissions and concentrations in the vicinity of the site.

Recommendations and Mitigation Measures

Notwithstanding the conclusion that the proposed development would not significantly alter existing air quality in the vicinity of the site, appropriate mitigation measures would be implemented through the construction and operation phases to ensure that air quality impacts would be minimised.

Construction phase

It is anticipated that the application of mitigation measures to reduce dust generation and vehicular emissions during construction would minimise dust generation to acceptable levels. Mitigation measures that would be implemented to minimise potential impacts on air quality include:

- ▶ Visible dust emissions from earth moving and transport activities would be the focus of prompt mitigation through the use of dust-suppressing sprays from water carts.
- ▶ The extent of exposed and unprotected areas would be limited by preserving existing groundcover (through staged clearing) and all disturbed areas would be stabilised as soon as possible.
- ▶ Stockpiles would be kept to a minimum.
- ▶ All haulage vehicles loads would be covered while transporting material to and from the work area.
- ▶ Construction traffic would be restricted to designated areas, which would be covered with a gravel/bitumen surface where practicable and subjected to regular dust suppression (eg. water cart).
- ▶ Where practicable, specific areas of the construction site (e.g. stockpiles) would be fenced with shade cloth to minimise wind erosion and the transport of dust beyond the site boundary.
- ▶ Vehicular speeds would be limited to 15 km / hour on areas of unconsolidated or unvegetated soil associated with the project area; and
- ▶ All construction and administrative vehicles would be maintained in a serviceable condition such that exhaust emissions are minimised.

Operation Phase

GHD recommended that post-commissioning testing be undertaken to assess compliance with the standard of concentration prescribed under the *Protection of the Environment Operations (Clean Air) Regulation 2002*.

8.1.3 Greenhouse Gas Emissions

Greenhouse gas emissions from the proposed Flour Mill would be predominantly associated with the electrical energy required for the operation of the plant, equipment and lighting. The proposal would not alter the total volume or tonnage of raw material transported to the site by train as it would merely substitute wheat deliveries in place of existing flour/millmix deliveries. Consequently this potential emission source has been considered by GHD to be negligible, and has therefore been excluded from this assessment by GHD. The proposed mill would also not utilise steam during the process, and would not directly combust gas or any other fuels. Electricity would be used on site to operate lighting and equipment.

Plant and Equipment Power Requirements

The electrical energy required to operate the new equipment and machinery in the proposed mill was based on the draft Motor List (dated December 12, 2006) provided by Manildra, which is presented in Appendix A of GHD's report which forms **Annexure G** to the Environmental Assessment. Values were estimated for the equipment for which power information was not available, resulting in an increase of approximately 10% in the total power requirement of the listed equipment, to 1.7 MW. The greenhouse gas emissions calculation was based on the following assumptions:

- All plant and equipment would operate 24 hours per day, 365 days per year, except during maintenance and cleaning shut downs.
- All plant and equipment would operate at a loading of 80%.
- Maintenance shutdowns would be scheduled every three weeks, for an eight-hour period (a total of 139 hours per year).

The plant would therefore operate for 8621 hours per year with a corresponding annual electricity consumption of approximately 11,725 MWh, calculated as:

Rated megawatts x loading factor x hours/year.

Lighting Power Requirements

The electricity required for lighting the building was calculated based on the following assumptions:

- The typical lighting requirement for industrial or factory buildings, of 20 W/m² of floor area.
- A floor area of approximately 237 m² (based on a length of 22.8 m and a width of 10.4 m) as calculated from the scale plan on which Figure 1 is based.
- That only one floor in the building would require lighting at any given time, as the lights on each floor would be activated by motion sensors, and there would only be one plant manager on site most of the time.
- That lighting would be required during maintenance shut downs.

The operation of lighting on one floor for 24 hours per day, 365 days per year equates to a total of 8770 hours annually, with an electricity requirement of close to 42 MWh calculated as:

$$(\text{Floor area} \times \text{lighting requirement} \times \text{hours/year}) / 1,000,000.$$

Total Greenhouse Gas Emissions

To calculate the total greenhouse gas emissions associated with the Flour Mill, the sum of the annual electricity consumption figures associated with plant, equipment and lighting (11,767 MWh) was multiplied by the Australian Greenhouse Gas Office (AGO) emission factor for electricity usage in New South Wales of 1.068 kg CO₂-e/kWh (AGO *Factors and Methods Workbook, December 2006*).

The additional greenhouse gas emissions associated with the proposed Flour Mill at the existing Shoalhaven site would be 12,567 tCO₂-e per year.

8.1.4 Conclusion and Recommendations

GHD conclude that:

- *The total odour emission rate for the flour mill would not have a significant incremental or cumulative odour impact at the Shoalhaven Starches site, and would equate to <0.1% of the existing total odour emission rate for the Shoalhaven Starches facility (excluding emissions from the Environmental Farm).*
- *Odour emissions from the flour mill would be likely to have a neutral hedonic tone, which is to say that the odour would be regarded as being neither unpleasant nor pleasant.*

- *All exhaust discharge points would be equipped with Buhler Airjet filters, which are capable of achieving an in-stack particulate concentration of considerably less than 50 mg/m³.*
- *Emissions of total suspended particulates would comply with the concentration prescribed by the Protection of the Environment Operations (Clean Air) Regulation 2002.*
- *The total particulate emission rate for the flour mill would not have a significant incremental or cumulative impact at the Shoalhaven Starches site, and would equate to 2.4% of the existing PM₁₀ emission rate, and 1.5% of the existing TSP emission rate.*
- *The additional greenhouse gas emissions associated with the proposed flour mill at the existing Shoalhaven site would be 12,567 tCO₂e per year.*
- *The development and rigorous implementation of appropriate environmental management measures throughout the construction period would minimise environmental impacts associated with the construction process.*

GHD make the following recommendations in relation to the proposal:

- ▶ *Post-commissioning testing be undertaken to assess the compliance of the Buhler Airjet bag houses with the standard of particulate matter concentrations prescribed under the Protection of the Environment Operations (Clean Air) Regulation 2002.*
- ▶ *All appropriate environmental management measures detailed in this report, together with any other environmental management commitments detailed in the Environmental Assessment document be developed in a Construction Environmental Management Plan (CEMP) and implemented throughout the construction phase.*

8.2 NOISE

This section of the EA is based upon the findings of the Acoustical Assessment prepared by Mr Stephen Cooper of The Acoustic Group. A copy of the Acoustical Assessment prepared by The Acoustic Group forms **Annexure H** to this EA.

According to the Acoustic Group the DEC required the Acoustic Assessment to reference the *Industrial Noise Policy* document, the *Environmental Criteria for Road Traffic Noise* document and the *Construction Site Noise* guidelines from the *Environmental Noise Control Manual*.

Pursuant to the EPA (now DEC) Licence issued for the subject premises there is a requirement under the Industrial Noise Policy (INP), for the company to achieve specific noise contribution levels at four reference residential boundaries nominated to the south and north.

Monitoring carried out by The Acoustic Group has found the Shoalhaven Starches site to comply with the EPA (DEC) licence conditions. To ensure any new plant does not increase the overall noise emission from the site one needs to generate a noise contribution at least 10 dB below the Licence target.

The Pollution Reduction Program (PRP) 7 carried out at the site utilised an acoustic design goal of 10 dB below the EPA Licence conditions. The PRP7 acoustical assessment evaluated noise propagation from the site to reference residential locations under various wind and temperature conditions and determined an effective sound power level for the proposed upgrade with respect to the nominated monitoring areas.

The design goals for 10 dB below the normal noise operating conditions of the plant was nominated by the EPA for the PRP 7 project as:

The $LA_{10(15\text{ minute})}$ sound pressure level contribution generated from the PRP 7 project must not exceed the following levels when measured at or near the boundary of any residential premises:

- *28 dB(A) at locations in Terara on the south side of the Shoalhaven River;*
- *28 dB(A) at locations in Nowra on the south side of the Shoalhaven River;*
- *32 dB(A) at locations in Meroo Street, Bomaderry; and*
- *30 dB(A) at other residential locations in Bomaderry.*

The acoustical assessment in the PRP7 EIS examined, by way of weather data from Stephens Environment Management and determined that in accordance with the EPA's Industrial Noise Policy document, the noise assessment did not require an assessment in terms of wind or temperature inversions, and that the design goals were to be assessed for neutral weather conditions.

The analysis of noise propagation from PRP 7, by way computer modelling using Environmental Noise Model ("ENM"), for neutral weather conditions and consideration of elevated noise sources provided an indication of the effective sound power level of the PRP 7 with respect to the nominated receiver positions. The effective sound power level obtained for that analysis was obtained by the individual point source calculation for four building locations to the effective sound power level shown in **Table 12** below.

Table 12
PRP 7 Elevated Source – Noise Contributions – dB(A)

	Riverview Road	Nobbers Lane	Meroo Road (town)	Meroo Road (hill)
Base Effective Sound Power Level	104	104	108	105

8.2.1 Flour Mill INP Acoustic Design Targets

For the proposed Flour Mill project the residential noise emission target has been set at 14 dB(A) below the EPA Licence reference location targets so as to ensure the Flour Mill project does not increase the site noise emission levels. Therefore for design purposes in a general sense, noise targets 4 dB(A) below the PRP7 targets as set out in **Table 12** above would apply.

The Acoustic Group's assessment is based on the premise that there will be no additional truck traffic movements associated with the proposed Mill and therefore, no requirement for the ECRTN.

8.2.2 Acoustical Assessment

The majority of the equipment is housed in one concrete building with a few holding tanks located external to the building further to the east. The overall design concept identifies different areas of equipment which may be classified as:

- 7 x Four Roller Mills
- 6 x Eight Roller Mills
- 1 x Small Hammer Mill
- 3 x Sifters
- 2 x Air Lifters
- 10 x Screw Conveyors
- 4 x Blowers

For the purpose of assessing the noise controls associated with the nominated plant. The Acoustic Group have run the EM computer model for Shoalhaven Starches for neutral weather conditions to establish in-plant shielding and the attenuation from the Flour Mill to the reference residential locations.

At the EIS stage the manufacturer's noise data for the various plant times have been expressed generally in a dB(A) format rather than octave bands. For this ENM assessment The Acoustic Group have utilised a broadband spectrum to derive attenuation to residential reference locations, and additional noise data from similar plant at the Manildra flour mill.

The building construction is one of solid concrete panels for walls and metal deck roof.

From the analysis carried out by The Acoustic Group of the proposed plant, associated with the proposed Flour Mill the provision of the concrete building without any additional noise control measures would exceed the overall EPA noise limits and obviously the more stringent criteria nominated for the project. According to the Acoustical Assessment carried out by The Acoustic Group attenuation is required to the blower inlet, the roof fan discharges and the external conveyors to satisfy the nominated design limits, leading to the following sound pressure level contributions for the four reference locations.

Table 13
Noise Emission Contributions

	Riverview Road	Nobbers Lane	Meroo Road (town)	Meroo Road (hill)
Ground Floor	-2.1	6.0	6.8	10.9
Motor Floor	-6.8	-5.1	-4.9	-0.8
Roll Mill Floor	-14.1	-12.4	-12.2	-8.1
Spouting Floor	-13.1	-11.4	-11.2	-7.1
Cyclone Floor	-5.1	-3.4	-3.2	0.9
Roof	17.9	19.6	19.8	23.9
External Tanks	13.7	17.6	19.8	19.9
Total	19.3	21.8	22.9	25.5
Four Mill Goal	24	24	28	26

As a result of the analysis undertaken by The Acoustic Group in order to meet compliance with the residential design goals the following noise control measures are required:

- the blower inlet (at ground level) is to have an inlet silencer providing an insertion loss of not less than 20 dB(A);

- the blowers (at ground level) are to be housed in a concrete room that is independent from the external building elements;
- all fan discharges through the roof to have a total sound power noise emission level no greater than 98 dB(A);
- the HP discharge fan No 1 is to have a discharge silencer (vertical discharge) to produce a sound power emission level not less than 96 dB(A) with no tonal characteristics;
- the HP discharge fan No 2 is to have a discharge silencer (vertical discharge) to produce a sound power emission level not less than 94 dB(A) with no tonal characteristics;
- the Mill Aspirator fan is to have a discharge silencer (vertical discharge) to produce a sound power emission level not less than 88 dB(A) with no tonal characteristics;
- the Cleaning Aspirator fan is to have a discharge silencer (vertical discharge) to produce a sound power emission level not less than 88 dB(A) with no tonal characteristics;
- all external chain/bucket conveyors or elevators are to have a total sound power noise emission level not exceeding 106 dB(A);
- the roof of the building is to be a solid concrete floor or of an alternative construction having a weighted noise reduction R_w of not less than 40.

The Acoustic Group anticipate lower internal noise emission level due to the occupational requirements for such plant but as seen by **Table 13** the governing noise emission source are the noise sources external to the building.

8.2.3 Construction Noise

Construction noise is not part of the Licence and utilises different noise indices to that for the operating plant.

The principal noise emission construction activities for the erection of the Flour Mill area associated with the piling and foundation works associated with the proposed concrete slab, and pouring of the slab. The construction of the building proper and fit out of the building generate significantly lower noise levels.

Based on construction of the PRP7 project there will be piles driven throughout the site of the slab where such piles are driven by a pile driving rig.

The total works associated with the slab will take a period of up to 5 weeks, being 2 weeks for the pile driving operations and 2 weeks for the preparation/pouring of the slab. The actual pouring of the slab will take up to 7 days.

This same form of construction (including the driving of piles) has occurred on the Shoalhaven Starches site over the last ten years without receipt of any noise complaints.

On past experience, according to The Acoustic Group it is not envisaged there would be any noise disturbance in relation to the piling operations for the proposed concrete slab, if such operations were restricted to the daytime period.

The Company has an ongoing building works program that has not given rise to any noise complaints and as such the forming and pouring of the slab and any other site works associated with the subject application is not envisaged to generate any noise impacts.

The current EPA Licence conditions relate to criteria derived from night time ambient measurements and the EPA Environmental Noise Control Manual (the "ENCM") that utilised the concept of an average maximum (L10) noise level versus the average minimum (L90 background) level.

Contained in the ENCM are a set of Noise Control Guidelines for various types of noise emission sources. A Construction Site Noise Guideline is set out in Chapter 171 of the ENCM and indicates the following criteria may be specified in a development consent or building application:

The $L_{A10,T}$ noise levels emanating from the construction site shall not exceed the background levels by the following criteria, in the interval specified:

- 20 dB(A) for construction activity period up to 4 weeks
- 10 dB(A) for construction activity period over 4 weeks and up to 26 weeks.
- 5 dB(A) for construction activity period over 26 weeks.

Time Restrictions of Monday to Friday, 7am to 6pm, and Saturday 7am to 1pm if audible on residential premises and no construction work to take place on Sundays or Public Holidays.

The ENCM indicates the $L_{A10,T}$ sound pressure levels shall be measured or computed at any point within one metre of the boundary of the nearest affected residential premises. Measurements shall be made over a 10 to 15 minute interval (T), using the "fast" response of the sound level meter. The $L_{A10,T}$ is the A-weighted sound pressure level which is exceeded for 10 percent of the time over the measurement interval T.

Due to the location of the plant being significantly removed from residential premises and the existing ambient levels, primarily as a result of traffic in the area, according to The Acoustic Group normal construction activities are not envisaged to create a noise impact. However, the proposed concrete foundation slab requires the driving of piles (by a pile rig) into the ground, which creates a greater level of noise than for normal building and excavation works. Notwithstanding the previous pile driving operations complying with the relevant noise targets, the NSW EPA previously required construction noise for the Flour Mill to be assessed.

8.2.4 Noise Emission From Proposed Construction Plant

In order to consider the likelihood of noise emission from the proposed construction, The Acoustic Group utilised noise data from previous projects, as set out in **Table 14** below.

Table 14
Sound Power Noise Emission Levels of Plant Items – dB(A)

Item	Typical Plant or Equipment	Max. Noise Level L₁₀ at 7 metres	Sound Power Level
Bulldozer	Caterpillar D7, D8, D9	88	113
Front End Loader	Wheeled	90	115
Scraper	Caterpillar 631	89	114
Scraper	Caterpillar 651	85	110
Grader	Caterpillar 16	85	110
Compactor	Caterpillar 825	85	110
Crane	Truck Mounted	85	110
Piling Hammer	for piles	93	118
Concrete Truck		83	108
Concrete Pump		84	109
Concrete Vibrators		80	105
Helicopter		78	103

According to the Acoustic Assessment the basis of the noise emission levels set out in the above Table, the total sound power level of the plant is significantly less than the maximum level permitted by the EPA Construction Noise Guideline. The piling operations generate a maximum level 9 dB(A) below that indicated by the permitted sound power level.

Therefore other than the piling operations, all other construction activities would not exceed background +10 dB(A) and therefore would satisfy the EPA secondary criterion of background +10 dB(A) for construction works of 4 – 26 weeks.

8.2.5 Conclusion

The Acoustic Assessment of the proposed Flour Mill prepared by The Acoustic Group concludes:

“An acoustical assessment of the proposed short mill at the Shoalhaven Starches plant has been undertaken with reference to the INP requirements and the EPA Licence for the plant.

For the short mill a design target of 14 dB(A) below the EPA Licence conditions at the residential reference locations has been used. As a result of these design goals the proposed mill is to be housed in a concrete building with silencers specified for the various fan discharges/inlets.

The construction of the short mill will satisfy the EPA construction noise limits as demonstrated previously.”

8.3 WATER AND WASTEWATER MANAGEMENT

8.3.1 Water Consumption

Water is used in the starch production process. Production of starch and protein (gluten) from wheat flour is a water based mechanical separation process, which results in the production of an aqueous waste stream which contains residual fibre, soluble sugars, protein and starch.

In terms of water use it is common industry practice that 10 tonnes of water is required for each tonne of flour processed. Using technology developed at Shoalhaven Starches, water consumption is approximately 3 tonnes per tonne of flour processed.

A daily average of 7,500 kilolitres of water is used by Shoalhaven Starches for their total operations, comprising:

- 6,000 KL from the town water supply; and
- 1,500 KL from a raw water supply provided by Shoalhaven City Council via a pipeline from the Australian Paper Mill.

The moisture content of wheat received at the site would typically be in the range of 8% - 10%, which is too dry for milling. Water would therefore be added to the wheat in a carefully controlled manner to increase the moisture content of the grain to around 15%. The dampened wheat would then be stored in a conditioning or tempering bin where it

would be allowed to remain for a period of time to allow the added moisture to be fully absorbed into the grain. Conditioning of grain would be necessary to:

- assist in the separation of the component parts of the grain by toughening the bran to ensure a clean separation of the endosperm from the bran and germ; and
- allow the reduction rollers to grind the endosperm into flour with the minimum power consumption, and ensure accurate and easy sifting on the following sieving machines.

Shoalhaven Starches estimate, that a flour mill production capacity of 890 tonnes of wheat per day would generate an additional water consumption as follows:

Raw wheat moisture	:	8%
Cleaning flow rate	:	37 t/h
Target moisture	:	15.5%
Water addition	:	3,291 l/h
	=	79 ³
	or	79 KL per day

In terms of the existing site operations, this would represent an increase in water consumption for the overall Shoalhaven Starches factory site of 0.01% per day.

8.3.2 Water Quality Impacts

Water Discharges

The Shoalhaven Starches Factory and Environmental Farm are licensed premises under the Protection of the Environment Operations Act. Wastewater discharges from the site are licensed by the DEC (EPL 883).

The plant has a licensed outfall into the Shoalhaven River. The outfall point is a 50 cm diameter metal pipe discharging at the end of an existing jetty. It also has a cooling water discharge comprising a 50 cm diameter pipe which discharges onto a gabion spillway.

Under the terms of the Company's EPL water waste streams associated with the plant include:

- river water passed through the boiler condensers and the primary side of the heat exchangers;
- boiler water treatment plant regeneration waters; and
- pH adjusted glucose plant ion exchange unit regeneration waters.

All these must be discharged from the cooling water discharges.

The limiting conditions in relation to these discharges include:

- The volume of water discharged from the cooling water discharges must not exceed 100,000 kilolitres per day.
- The waste waters discharged at both points shall not exceed a temperature of 32°C.
- The water discharged from both discharges shall not contain more than 500 micrograms per litre of chlorine; and comprise a pH within the limits of 6.5 to 8.5.

The Flour Mill proposal will not involve any changes to these discharges waters.

Site Stormwater Management

Existing Site Stormwater Management System

Shoalhaven Starches existing site stormwater management system is divided into three zones as detailed on **Figure 7**. The zones are:

- eastern portion of the site – all site stormwater is collected and passed through a first flush pit to remove gross solids and pollutants prior to discharge to the Shoalhaven River;
- central portion of the site – all site stormwater is collected in pits and drainage channels and conveyed to the Environmental Farm where it is stored in dams prior to being irrigated. No stormwater from this zone is discharged to the Shoalhaven River; and
- the Western portion of the site – all stormwater is collected and pumped to the Environmental Farm during small storm events. Stormwater is discharged to the Shoalhaven River during heavy rainfall events.

Construction Stormwater Management

The proposed Flour Mill development would be located entirely within the central portion of the site, and consequently all construction runoff generated at the site during construction works would be conveyed to the Environmental Farm for treatment. No runoff or stormwater would be discharged to the Shoalhaven River. The erosion and sediment controls proposed for the works (refer Section 9.0 of this EA) have been developed by GHD to ensure that construction runoff is contained on site and not discharged to the river.

Operational Stormwater Management

The proposed works would not alter the existing site stormwater management system, and consequently all stormwater generated by the proposed Flour Mill during the operational phase would be discharged to the Environmental Farm.

The proposed Flour Mill would also not increase the volume of stormwater generated from this area of the site during operation according to GHD as the area is currently all surfaced with bitumen.

8.3.3 Wastewater (Condensate) Management

The current approved operation at Shoalhaven Starches generates no more than 1720 ML/year of waste water discharged from the factory to the wastewater storage ponds in accordance with L4.3 of the Company's EPL. This flow is directed to the environmental farm for irrigation. The environmental farm covers 1000 ha of cleared grazing land. The effluent is limed ready for spray irrigation to produce forage, silage and pasture on licensed irrigation areas.

During prolonged wet weather, this effluent is directed to the wet weather storage ponds (capacity 925 ML) also situated within the environmental farm. The wet weather pond system comprises 6 ponds with a combined storage capacity of 925 ML and covering an area of around 15 ha.

For over 10 years, ground water and surface water monitoring has been undertaken across the farm providing a means to investigate irrigation practices.

As a result of this proposal the total flour processed on the site will not exceed the previously approved amount of 10,000 tpw. Consequently wastewater volumes will remain unchanged.

The treatment and management of wastewater from the site is therefore not envisaged to be a key issue that will need consideration as part of the Environmental Assessment.

8.4 HAZARDS AND RISK

In general, risk assessment of industrial developments follows 5 basic steps:

- identification of potential hazards;
- an evaluation of safeguards to minimise the chance of occurrence of the identified hazards and their impact;
- an assessment of the magnitude of the consequences of the identified hazards;

- an assessment of the likelihood of occurrence; and
- an assessment of the risk by a combination of the consequences and likelihoods and comparison with tolerability criteria.

The Department of Planning has prepared a set of guidelines to help determine the level required according to the nature of the development:

- Multi-level Risk Assessment (MRA) describes the level and extent of the analysis reflecting the nature, scale, location of the proposed development;
- Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 provides guidelines on requirements of the analysis;
- Hazardous Industry Planning Advisory Paper (HIPAP) No. 4 provides the adopted risk criteria for land use planning decisions;
- SEPP No. 33 provides a screening tool to determine whether a proposed development is hazardous and offensive, whether it requires a PHA, whether the PHA needs to be qualitative or quantitative and whether a detailed transportation study is required.

As the proposal involves the processing of flour, and given the nature of the existing processes on the existing factory site, the proposal is subject to the provisions of SEPP No. 33 - Offensive & Hazardous Industry. A Preliminary Hazard Analysis has been prepared for this proposal by GHD Pty Ltd and forms **Annexure C** to this EA.

The proposed Flour Mill will generate up to 5,000 tonnes of wheat flour weekly.

The SEPP 33 threshold screening value for dangerous goods according to GHD is not exceeded by the proposed Flour Mill, as no new chemicals would be introduced to the site, other than those already approved. Additionally, as the proposed Flour Mill would not require new chemicals to be introduced to the site, the transportation screening thresholds are not exceeded. As a result, GHD indicate that the proposed development is not potentially hazardous with respect to dangerous goods, and these aspects do not require a PHA.

The qualitative risk assessment/hazard identification study undertaken by GHD identified a number of possible hazard scenarios of high risk due to unacceptable potential consequences and/or possible likelihoods that may result in impacts to surrounding land users. These included:

- Deflagration of wheat dust in storage silo;

- Deflagration of wheat dust in tempering bins;
- Deflagration of wheat dust / flour in bag houses; and
- Deflagration of screening in screenings bin.

The likelihood of the above hazards causing harm to adjacent land users is also dependant on the probability of the presence of a passing vessel on the river.

None of the other hazard scenarios identified by GHD had the potential to present an unacceptable risk to the surrounding land users. Adequate safeguards are required to ensure the high and medium risk scenarios that were identified with potential off site impact are contained or at least controlled to an acceptable level.

Based on the results of the qualitative risk assessment carried out by GHD, particularly the limited potential for the deflagration scenario to occur, it was found that all objectives of Level 1 of the Multi-Level Risk Assessment (1997)[3] were met and that conducting a quantitative analysis (Levels 2 and 3) would not be necessary.

GHD conclude that although there exists a potential for deflagration to cause offsite effects, the scenario of wheat or flour deflagration is considered to be unlikely due to the design incorporating sufficient engineering controls to adequately minimise its low probability of occurrence. Additionally, the occurrence of such a scenario would have to coincide with the presence of a passing vessel on the Shoalhaven River for it to have an impact on adjacent land users.

GHD recommend that all possible safeguards be employed to ensure that the potential for deflagration of wheat and / or flour is minimised. According to GHD there are three strategies for reducing risk:

- Elimination;
- Management; and
- Mitigation.

The complete elimination of the potential scenario is not an option considered for this development, as wheat and flour are the key inputs and outputs respectively for the process. Therefore risk management and mitigation procedures need to be employed.

GHD recommend that management procedures and design considerations be implemented to incorporate practices that would prevent risk scenarios occurring through:

- *“Minimising build-up of combustible materials on-site;*

- *Minimising dust cloud formation;*
- *Ensuring all silos and the flour mill are electrically earthed;*
- *Enclosing plant to prevent the escape and accumulation of dust in the building;*
- *Fitting silos and dust collection systems with explosion relief;*
- *Using antistatic bags in the bag houses;*
- *Providing dust protection to all electricity supply;*
- *Zoning areas appropriately to limit ignition sources associated with electricity supply (zone 20, 21 and 22 according to Australian Standards);*
- *Designing the plant to prevent dust explosions;*
- *Implementing a monitoring and maintenance program; and*
- *Installing a suitable fire protection system.*

Mitigation measures are practices that control the impact after a risk scenario has occurred. It is recommended that emergency management procedures be developed for response to fire and explosion that may be initiated from either on-site or off-site sources.

The risks posed by the deflagration of wheat dust or flour poses an on-site risk. It should therefore be examined in more detail during the design and construction phase of the project."

8.5 TRANSPORT

Traffic Access

Traffic access to the Shoalhaven Starches site is provided via Bolong Road from the Princes Highway. From the Highway, trips distribute to the north and south, as well as to the west (via a northern route through Albion Park to the Hume Highway or via Moss Vale). Light vehicle trips are able to disperse from the site along any route, including Bolong Road eastbound for trips to the north (via Gerringong). Heavy vehicles are not permitted to use Bolong Road (eastbound) for regional trips.

Heavy vehicle trips use the following regional routes: -

North

- Via Bolong Road, Railway Street, Cambewarra Road and Meroo Road to the Princes Highway

- Via Bolong Road and the Princes Highway (B-double restrictions apply in Railway Street, Cambewarra Road and Meroo Road)

South

- Via Bolong Road and the Princes Highway south
- Via Bolong Road, Railway Street and Cambewarra Road (through Moss Vale)
- Via Bolong Road and the Princes Highway north through Mount Ousley and Wilton for B-doubles
- Via Bolong Road and the Princes Highway south to Nowra businesses or driver residences (no B-double route south of Nowra)

West

- Via Bolong Road and the Princes Highway north (B-doubles through Mount Ousley and Wilton)
- Via Bolong Road, Railway Street and Cambewarra Road (through Moss Vale)

Site Access

Access to the site for heavy and light vehicles is provided via three separate access points to Bolong Road. Vehicle movements to these access points remain constant throughout the week; some small access changes occur when the train is stopped on-site, requiring vehicles to [occasionally] depart via a different access point during that period.

Access Point 1 is located at the eastern end of the Site. The intersection of this access point and Bolong Road is designed as a Type “C” intersection (as described by AustRoads in the *Guide to Traffic Engineering Practice Part 5*).

Access Point 1 provides access for:

- Staff vehicles to the primary staff car park (arrival and departure);
- Ethanol trucks (arrival and departure);
- Brewers trucks (arrival and departure);
- Glucose trucks (arrival and departure);
- Starch trucks (arrival and departure).

Access Point 2 is located just to the east of the railway line, and directly adjacent to a drainage culvert (Abernathy's Creek). The intersection is designed as a Type "A" intersection (as per AustRoads).

Access Point 2 provides access for: -

- Staff vehicles (minimal);
- Brewers trucks (departure only);
- Bulk starch (arrival and departure);
- Glucose trucks (departure only).

Access Point 3 is located at the end of a spur road that leads from the primary *Shoalhaven Starches* site around behind smaller industrial units to a point adjacent (west) to the Cleary Bros Concrete site. The spur continues to an intersection with Bolong Road. The intersection is designed as a Type "A" intersection (as per AustRoads), though the road reserve is not fully sealed.

All flour and mill feed currently transported to the site is undertaken by rail. Under the proposal all wheat that is to be imported to the site for processing will also be brought into the site by rail. Under these circumstances it is envisaged that the Flour Mill proposal will not have any effect on the level of heavy vehicular traffic attracted to the site. Under these circumstances the proposal will not result in any increase in heavy vehicle movements to the site.

The proposed Flour Mill will result in the employment of an additional eight employees; which is likely to generate a additional eight two-way trips per day. These vehicular movements are likely to be divided between access 1 and 3. Such is considered a insignificant increase in traffic in light of the existing employee vehicle movements.

As outlined in Section 6.6 of this EA, there is ample on-site parking available for the increase in employees.

Rail

Along the southern edge of the site is a private rail line with two sidings. The line originates from Bomaderry, and is joined at Bomaderry to the main South Coast line from Sydney. Under current operations, trains arrive and depart at the Manildra site as follows:

- (i) Arrive at 3:00 am and depart at about 10:00 am. Presently these trains usually run on Tuesday and Thursday.

- (ii) Arrive at about 3:00 pm and depart at about 10:00 pm. Presently these trains run every day except Saturday.

All flour and mill feed currently transported to the site is undertaken by rail. Under this proposal all wheat that is to be imported to the site will also be transported to the site by rail. As the amount of flour produced from the wheat transported to the site will simply substitute flour currently brought to the site there will therefore be no change in frequency of train movement to and from the site as a result of this proposal, only the time tabling of train movements may need to be altered subject to the requirements of the State Rail authorities.

8.6 FLOODING

The site is located on the northern bank of the Shoalhaven River adjacent to Abernathys Creek and on the southern side of Bolong Road. The site is within the 1% annual exceedance probability (AEP) floodplain of the Shoalhaven River as defined in the *Lower Shoalhaven River Flood Study* (April, 1990) which was prepared by Webb, McKeown & Associates (WM) for Public Works.

During major rainfall events, runoff from the Shoalhaven River catchment enters the site from the south and from the Bomaderry Creek catchment to the west. Once the banks of the Shoalhaven River and Bomaderry Creek are overtopped, floodwaters pass over the site, between the existing plant and associated buildings and towards Bolong Road. Once Bolong is overtopped, floodwaters continue north, spreading out over the low-lying floodplain. Ultimately the floodwaters return back to the Shoalhaven River further downstream of the site. The northern floodplain is also inundated from local catchment runoff directly entering the floodplain. The main contributor is Broughton Creek.

The largest floods in recent times have been in August 1974, June 1975, March 1978 and April 1988. These events would all have overtopped the river bank (in parts) and caused overbank inundation. Of the four, the largest was March 1978 which reached approximately 5.0 m AHD near the site.

In addition to the existing plant and associated buildings at the subject site, other development is evident on the Shoalhaven River floodplain in the vicinity. This includes a concrete batching plant (Cleary Bros), a paper mill, the Dairy Farmers complex (now closed), the 5 storage ponds opposite the paper mill, and on the opposite (southern) river bank, the Riverview Road and Terara village flood protection levees. These developments on the floodplain have resulted in a reduction in the available flow area and floodplain storage capacity during a major flood event.

Webb McKeown & Associates have been engaged to investigate mainstream flooding resulting from Shoalhaven River or its major tributaries overtopping their banks and its implications to this proposal. Webb McKeown & Associates report forms **Annexure F** to this EA. The impact of local catchment runoff within the site or from the nearby surrounds (such as Abernathys Creek) has not been addressed. This section of the EA is based upon the findings of this assessment.

8.6.1 Existing Development

Development at the subject site has continued progressively since at least the 1960's. Aerial photography showing the site in 1986 indicates that from at least the early 1980's the extent of development along the immediate northern river bank has been intensive and extensive. The majority of development within the site over that time period has been concentrated around the northern boundary of the site, near Bolong Road.

Development approval for the existing plant and associated buildings within the subject site has, to date, not been subject to detailed hydraulic modelling. Previous assessments have been based upon local flood information and knowledge available at the time. (Development outside the site has required an investigation of hydraulic effects.) In consultation with the then DLWC (now DNR) and Council in 2000 (refer Report titled *"Further Development within the Manildra Starches Plant off Bolong Road, Bomaderry"*, dated October 2000), it was agreed that the Shoalhaven Starches factory site should be regarded as 'existing and approved'. The hydraulic impacts and cumulative effects of any further development (within the site) should be compared to this existing state of development.

The majority of the subject site now comprises an extensive built-up arrangement of plant and associated buildings which would almost completely obstruct the movement of overbank floodwaters through the site. The intensively built-up area comprises approximately 60% of the subject site lying east of Abernathys Creek, south of Bolong Road and to the car park in the east. From examination of the available plans and current aerial photography Webb McKeown & Associates estimates that approximately 80% to 90% of the area within the intensively built-up area provides a total barrier to the movement of floodwaters from the river northwards.

The only opportunity for floodwaters to pass through this built-up area is through the limited number of gaps or openings between the existing plant and associated buildings. These "gaps" or openings generally satisfy trafficability requirements within the site. The capacity of these "gaps" to convey overbank floodwaters through the site would be low due to their meandering path. In addition, the existing fence along the northern site

boundary fronting Bolong Road further obstructs the movement of any floodwaters able to pass from the river northwards through the site.

8.6.2 Proposed Development

The hydraulic impacts of any proposed development on the floodplain according to Webb McKeown & Associates are typically quantified by the use of an appropriate hydraulic model. In this case, the hydraulic impacts and cumulative effects of the proposed development within the intensively built-up area of the Shoalhaven Starches factory site are considered by Webb McKeown & Associates as insignificant.

The extent and density of the existing built-up area is such that the remaining space available for additional development is so limited that the additional hydraulic restrictions provided by the development would be very minor. Hence it follows that it would have only a very minor adverse hydraulic impact and would only add marginally to the overall cumulative effect of the total development. For Webb McKeown & Associates' October 2000 study it was decided in consultation with Council and the then DLWC that provided the proposed development was within the intensively built-up area, hydraulic modelling to quantify the hydraulic impacts and cumulative effects would not be required.

A qualitative assessment of each component of the proposed development carried out by Webb McKeown & Associates further confirms that the hydraulic impacts and cumulative effects are insignificant.

- The proposed 10 m diameter silo is to be located largely in the "shadow" of an approved 11 m diameter silo (this silo has been slightly relocated to accommodate development constraints) and will therefore have only minor impacts on existing flood flow paths.
- The proposed Flour Mill is located so as to minimise any hydraulic impacts as it is largely in the "shadow" of the existing adjoining building. However the eastern section of the building does "close off" a 7 m wide flow path. However it should be noted that there are several other flow paths through the site.

8.6.3 Conclusions

Conclusion from Webb McKeown & Associates' October 2000 Report

The following text is taken from Webb McKeown & Associates' October 2000 report.

"In consultation with Council and the DLWC, it is agreed that any future development of the Manildra Starches Plant within the intensively built-up area, as defined on Figures 2 and 4, will not require hydraulic modelling to quantify the hydraulic impacts and cumulative effects. The hydraulic impacts

and cumulative effects of such developments are considered to be insignificant given the intensive development already present. As mentioned in previous sections, the only opportunity for floodwaters to pass through the intensively built-up area of the site is through the limited number of gaps or openings between the plant and associated buildings. Although these gaps or openings may be relocated to accommodate any future development, the movement of overland floodwaters will never be completely blocked, as gaps or openings similar to those which currently exist will always be maintained for trafficability requirements.

Any proposed future development is not exempt from flood hazard and structural assessment."

Proposed Development

According to Webb McKeown & Associates:

"For the reasons detailed above, hydraulic modelling of the proposed development has not been undertaken and the hydraulic impacts and cumulative effects of this proposal are considered to be insignificant given the intensive development already present. There is a need however, to consider (amongst other things) the flood hazard and structural assessment (with regard to velocity of floodwaters and impact by flood debris) of the proposed development. In quantifying the flood hazard, some important issues for consideration include:

- damage to the plant, including as a result of flood debris or structural failure,*
- damage to the plant due to the possible buoyancy of equipment,*
- malfunction of the plant (or any services on which the plant relies for operation) as a result of inundation and the associated risk of such malfunction to other users of the floodplain,*
- access and evacuation of workers from the site during floods.*

These issues need to be addressed detailed engineering design as part of the Construction Certificate process."

8.7 RIVER BANK STABILITY AND GEOTECHNICAL ISSUES

This section of the EA is based upon a report prepared by Coffey Geotechnics that provides a geotechnical assessment of the stability of a section of the northern bank of the Shoalhaven River in the vicinity of proposed new structures (**Annexure J**). The purpose of this assessment was to advise on the current stability of the river bank in these areas, effect of the development on stability of the river bank and stability of the bank where conditions change (eg. flooding or oversteepening of the bank). The assessment discusses measures that would reduce the risk of failure of the river bank in some circumstances. In the event of failure of the bank occurring the possible effects on

the proposed structures (if developed in the positions shown on the plan) have also been considered.

The assessment does not address foundation conditions for any of the new structures proposed and no additional subsurface investigation was carried out for this assessment.

Stability Analysis

Soil Parameters

The Manildra plant at Bomaderry is underlain by deep alluvial soils to depths ranging from about 15 m to 25 m. A range of soil parameters have been used in the stability analysis based on information from the nearest boreholes (Golder Report, Boreholes S2 and S5), however no new boreholes or soil samples have been taken along the river bank or at the sites of the proposed new structures.

Methods of Analysis

A number of different parameters and various water level scenarios were assessed using the program Slope-W and factors of safety (FOS) in relation to stability of the river bank were determined for each case.

Results of Analysis

According to Coffey's the results of the stability analyses are presented in Figures 3A to 3F of **Annexure J**, together with a summary of results for the various parameters and water levels for the river.

The results show that the river bank under the site conditions of the time of the survey has a marginal factor of safety (FOS) based on the soil parameters adopted. The FOS actually increases if the water level increases but does not overtop the bank during a moderate flood event, provided the bank is not steepened by erosion. However assuming the flood waters dissipate such that there is rapid drawdown of the flood water level back to the high tide mark or possibly lower, then the FOS can fall below 1.0 indicating that failure of the bank could occur during or following drawdown.

Possible Failure Mechanisms

According to Coffey's the river bank would be at significant risk of failure if a significant flood event (PMF) was to occur where water would rise above the existing bank. This would potentially cause collapse of the bank on saturation, even if bank protection (rock facing/revetment) was in place.

The recent failure of the river bank over a section about 20 m in length, (immediately at the downstream end of the section of the river now being assessed), appears to have

failed due to oversteepening of the river bank below the high tide level. Stronger flows in the river, possibly due to a combination of runoff and tidal flows may also have caused the oversteepening of the bank.

Excessive loading of the bank can also increase the risk of failure, however for the proposed development Coffey's understand buildings will be independently supported on deep piles to rock.

Removal of vegetation and subsequent erosion scouring causing oversteepening of the bank could also result in instability of the bank according to Coffey's.

Risk of River Bank Failure

Under normal flow/tidal conditions and with the present river bank profile above and below the high tide mark the risk of failure is considered low. There are a number of mechanisms that could result in failure of the river bank occurring near or adjacent to the proposed site for development. The most likely cause of failure according to Coffey's would be flooding or significant increase in flows in the river, causing erosion and oversteepening the bank, and rapid drawdown of water levels following flooding.

Given the proximity of existing and proposed structures within the Manildra Plant relative to the river bank according to Coffey's, there is always some risk of buildings being affected by failure of the river bank.

The risk of failure can be mitigated to some extent by river bank erosion/scour protection and founding of all structures independently on piles to rock, assuming that the piles could survive some undercutting of the bank and loss of lateral support.

Recommendations

The sites for the proposed silos are close to the river bank and the one nearest the bank is closer to the river than most other permanent buildings in the plant. According to Coffey's no other sites for the silos were suitable. The development of the silos in the positions proposed will involve some risk to the long term performance of the structures. The proposed Flour Mill is set back further from the bank and is located partly within the site of the structure that is to be demolished.

The following measures are recommended by Coffey's to reduce the risk of river bank failure affecting the proposed structures close to the river bank:

- *Continue the recent rock revetment along the river bank using large rocks. The rocks are only to be considered as a lining to reduce the risk of undercutting or oversteepening of the bank and do not act as a retaining wall. The rock lining should extend from the recent works upstream to the jetty. Additional strengthening of the rock lining and*

erosion protection (e.g. using concrete) and concrete apron around the base of the silo nearest the river may be required. Construction of the rock lining would involve removal of vegetation from the banks. This should be carried out in stages (say 10m to 15m at a time) as the rock lining advances and should not significantly disturb or loosen the soils in the bank. Large rocks should not be stockpiled on any part of the bank during this work. Rocks should also not be concentrated in any one part of the river bank, as this could result in localised failure occurring.

- *The new structures should be founded on piles to rock. The silo nearest the river bank should be supported on stiffer piles that allow for possible loss of lateral soil support through the upper 5m to 6m. We would not expect the piles to resist a large deep seated failure of the bank, however in the event of gradual undercutting of the soil below the silo, the stiffer piles could support the silo until remedial works were carried out to restore eroded or failed sections of the bank.*

8.8 ACID SULPHATE SOILS

Coffey Geotechnics Pty Ltd were also engaged to undertake an investigation of the presence of acid sulphate soils below the proposed development site. Their assessment is included in **Annexure E** to this EA. Six soil samples were screened in Coffey's Wollongong Laboratory on 17 April 2007 using the field pH and peroxide test, generally as described in the Acid Sulfate Soil Management Advisory Committee (ASSMAC, 1998) Acid Sulfate Soils Manual and the QLD Department of Natural Resources, Mines and Energy (2004) Acid Sulfate Soils – Laboratory Methods Guidelines. Initially the pH of the soil was tested in a 1:5 solution of distilled water and then also tested following reaction with 30% hydrogen peroxide.

The results of the acid sulfate soil screening tests are presented in Appendix C of **Annexure E** to this EA.

According to Coffey's field pH below 4 can indicate that actual acid sulfate soils are present (i.e. soils in which oxidation of iron sulfides has occurred and have produced acid). Generally a pH drop below 3 following oxidation with hydrogen peroxide indicates the probable presence of unoxidised sulfides in the samples, and for the purposes of the screening test, is taken as an indication of the probable presence of potential acid sulfate soils.

The screening results indicated the following:

- 6 soil samples selected for screening recorded field pH values greater than 5, where sample CTP3/1.2-1.3m recorded the lowest field pH value of 5.04;
- 6 soil samples recorded pH values greater than 3, following oxidation with hydrogen peroxide, where sample CTP5/2.0-2.1m recorded the lowest pH value of 3.27.

In relation to this issue Coffey's conclude:

"Acid sulphate soil risk maps suggest that the area being assessed is in an area with a low probability of acid sulphate soil occurrence. Field screening results also suggested that the soils within the upper 2m of were unlikely to be acid sulphate soils. It is probable that acid sulphate soils could occur at depths beyond those assessed in this study. We understand that the proposed development is unlikely to disturb soils below the existing pavements and some fill materials on the levee/river bank and is therefore unlikely to disturb acid sulphate soil.

Should the proposed depth of disturbance change or different soils be encountered, then this would need to be re-assessed."

8.9 VISUAL IMPACT

The Shoalhaven Starches Factory Site is located on Bolong Road, one of the main gateway entrances to the Nowra/Bomaderry urban areas, and a significant tourist route along this section of the South Coast.

The Scenic Character and Environment

The Shoalhaven Starches factory site is situated on Bolong Road, the gateway to Bomaderry, within an area currently containing a mixture of rural and industrial land uses. These different land uses contrast with each other and result in a mixed visual character.

The rural areas, much of which comprises the Shoalhaven Starches Environmental Farm, are generally flat to gently undulating and planted with pasture grasses. These areas have a typical rural/agricultural character, common throughout the region. To the north and forming a background to the rural landscape are the timbered slopes of the Cambewarra escarpment.

The Shoalhaven City Council Heritage Study 1995 – 1998 prepared by Peter Freeman Pty Ltd in association with JRC Planning Services identified the rural landscapes north of the Shoalhaven River as the Berry-Bolong Pastoral Landscape. This Study described this area as:

"North of the Shoalhaven River the area is dominated by the close relationship between the Princes Highway (formalised by Berry in 1857/1858) and the railway (1893) which were instrumental in determining the location of new homesteads on Berry estate lands which resulted from drainage schemes implemented by Sir John Hay. In the foothills to the north-west, and towards Cambewarra, settlement patterns were in the main determined by the impact of Free Selection after 1861. Sub-zones include the Cambewarra-Tapitallee area, Bellowongarah and the catchment areas of Broughton Creek north of Berry. The latter are focused around communities which developed outside the Berry Estate: Cambewarra, Tapitallee,

Bundewallah, Woodhill and Broughton Vale. The scale and character are dependent on the distribution of small dairy farms, with internal and external boundaries created by modified and natural vegetation (River Oaks), roads, creeks and property boundaries.

Continuing dairy farms has contributed to the survival of the underlying late nineteenth and early twentieth century landscape patterns."

The Shoalhaven Starches factory complex is characterised by typical industrial structures with an overall bulk and scale that dominates the surrounding locality. The site, despite being partially screened by vegetation along Bolong Road, the Shoalhaven River and Abernethy's Creek visually dominates the locality. The development is particularly exposed to view along Bolong Road. This view reveals some of the internal structures within the site including recovery and storage tanks, car park, fermentation tanks and the Ethanol Plant. Overall the appearance of the site is typical of an industrial facility of this nature.

The most relevant vantage points from where the factory site is visible would include:

The Princes Highway – views of the existing factory site are possible from selected locations along the Princes Highway north of Bomaderry, travelling in both a northerly and southerly direction. Whilst the factory site is visible in the landscape, its overall visual impact is reduced by virtue of the distance between the plant; the intermittent nature of the views; a rise in topography which screens the site from view; and vegetation. The site of the proposed Flour Mill, to the rear of the site, will not be visible from the highway.

Burruga (Pig) Island – Burruga Island is situated in the middle of the Shoalhaven River and provides the closest vantage point to the southern boundary of the site. The island however is privately owned and not accessible to the public. Vegetation screening along the riverbank adjacent to the site also reduces the visibility of the existing buildings and structures.

Bolong Road – Bolong Road runs along the frontage of the site. Views of the plant are possible when travelling in both an easterly or westerly direction. Some attempts have been made to provide some tree planting along the boundaries to "soften" the appearance of the development. The existing building forms and structures are however clearly visible to motorists travelling along this stretch of Bolong Road. The Flour Mill however is proposed to be sited to the southern boundary of the site behind the existing factory complex. This proposal will therefore not be visually prominent from Bolong Road.

Nowra Bridge – The Nowra Bridge crosses the Shoalhaven River and provides limited opportunities for views of the factory site. The dominant visual elements from the bridge are the river, vegetation along the riverbanks and the escarpment. The visual impact of the factory site is reduced by distance as well as the bridge structure which permits only glimpses of the site.

Bomaderry urban area – The existing plant is visible from a number of locations within the eastern outskirts of Bomaderry. Bomaderry is slightly elevated and some locations within the urban area do have extensive views of the site.

Terara – Distant views of the plant are possible from a number of vantage points in and around the village of Terara on the southern bank of the river. The visual impact of the site however is reduced by distance, the intervening landform of Pig Island and the vegetated riverbanks. **Plate 3** provides a view of the site from the banks of the Shoalhaven River from Terara.



Plate 3: View of Shoalhaven Starches factory site from Terara.

Riverview Road – Views of the site are available from residential development on the southern bank of the Shoalhaven River. Vegetation along both the northern and southern banks of the river partially screen the site from view. **Plate 4** provides a view of the site from Riverview Road.



Plate 4: View of Shoalhaven Starches factory site from Riverview Road.

Cambewarra Lookout – Cambewarra Lookout is a popular tourist lookout providing panoramic views over the Shoalhaven floodplain and estuary. Shoalhaven Starches, like the other significant industrial sites, is visible from the lookout.

Visual Impact of Proposal

In terms of visual impact of the proposed Flour Mill and associated silos, these are proposed essentially within a developed portion of the site, adjacent to structures of a similar height, bulk and scale.

The proposed structures within the existing factory site are generally of a similar height as the existing structures. The building forms, shapes and characteristics are also similar to those that presently exist on the site, and will conform to the visual character of the site, *i.e.* it is industrial development within an industrial setting (refer **Figure 3**).

Overall it is considered that the proposed works will not create a significant adverse visual impact due, principally, to the existing industrial development. There are however measures which can be implemented to assist in screening and further minimising any visual impact.

- The existing screening vegetation around the site is effective, particularly along the river bank, however additional supplementary plantings of dense bands of native trees and shrubs along the southern boundary of the site with the river (particularly between the river and the proposed evaporator columns) would further reduce the visibility of the development. In this regard a landscape and revegetation plan

should be prepared for that portion of the river bank in the vicinity of the development site.

- Where planting has already been established, measures should be taken to protect existing vegetation during the construction phase.
- In addition to landscaping, new structures can be constructed and treated to reduce visual impact. Where appropriate and possible, buildings and structures should be constructed of similar materials as those previously used on the site and be of a non-reflective nature. Colours should blend with existing structures on the site to ensure visual harmony. In this regard special consideration should be given to the proposed cladding of the evaporators. Consideration should be given to incorporating a cladding colour which will blend with the surrounding locality.

8.10 SITE CONTAMINATION

Coffey Geotechnics Pty Ltd (Coffey's) was commissioned by Shoalhaven Starches to carry out a Preliminary Contamination Assessment for the development site. A copy of the site contamination assessment forms **Annexure E** to this EA.

The objective of this assessment was to provide information on the potential for soil contamination to be present within the portion of the plant to be redeveloped and to make recommendations on the need for further investigation and or remediation, should contamination be present.

The following scope of work was carried out to meet the objectives of this assessment:

A limited site history study which included a walkover of the area where the upgrade works are to take place and holding interviews with persons familiar with the history of this part of the site;

- Field investigations comprising excavation of six test pits, from which the subsurface conditions were logged and soil samples were collected. In addition surface soil samples were also collected from the accessible parts of the levee/river bank;
- Laboratory analysis of selected soil samples for a suite of analytes including Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAH), Polychlorinated Biphenyls (PCB), Organochlorine Pesticides (OCP), Organophosphorous Pesticides (OPP), asbestos and heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); and

- Preparation of this report summarising the limited history, presenting the fieldwork and laboratory results, interpretation of the analytical results and findings, comparing contaminant concentrations to guidelines for industrial land use, providing recommendations on the need for further investigation, remediation and/or management with respect to soil contamination and acid sulfate soils (as applicable).

The contamination assessment carried out by Coffey's makes the following conclusions:

"The results of this preliminary study did not indicate concentrations of a suite of potential chemicals of concern above the adopted soil investigation levels for an industrial land use setting within the soil profile tested. Based on these results it appears that there is a low likelihood of widespread contamination in the soil that would adversely affect the proposed redevelopment works."

"Access to the levee/river bank was poor at the time of the fieldwork and only surface soil samples could be collected. Based on the history of this area and the results of the surface samples it appears that there is a low likelihood that these soils would be contaminated."

8.11 WASTE MANAGEMENT

Shoalhaven Starches since the 1980's have been "value adding" their products from their waste stream. The raw materials for the plant are water and flour. These are mixed and after a separation process, starch (as slurry or dried) and gluten are extracted. Glucose is also made from starch slurry as well as brewers syrup. The Environmental Farm was originally established as a land application area for effluent.

Since the 1990's the lower grades of starch have been fed into fermentation tanks and after distillation ethanol is produced. This consumes all starch left in the stream. By 2001 the by-products from the fermentation process were also captured. Carbon dioxide (CO₂) is collected by BOC Gases and after screening the effluent, Shoalhaven Starches produces DDG (dried distillers grain) as a stock food. The remainder of the effluent stream is utilised as an irrigation resource on the Environmental Farm.

Over the last 20 years innovative production techniques developed by the Company has utilised the effluent as a valuable resource and not as a waste.

The PRP No. 7 approved by the Minister in 2003 and which is now being established will further recover DDG and produce a clearer and much lower nutrient condensate. This will improve the efficiency of irrigation.

The importance of an efficient waste removal system can not be emphasised enough for a food manufacturer. Good Manufacturing Practices (GMP) is part of the Food Safety

Policy that The Manildra Group of Companies maintains. Audits from internal, external, national and international companies, industry institutes and authorities are regular and essential to ensure product safety. Hazard Analysis and Critical Control Point (HACCP) based Food Safety Management systems are implemented, as are cleaner production principles.

Shoalhaven Starches has a record as one of the most efficient water users for this type of industry in the world. For every tonne of flour, Shoalhaven Starches uses 3 tonne of water. Similar industries worldwide use over three times as much water. All production managers and staff are active in identifying water savings to reduce the environmental load and cost, and minimise effluent to the farm.

Air

The company's commitment to cleaner production principles is further demonstrated by the use of DDG dryers within the Stillage Recovery Process. The system utilised incorporates a closed loop air circuit with a small amount of bleed air being vented into the boilers to minimise the emission of air to the stack and reduce potential odour generation. Baghouses and/or wet scrubbers on vents reduce dust emissions. The boilers are fitted with economisers to improve efficiencies. Variable speed high efficiency drives are used on the boiler fans.

CO₂ from the existing fermenters is harvested and directed to the BOC CO₂ plant located opposite the factory site.

Air quality impacts associated with this project are further addressed in Section 8.1 and **Annexure G**.

Solid

All reject products (Group B liquid and non-liquid) are reassigned or reprocessed within the production plant. Customers also return fragment sugar wastes from their own processes for recycling within the fermentation process. Damaged and out of specification packed powdered product is recycled back at the beginning of the process at the flour unloader. These "wastes" would otherwise be sent to landfill but are valued as a resource by the company.

Wastes yielded from the production plant are handled according to minimisation guidelines or recycled within the facility itself. Good Management Practices as per EPA Guidelines such as waste separation and reuse, recycling or reprocessing of wastes are practiced (Quality Assurance Standard Procedure "Waste Management System"

SA-P-140). Currently the prototype DDG recovery system is operating under the Quality Assurance System.

Solid rubbish from within the site is separated prior to disposal. Bins for cardboard, metal and plastic are located around the plant. Cardboard and paper products from the main store, office/lab, workshops, packing operating are collected and recycled as “Non-liquid-Solid Waste”.

The automatic packing operation often can not reuse cardboard sheeting due to strict customer specifications thus it is recycled. Plastics from wrapping procedures are collected in the plastic bin and torn paper product bags are recycled for pulp. Infrequent quarantine Waste (Liquid and Non-liquid – Hazardous) is separated and disposed of accordingly by a licensed contractor. As the site is a Food Producer there is a “no glass” policy in all production areas. Scrap metal is collected and routinely recycled by the maintenance crew or sold to a commercial recycler.

Ash from the boiler house is used for roads, feed pads and silage mounds on the Environmental Farm. A licensed, commercial composter also reuses ash, non-liquid filter cake (N190) and damaged hay bales (non-liquid-solid vegetative) from the Environmental Farm as ingredients for horticultural mixes. Whilst the PRP No. 7 envisaged a 20% increase in ash from the boilers, a recent agreement reached with the commercial composter will result in 50% of ash generated from the plant being reused as a compost ingredient. This will result in an overall reduction in ash ‘waste’.

The proposed Flour Mill operations have been designed to complement the overall waste reduction strategies adopted by the Company. The main ‘waste’ generated by the flour mill processing operation consists of the husk material from the milled wheat grain. As outlined previously, it is proposed that this husk or ‘mill feed’ will be utilised in the DDG dryers as part of the Stillage Recovery process. The mill feed will essentially replace ‘grain mill feed’ that is currently transported to the site.

A small amount of impurities (2 – 3 m²/week estimated) will be screened from the loaded wheat. This material will need to be disposed to Council’s waste depot.

Liquid

Cooling water at the plant will continue according to the existing licence conditions. Surface water management is described in Section 8.3.2.

The Stillage Recovery Process adopted by the PRP No. 7 approved in 2003 sought to recover solids by decanting and evaporating the liquid stream at the plant before reaching the Environmental Farm and reduce solids at the Environmental Farm. The

evaporated wastewater (condensate) is used as an irrigation resource. If wet weather persists then storage of it is necessary in the wet weather storage ponds. As the wastewater (condensate) has a Total Soluble Solids (TSS) of < 0.01% then the accumulation of solids in the ponds is greatly reduced.

As outlined in Section 8.3 of this EA the proposal will not generate any additional waste water.

8.12 HERITAGE AND ARCHAEOLOGICAL ISSUES

8.12.1 Aboriginal Archaeology

South East Archaeology was engaged by Shoalhaven Starches to undertake a review of the potential Aboriginal heritage significance of the development site. **Annexure I** to this EA is an Addendum Report prepared by South East Archaeology in relation to the likely impacts associated with this proposal on Indigenous heritage significance.

South East Archaeology Pty Ltd was initially commissioned in 2002 by Cowman Stoddart Pty Ltd, on behalf of the Manildra Group, to undertake an archaeological assessment of Aboriginal heritage within areas to be affected by proposed PRP No. 7 project. The areas subjected to assessment comprised a proposed employee car park and evaporation plant and other facilities adjacent to the existing Environmental Farm infrastructure, and an extension to an irrigation area on land located approximately 3.5 kilometres to the north-east.

The principal aims of the assessment were to identify and record any Aboriginal heritage evidence within the study area and to formulate recommendations for the conservation and management of any cultural heritage resources present, in consultation with the local Aboriginal community. The assessment was completed in 2002. The investigation proceeded by recourse to the archaeological and environmental background of the locality, followed by a field survey undertaken with the assistance of the Nowra Local Aboriginal Land Council and Shoalhaven Aboriginal Elders.

No Aboriginal heritage evidence was identified within the study area during the investigation or had previously been reported there. According to South East Archaeology, the primary reasons for the absence of evidence include the genuinely low Aboriginal utilisation of the study area and impacts from recent non-indigenous land-use practices. It was concluded that there remains a very low potential for Aboriginal heritage evidence to occur within the study area, particularly evidence that may be *in situ* or of scientific significance.

The proposed Flour Mill and its associated facilities will be located amidst the existing industrial infrastructure. Plans of the proposal and photographs of the locations of the facilities have been examined by South East Archaeology. With respect to this proposal, South East Archaeology conclude:

“The locality of the new flour mill and silos was inspected by South East Archaeology in 2002, with representatives of the local Aboriginal community. This locality has been extensively affected by the construction of existing facilities, along with previous pastoral and agricultural uses. As such the potential for any Aboriginal heritage evidence to survive is virtually negligible.

In view of the minimal extent of the proposed impacts, and the register searches, field survey and consultation with the Aboriginal community conducted to date, along with the extensive impacts from current infrastructure and very low conditions of surface visibility in adjacent pasture grass, further heritage assessment is not considered to be warranted.

However, in the event that Aboriginal objects were to be identified during construction, work in the immediate vicinity of those items must cease promptly and the finds be reported to the Department of Environment and Conservation and advice sought as to the appropriate course of action. Under the terms of the National Parks and Wildlife Act 1974 it is an offence to knowingly destroy, damage or deface an Aboriginal object without obtaining the prior written permission of the Director-General of the Department of Environment and Conservation (NSW).”

In addition to the above assessment, a community consultation program was initiated in accordance with the notification procedures as outlined in the DEC’s draft *“Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation”*. Notification was placed in the South Coast Register on the 20th April, 2007. One Aboriginal organisation, Jerrinja Consultants, registered as an interested Aboriginal organisation as a result of this notification process. A copy of the report prepared by South East Archaeology for this project was referred to Jerrinja Consultants, as well as the two other Aboriginal groups who were involved in the original Aboriginal Archaeological Assessment associated with the PRP NO. 7 project. At the time of finalising this EA no further response has been received to this consultation process.

8.12.2 European Heritage

A review of heritage schedules of SLEP 1985, the IREP No. 1, Councils’ Heritage Study as well as a review of the National Trust register has revealed no known items of European heritage value on the factory site.

Council’s recently completed Heritage Study does identify an item of environmental heritage on the Company’s Environmental Farm, on Lot 23 DP 811233. This item is a

weatherboard and iron farm house which is dated to about 1910. The Heritage Study describes this building as

“Weatherboard and galvanised iron cottage reflecting the influence of the Federation style on the local Victorian Georgian idiom. The traditional hipped roof form with encircling verandahs has been modified by the introduction of two projecting gables which effectively truncate the verandah, restricting it to two sides. In contrast to other nearby weatherboard cottages the structure is clad with broad edge moulded pine boards. Windows are simple 2x2 sash but those in the gabled projections reflect Federation style in the use of narrow flanking fixed lights. The building appears to be supported on brick piers. At the rear a single brick chimney defines the kitchen and adjacent skillion extension. The cottage is similar to urban forms such as Cambewarra Post Office.”

The Heritage Study assessed the significance of this structure as follows:

“A simple weatherboard cottage reflecting the transition of the late Victorian vernacular style towards the Federation style. Characteristic of small farmhouses erected on land made available by the subdivision of the Berry Estate c.1900. Contributes to the Berry-Bolong pastoral landscapes. Local significance (Shoalhaven District).”

The factory site is located 2.0 kilometres to the south west and no works are envisaged within the environmental farm within the vicinity of this building. Under the circumstances it is considered that the project will have no significant impact on the heritage significance of the building.

8.13 CUMULATIVE IMPACTS

The DGR's for this proposal require the assessment of potential cumulative impacts that may arise from the combined operation of the proposed Flour Mill and existing activities.

Air Quality

Section 8.1 of this EA includes detailed assessment of the potential air quality impacts associated with the proposed Flour Mill having regard to the existing Shoalhaven Starches operation.

Odour

The report by GHD identifies that the proposed Flour Mill has the potential total odour emission rate of 4300 OU/second which equates to < 0.1% of the existing total emission rate for the Shoalhaven Starches factory site. The assessment concludes that odour emissions from the proposed Flour Mill would not have a significant cumulative odour impact.

Particulates

The proposed Flour Mill would have the potential to increase particulate matter emissions from the overall Shoalhaven Starches plant. Shoalhaven Starches is not currently required to monitor particulate matter emissions at any of its licensed discharge points, with the exception of the boiler exhaust stack (Point No. 35). Therefore, unlike odour emissions, it is not possible to readily quantify existing emissions of particulate matter in order to gauge the potential for incremental or cumulative impact.

According to GHD the proposed short Flour Mill would only marginally increase PM₁₀ and TSP emissions above existing levels, and the associated maximum predicted ground level concentrations would still comply with the relevant air quality goals. Consequently, it is considered that the proposed development would have a negligible impact on particulate emissions and concentrations in the vicinity of the site.

Greenhouse Gas Emissions

The Flour Mill is also anticipated to create 12,567 tCO₂-e per year in additional greenhouse emissions.

Noise

Section 8.2 of the EA includes a detailed assessment of the potential noise impacts associated with the proposed Flour Mill and including its potential cumulative noise impacts with the overall Shoalhaven Starches operations. This assessment examines noise impacts and recommends overall specific measures to ensure that the proposed Flour Mill will achieve a design target of 14dB(A) below the EPA Licence conditions at residential reference locations.

Stormwater

As outlined in Section 8.3 of this EA the proposed Flour Mill would be sited within the central portion of the site and consequently all construction runoff generated at the site during construction works would be conveyed to the Environmental Farm for treatment. No runoff or stormwater would be discharged to the Shoalhaven River. The erosion and sediment controls proposed for the works (refer Section 9.0 of this EA) have been developed by GHD to ensure that construction runoff is contained on site and not discharged to the river.

The proposed works would not alter the existing site stormwater management system, and consequently all stormwater generated by the proposed Flour Mill during the operational phase would be discharged to the Environmental Farm.

The proposed Flour Mill would also not increase the volume of stormwater generated from this area of the site during operation according to GHD as the area is currently all surfaced with bitumen.

Flooding

Section 8.6 of the EA addresses the flooding issues associated with this proposal. As outlined by the report prepared by Webb McKeown & Associates any development, the hydraulic and cumulative flooding impacts associated with any development including the proposed Flour Mill within the intensively built-up area of the site are considered to be insignificant given the intensive development already present.

Traffic

The proposal will not increase the overall amount of materials to the site by rail. There will therefore be no change to the frequency of train movements to and from the site. Time tabling of train movements may need to be altered subject to the requirements of State Rail authorities.

The proposal will not alter heavy vehicle movements to and from the site.

The proposed Flour Mill is likely to generate an insignificant increase in light vehicle movements associated with a additional eight employees. This slight increase in traffic will be able to be accommodated at the existing vehicle entrances to the site; and sufficient parking on-site will be able to accommodate such vehicles.

9.0 STATEMENT OF COMMITMENTS – ENVIRONMENTAL MANAGEMENT

This section of the EA provides a Statement of Commitments agreed to by Shoalhaven Starches Pty Ltd outlining environmental management, mitigation and monitoring measures to be implemented to minimise potential impacts associated with this proposal and having regard to the findings of the assessment of Key Issues as outlined in Section 8.0 of this EA.

The following is a Statement of Commitments as proposed by this EA, and agreed to by Shoalhaven Starches:

9.1 LEGISLATIVE REQUIREMENTS

All activities carried out on the site, and in relation to the project, would comply with the relevant provisions of all relevant legislation and regulations, and would also comply with relevant policies and guidelines relating to the construction and operation of the project including, but not limited to, those detailed in Sections 9.1.1 and 9.1.2.

9.1.1 Legislation and Regulations

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984.*
- *Contaminated Land Management Act 1997.*
- *Dangerous Goods Act 1975.*
- *Environment Protection and Biodiversity Conservation Act 1999.*
- *Environmental Planning and Assessment Act 1979.*
- *Environmental Planning and Assessment Regulations 2000.*
- *Environmentally Hazardous Chemicals Act 1985.*
- *Fisheries Management Act 1994.*
- *Fisheries Management Amendment Act 2001.*
- *Heritage Act 1977.*
- *Heritage Amendment Act 1998.*
- *Local Government Act 1993.*
- *National Parks and Wildlife Act 1974.*
- *National Parks and Wildlife Amendment Act 2002.*
- *Native Vegetation Act 2003.*
- *Native Vegetation Conservation Act 1997.*
- *Noxious Weeds Act 1993.*
- *Occupational Health and Safety Act 2000.*
- *Ozone Protection Act 1989.*
- *Pesticides Act 1999.*
- *Protection of the Environment Operations Act 1997.*
- *Protection of the Environment Administration Act 1997.*
- *Rivers and Foreshores Improvement Act 1984.*

- *Roads Act 1993.*
- *Rural Fires Act 1997.*
- *Soil Conservation Act 1938.*
- *Threatened Species Conservation Act 1995.*
- *Threatened Species Conservation Amendment Act 2002.*
- *Waste Avoidance and Resource Recovery Act 2001.*
- *Waste Recycling and Processing Corporation Act 2001.*
- *Water Act 1912; and*
- *Water Management Act 2000.*

9.1.2 Policies and Guidelines

- Managing Urban Stormwater: Soils and Construction, NSW Department of Housing (1998).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council, and the Agriculture and Resource Management Council of Australia and New Zealand (2000).
- National Environment Protection Measures (NEPM) for Ambient Air Quality, NEPC (1998); and
- Industrial Noise Policy, DEC (1999).

9.2 APPROVALS, PERMITS AND LICENCES

All necessary approvals, permits and licences required by NSW legislation must be obtained prior to construction commencing. Approvals, permits and licences that may be necessary may include, but are not necessarily limited to:

- The Contractor and the Proponent are obliged to notify DEC when a pollution incident occurs that causes or threatens 'material harm' to the environment, under the Protection of the Environment Operations Act, 1997.

The Contractor and Proponent shall liaise with relevant government agencies to ensure that all their requirements are met in relation to approvals, permits and licences. The relevant government agencies include, but may not be limited to:

- NSW Department of Environment and Conservation (water, air, noise, waste, pollution, flora, fauna, and aboriginal heritage issues); and
- NSW Department of Natural Resources (works in or near waterways).

All necessary licences, approvals and permits obtained by the Contractor and/or Proponent must be complied with, maintained and renewed as necessary throughout the duration of the works.

9.3 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

The Contractor/Proponent would prepare a Construction Environmental Management Plan (CEMP). The CEMP would be prepared generally in accordance with the framework, principles and requirements detailed in AS/NZS ISO 14001:2004: Environmental management systems – Specification with guidance for use.

The CEMP would be developed prior to site activities commencing, and would be fully implemented, maintained, reviewed, audited and updated throughout the construction phase as may be required by the Conditions of Approval, or as otherwise directed.

In addition to the generic requirements of ISO/NZS 14001 the CEMP would address and/or develop:

- All relevant Conditions of Approval and environmental requirements.
- All other environmental control measures, actions, procedures and activities required to address all relevant legislation, regulations, guidelines and policies.
- Environmental monitoring programs, including the identification of monitoring locations, equipment, methodologies, analytical requirements, quality trigger levels/thresholds, and reporting mechanisms.
- Roles and responsibilities for the environmental management of the works.
- Environmental training requirements, procedures, and documentation; and
- A complaints management and community consultation/notification process.

The CEMP would document the key environmental management measures associated with the construction phase of the project, which would include, but not necessarily be limited to:

- General environmental management measures;
- Erosion and sediment control;
- Air quality (dust);
- Noise; and
- Waste and chemical management.

Further details on each key issue are provided in Sections 9.3.1 to 9.3.5. Appropriate environmental mitigation and control measures for each key issue are detailed in **Table 15** to **Table 19**.

9.3.1 General Environmental Management

General environmental mitigation measures for the project are detailed in **Table 15**.

Table 15
Environmental Management Framework

Environmental Management Framework
<p>All safeguard measures detailed in the Environmental Assessment would be applied to the project.</p> <p>Construction activities would be managed to comply with the premises' Environment Protection Licence noise limits, which range from 38 – 42 dB(A) when measured at the nearest residences. Noisy construction activities would generally be undertaken during daylight hours, although some construction activities would be undertaken outside these hours if they comply with the EPL noise limits.</p> <p>No construction work will be permitted on Sundays or Public Holidays.</p> <p>Environmental awareness training would be provided to all personnel (including all labourers/ plant operators/ supervisors and engineers), and would address, but not be limited to:</p> <ul style="list-style-type: none">• Sedimentation and erosion control;• Water quality control;• Pollution control; and• DEC requirements. <p>The training would commence at the start of construction and would continue as new personnel are engaged.</p> <p>A register of environmental awareness training shall be established and maintained at the site. The register shall contain details of the type of training, personnel trained, training dates and qualifications of the trainer.</p> <p>All necessary approvals, permits and licences required by NSW legislation would be obtained prior to construction commencing. These approvals, permits and licences would be maintained and complied with during the construction period. Liaison would occur with the:</p> <ul style="list-style-type: none">• Department of Environment and Conservation (water, air, noise, waste, pollution, flora, fauna, and aboriginal heritage issues);• Department of Natural Resources (works near waterways); and• Heritage Office of NSW (non-indigenous heritage issues). <p>to ensure all their requirements are met in relation to approvals, permits and licences.</p> <p>All wastes would be transported by licensed waste management contractors and would be disposed of to an appropriately licensed waste management facility.</p> <p>A register of public complaints shall be established at time of construction commencing and maintained for the full duration of construction. The register shall record details of complaints, complainant contact information and action taken to address complaints.</p> <p>Any complaints received shall be recorded and attended to promptly. On receiving a complaint, works shall be reviewed to determine whether issues relating to the complaint can be avoided or minimised. Feedback shall be provided to the complainant explaining what outcomes resulted.</p>

9.3.2 Soil and Water Management

The potential impacts of construction activities on soil and water resources are generally associated with the erosion of soils and subsequent discharge of sediments or turbid runoff to watercourses, together with pollution associated with the spillage of fuels, chemicals, and other materials into waterways.

The location of the construction activities immediately adjacent to the banks of the Shoalhaven River increases the risk of potential impacts to the river occurring, although the site stormwater management system would collect all runoff from the construction area and convey it to the Environmental Farm for treatment and irrigation. However, additional environmental control measures have been developed to further minimise the risk of discharges to the Shoalhaven River, as detailed in **Table 16**.

Acid Sulphate Soils (ASS) are not expected to be encountered on site; however are considered separately.

Table 16
Soil and Water Management Measures

Soil and Water Management Measures
<p>A site-specific Erosion and Sediment Control Plan (ESCP) has been developed for the project (refer Figure 8). The ESCP identifies appropriate control measures and practices to prevent soil and erosion impacts, and discharges of turbid site runoff to the Shoalhaven River.</p> <p>All erosion and sediment control measures detailed in the ESCP would be implemented on site prior to construction commencing.</p> <p>All sediment and erosion controls would be inspected by the Contractor/Proponent at a minimum of weekly intervals and within 24 hours of all rainfall events exceeding 10 mm in a 24-hour period.</p> <p>Regular routine maintenance would be undertaken to de-silt sediment basins and traps, replace damaged sediment control fences and other structures. A register of these inspections, maintenance and rainfall levels would be maintained. One person would have overall responsibility on site for erosion and sediment control issues.</p> <p>Loss of suspended solids and sediment to the Shoalhaven River would be prevented by using temporary or reverse superelevation for any excavations, constructing berms along the edge of the site to prevent runoff to the river and installing silt fences along the property boundary with the river.</p> <p>A silt fence would be installed between the site and the Shoalhaven River, along the entire perimeter of the construction area, to prevent suspended solids being transported off-site. The silt fence would be constructed in accordance with Standard Drawing SD 6-7, from the publication Managing Urban Stormwater: Soils and Construction, NSW Department of Housing (1998).</p> <p>All site runoff would be collected and diverted to the site stormwater management system, which would then convey it to the Environmental Farm for treatment and irrigation, thereby preventing any off-site impacts.</p> <p>The inlet grates of the site stormwater management system would be covered with geotextile to provide initial filtering of gross sediment pollutants before conveyance to the Environmental Farm.</p>

Soil and Water Management Measures (continued)

Alternatively, the grates could be protected by implementing the control measure detailed in Standard Drawing SD 6-9, from the publication Managing Urban Stormwater: Soils and Construction, NSW Department of Housing (1998).

Works relating to drainage and sediment control would be completed promptly to minimise exposure time of disturbed areas.

Exposed areas of erodible material would be limited to those areas being actively worked. Any material stockpiles on site would be designed and located to prevent any loss of sediment, or other materials, to the Shoalhaven River in the event of heavy or prolonged rainfall

Temporary sediment control fences would be installed below any stockpiles.

Stockpiles would not be located within 50 m of a watercourse, in accordance with NSW Fisheries requirements.

In the event of a spillage of potentially harmful chemicals, fuels, oils or materials, the DEC would be contacted immediately, and contaminants would be immediately contained, removed, treated (if necessary) and disposed of in accordance with DEC requirements.

An incident/emergency spill plan would be developed. This would include measures to avoid spillages of fuels, chemicals, and fluids onto the floodplain and/or into any waterways. All personnel would be made aware of these measures. An emergency spill kit would be kept onsite at all times.

All fuels, chemicals, and liquids would be stored at least 50 m away from any waterways or drainage

lines within an impervious bunded area.

All erosion and sediment control structures would be removed only after adequate stabilisation of disturbed surfaces is achieved.

Any wastewater generated from construction processes would be contained onsite and directed to the site stormwater management system for conveyance to the Environmental Farm for treatment and irrigation. The discharge of water into waterways would be prohibited.

The refuelling of plant and maintenance of machinery would be undertaken within impervious bunded areas within the compound sites.

Vehicle wash downs and/or cement washouts would be undertaken within a designated bunded area with impervious surfaces.

FIGURE 8

9.3.3 Noise and Vibration Management

The construction process would generate both noise vibration from heavy plant and equipment. However, the levels of noise and vibration would be likely to be similar to existing background levels associated with the existing plant. This notwithstanding, the Proponent/Contractor would implement appropriate noise and vibration management measures as detailed in the Environmental Assessment (EA) and as may be required by the Conditions of Approval.

The noise and vibration mitigation management measures would include the appropriate siting of plant, equipment, compounds, and machinery to minimise noise impacts and construction noise monitoring, as detailed in **Table 17**.

The potential effects of operational noise have been addressed in the design of the facility and are outside the scope of this assessment.

Table 17
Noise and Vibration Management Measures

Noise and Vibration Management Measures
Appropriate noise and vibration mitigation measures would be developed and implemented throughout the construction process, including all commitments made in the EA and required by the Conditions of Approval.
Construction activities would be managed to comply with the premises' Environment Protection Licence noise limits, which range from 38 – 42 dB(A) when measured at the nearest residences. Noisy construction activities would generally be undertaken during daylight hours, although some construction activities would be undertaken outside these hours if they comply with the EPL noise limits.
No construction work would be permitted on Sundays or Public Holidays.
Individual items of plant and equipment would comply with the requirements of Chapters 119 and 157 of the DEC's Environmental Noise Manual.
Plant and equipment would be selected and operated with appropriate mufflers and noise controls and where practical work practices and plant selection would be considered so as to minimise noise impacts.
High efficiency mufflers would be used on all construction equipment and manufacturer's noise control equipment would remain intact. All construction equipment would be well maintained and serviced.
Construction noise levels would be monitored so that performance against background levels could be assessed.

9.3.4 Air Quality Management

Construction activities have the potential to generate dust. The Proponent/Contractor would manage potential dust and air quality issues during construction by implementing appropriate control measures, including those detailed in **Table 18**.

Table 18
Air Quality Management Measures

Air Quality Management Measures
<p>Appropriate air quality mitigation measures would be developed and implemented throughout the construction process, including all commitments made in the EA, and required by the Conditions of Approval.</p> <p>Regular on-site watering of dust-generating materials would be used to control dust generation during construction. Adequate dust suppression resources would be available on site to reduce dust emissions.</p> <p>Additional measures implemented to reduce dust emissions during construction would include:</p> <ul style="list-style-type: none">Alternative timing of dust generating activities;Stopping of construction activities in very high wind conditions;Consideration of quickening of work in problem areas;Use of wind direction to advantage;Ensuring trucks are covered at all times when transporting or storing materials;Stabilisation of exposed areas as quickly as possible or within 14 days after completion of works;Confining vehicle movements to designated areas; andAppropriately located stockpile and compound sites. <p>The extent of exposed and unprotected areas would be limited by preserving existing groundcover (through staged clearing), and all disturbed areas would be stabilised as soon as possible.</p> <p>Loads with the potential to generate dust, which are to be carried on public streets, would be covered during transportation.</p> <p>Exhaust systems of construction plant, vehicles and machinery would be maintained in accordance with manufacturer's specifications and the exhaust emissions would comply with the requirements of relevant legislation.</p> <p>No open fires would be permitted on the project.</p> <p>Stockpiles would be kept to a minimum.</p> <p>Where practicable, specific areas of the construction site (e.g. stockpiles) would be fenced with shade-cloth to minimise wind erosion and the transport of dust beyond the site boundary.</p> <p>Any stockpiles with the capacity to cause dust would be dampened to suppress dust.</p> <p>When dust is visually detected, the frequency of watering would be increased. Dust generating activities would be reprogrammed to avoid periods of high wind velocity.</p> <p>If works are creating high levels of dust that are likely to cause discomfort to local residents or a safety hazard to work personnel, the works would be modified or stopped until the dust hazard is eliminated or has been reduced to an acceptable level.</p> <p>Tailgates would be secured during the operation of trucks and utes. All haulage vehicle loads would be covered while transporting material to and from the work area.</p> <p>Construction traffic would be restricted to designated areas, which would be covered with a gravel/bitumen surface where practicable and subjected to regular dust suppression (e.g. water cart).</p> <p>Vehicular speeds would be limited to 25 km / hour on areas of unconsolidated or un-vegetated soil associated with the project area.</p> <p>All vehicles would be maintained in a serviceable condition such that exhaust emissions are reduced to typical levels.</p> <p>Machinery would be turned off, rather than left idling for long periods.</p>

9.3.5 Waste and Chemical Management

The potential environmental impacts associated with spillages of chemicals, fuels and oils to both water and soils would be minimised through the implementation of detailed control measures designed to minimise the risk of such spillages occurring. In addition, appropriate waste management measures would be implemented to ensure that waste is avoided, minimised or recycled wherever possible, or responsibly disposed of.

Appropriate mitigation and management measures are detailed in **Table 19**.

Table 19
Waste and Chemical Management Measures

Waste and Chemical Management Measures
<p>An incident emergency spill plan would be developed and implemented as required. This would include measures to avoid spillages of fuels, chemicals, and fluids into any waterways. All personnel would be made aware of these measures. An emergency spill kit would be kept onsite at all times.</p> <p>Storage areas for fuels, oils and chemicals would be surrounded by impervious bund walls to contain any spillage. Storage areas would not be located within 50 metres of any waterway, on slopes above 10%, or near areas of native vegetation. All precautions would be taken to eliminate fuel or other spills.</p> <p>Storage areas for fuels, oils and chemical used in construction would be surrounded by bund walls to retain any spills. The bund would contain at least 110% of the volume of the largest container.</p> <p>The storage of chemicals on site would comply with the requirements of relevant authorities (DEC and Workcover).</p> <p>A schedule of all hazardous materials in use on the works shall be maintained and recorded for the duration of the construction.</p> <p>Refuelling operations would not be left unattended whilst refuelling is in progress. Refuelling of plant and maintenance would not occur within 50 m of waterways or sensitive areas.</p> <p>The refuelling of plant, and maintenance of machinery, would be undertaken within impervious bunded areas.</p> <p>Should any spillage of fuels, oils, chemicals or other potentially hazardous/polluting materials occur during construction the DEC would be contacted immediately, and contaminants would be immediately contained, removed, treated (if necessary) and disposed of in accordance with DEC requirements.</p> <p>All wastes would be transported by licensed waste management contractors and would be disposed of to an appropriately licensed waste management facility.</p> <p>The construction site would be maintained in a clean and tidy condition. Covered bins would be provided for waste disposal.</p> <p>The Resource Management Hierarchy principles of the WARR Act would be adopted as follows:</p> <ul style="list-style-type: none">Avoid unnecessary resource consumption as a priority;Avoidance would be followed by resource recovery (including reuse of materials, reprocessing, recycling, and energy recovery); andDisposal would be undertaken as a last resort. <p>Measures to avoid, reduce, re-use and recycle waste products including soil, pavement materials, concrete, and oils would be implemented.</p>

Waste and Chemical Management Measures (continued)
<p>If concrete agitator trucks are to be washed out on site, an impermeable bunded area would be constructed to contain wash out water and allow the concrete residue to settle. The concrete residue would be incorporated into the works or disposed of at a licensed waste depot.</p> <p>All construction materials, surplus soils and wastes generated from the site would be stockpiled and stored at the site prior to reuse, recycling or disposal. Measures would be implemented to prevent any scouring or loss of stockpiled materials during flood events.</p> <p>Wastes would not be stored for long periods during construction of the site. Empty drums of fuels, oils or chemicals and fluids would not be stored on site during construction.</p> <p>Materials or equipment that fall into or adjacent to the Shoalhaven River would be recovered immediately.</p> <p>Waste material generated would be reused or recycled where possible.</p>

9.3.6 Hazard and Risk Management

All possible safeguards would be employed to ensure that the potential for deflagration of wheat and / or flour is minimised.

Table 20 outlines recommended management procedures and design considerations that would be implemented and incorporated into practices that would prevent risk scenarios occurring.

Table 20
Hazard & Risk Management Measures

Hazard & Risk Management Measures
<p>Minimising build-up of combustible materials on-site.</p> <p>Minimising dust cloud formation.</p> <p>Ensuring all silos and the Flour Mill are electrically earthed.</p> <p>Locating plant within lightweight building, which acts as explosion relief.</p> <p>Enclosing plant to prevent the escape and accumulation of dust in the building.</p> <p>Fitting silos and dust collection systems with explosion relief.</p> <p>Using antistatic bags in the bag houses.</p> <p>Providing dust protection to all electricity supply.</p> <p>Zoning areas appropriately to limit ignition sources associated with electricity supply (zone 20, 21 and 22 according to Australian Standards).</p> <p>Designing the plant to prevent dust explosions.</p> <p>Implementing a monitoring and maintenance program.</p> <p>Installing a suitable fire protection system</p>

Mitigation measures are practices that control the impact after a risk scenario has occurred. It is recommended that emergency management procedures be developed for

response to fire and explosion that may be initiated from either on-site or off-site sources.

The risks posed by the deflagration of wheat dust or flour poses an on-site risk. It should therefore be examined in more detail during the design and construction phase of the project.

9.3.7 Flooding

Detailed consideration needs to be given to flood hazard and structural assessment of (with regard to velocity of floodwaters and impact by flood debris) the proposed development.

In quantifying the flood hazard, **Table 21** identifies the issues that need to be considered as part of detailed engineering design prior to the issue of a construction certificate for the development.

Table 21
Flood Hazard Issues

Flood Hazard
<p>In quantifying the flood hazard, some important issues for consideration include:</p> <ul style="list-style-type: none">• Damage to the plant, including as a result of flood debris or structural failure;• damage to the plant due to the possible buoyancy of equipment;• malfunction of the plant (or any services on which the plant relies for operation) as a result of inundation and the associated risk of such malfunction or other uses of the floodplain;• access and evacuation of workers from the site during floods.

9.3.8 Riverbank Stability

The sites for the proposed silos are close to the river bank and the one nearest the bank is closer to the river than most other permanent buildings in the plant. We understand that no other sites for the silos were suitable. The development of the silos in the positions proposed will involve some risk to the long term performance of the structures. The proposed Flour Mill is set back further from the bank and is located partly within the site of the structure that is to be demolished.

The following measures outlined in **Table 22** are recommended to reduce the risk of river bank failure affecting the proposed structures close to the river bank:

Table 22
Riverbank Stability

Riverbank Stability	
<ul style="list-style-type: none">• Continue the recent rock revetment along the river bank using large rocks. The rocks are only to be considered as a lining to reduce the risk of undercutting or oversteepening of the bank and do not act as a retaining wall. The rock lining should extend from the recent works upstream to the jetty. Additional strengthening of the rock lining and erosion protection (eg. using concrete) and concrete apron around the base of the silo nearest the river may be required. Construction of the rock lining would involve removal of vegetation from the banks. This should be carried out in stages (say 10 m to 15 m at a time) as the rock lining advances and should not significantly disturb or loosen the soils in the bank. Large rocks should not be stockpiled on any part of the bank during this work. Rocks should also not be concentrated in any one part of the river bank, as this could result in localised failure occurring.• The new structures should be founded on piles to rock. The silo nearest the river bank should be supported on stiffer piles that allow for possible loss of lateral soil support through the upper 5 m to 6 m. We would not expect the piles to resist a large deep seated failure of the bank, however in the event of gradual undercutting of the soil below the silo, the stiffer piles could support the silo until remedial works were carried out to restore eroded or failed sections of the bank.	

9.3.9 Visual Amenity

It is considered that the proposed works will not create a significant adverse visual impact due principally to the existing significant industrial development on the site. There are however measures as outlined in **Table 23** that can be implemented to assist in screening and further minimising visual impacts.

Table 23
Visual Impact Mitigation Measures

Visual Impact Mitigation Measures	
<ul style="list-style-type: none">• The existing screening vegetation around the site is effective, particularly along the river bank, however additional supplementary plantings of dense bands of native trees and shrubs along the southern boundary of the site with the river (particularly between the river and the proposed evaporator columns) would further reduce the visibility of the development. In this regard a landscape and revegetation plan should be prepared for that portion of the river bank in the vicinity of the development site.• Where planting has already been established, measures should be taken to protect existing vegetation during the construction phase.• In addition to landscaping, new structures can be constructed and treated to reduce visual impact. Where appropriate and possible, buildings and structures should be constructed of similar materials as those previously used on the site and be of a non-reflective nature. Colours should blend with existing structures on the site to ensure visual harmony. In this regard special consideration should be given to the proposed cladding of the evaporators. Consideration should be given to incorporating a cladding colour which will blend with the surrounding locality.	

9.3.10 Site Contamination and Acid Sulphate Soils

The results of the preliminary study did not indicate concentrations of a suite of potential chemicals of concern above the adopted soil investigation levels for an industrial land use setting within the soil profile tested. Based on these results it appears that there is a low likelihood of widespread contamination in the soil that would adversely affect the proposed redevelopment works.

Access to the levee/river bank was poor at the time of the fieldwork and only surface soil samples could be collected. Based on the history of this area and the results of the surface samples it appears that there is a low likelihood that these soils would be contaminated.

Acid sulphate soil risk maps suggest that the area being assessed is in an area with a low probability of acid sulphate soil occurrence. Field screening results also suggested that the soils within the upper 2 m of were unlikely to be acid sulphate soils. It is probable that acid sulphate soils could occur at depths beyond those assessed in this study. The proposed development is unlikely to disturb soils below the existing pavements and some fill materials on the levee/river bank and is therefore unlikely to disturb acid sulphate soil.

Should the proposed depth of disturbance change or different soils be encountered, then this would need to be re-assessed.

9.3.11 Aboriginal Heritage

The proposed Flour Mill and its associated facilities are to be sited amidst existing industrial infrastructure and buildings. The potential for any Aboriginal Heritage evidence to survive is virtually negligible.

However, in the event that Aboriginal objects were to be identified during construction, work in the immediate vicinity of those items must cease promptly and the finds be reported to the Department of Environment and Conservation and advice sought as to the appropriate course of action. Under the terms of the National parks and Wildlife Act 1974 it is an offence to knowingly destroy, damage or deface an Aboriginal object without obtaining the prior written permission of the Director-General of the Department of Environment and Conservation (NSW).

10.0 CONCLUSION

Shoalhaven Starches is a member of the Manildra Group of Companies that produce a variety of flour, starch, gluten and ethanol based products. The Manildra Group owns and operates flour mills at Manildra, Gunnedah and Narrandera, that all produce a variety of flours that supply the Shoalhaven Starches factory site at Bomaderry.

It is proposed to establish a flour mill at the Shoalhaven Starches site at Bomaderry to produce industrial grade flour for use in the production of starch and gluten at the Bomaderry factory. The husk (mill feed) material from the process will be utilised in the DDG dryers at the site.

As a result the equivalent amount of flour and mill feed will no longer need to be transported to the site. The amount of material transported to the site will not change.

The benefit to the Company for relocating part of the industrial grade flour production to the Bomaderry site; will be the subsequent spare capacity at the Company's flour mills at Manildra, Gunnedah and Narrandera will be able to be devoted to the production of higher grade flour. This will increase international export opportunities for the Company (and the State and Nation).

The Flour Mill is proposed to be sited entirely within the existing factory site. The site is zoned Industrial 4(e) Restricted Development under Shoalhaven Local Environmental Plan 1985. The development is permissible with consent.

The application is one subject to Part 3A of the Environmental Planning & Assessment Act 1979. The Department of Planning has determined that the proposal is a Major Project for the purposes of this legislation and the Minister for Planning is the consent authority. The Director-General has also issued requirements for the preparation of this Environmental Assessment. This Environmental Assessment report has been prepared to address the issues raised by the Director-General's requirements for this proposal.

Following an assessment of the key issues associated with this proposal the Environmental Assessment concludes that the proposal is suitable for the site and this locality. The Environmental Assessment includes a Statement of Commitments outlining environmental management, mitigation and monitoring measures that should be implemented to minimise potential impacts associated with the proposal.

The Minister's approval for the proposal is sought.

Stephen Richardson
Town Planner, CPP, MPIA

ANNEXURES

ANNEXURE A

Director-General's Requirements for the Preparation of this Environmental Assessment

ANNEXURE B

Government Agency Submissions

ANNEXURE C

Preliminary Hazard Analysis

prepared by

GHD Pty Ltd

ANNEXURE D

NSW Coastal Policy 1997

Compliance Checklist for the Preparation of Development Proposals

ANNEXURE E

Preliminary Contamination Assessment

carried out by

Coffey Geotechnics Pty Ltd

ANNEXURE F

Flood Assessment Report

prepared by

Webb McKeown Pty Ltd

ANNEXURE G

**Short Flour Mill Environmental Assessment
Air Quality & Environmental Management Report**

prepared by

GHD Pty Ltd

ANNEXURE H

Acoustical Assessment

prepared by

The Acoustic Group

ANNEXURE I

Aboriginal Heritage Assessment – Addendum Report

prepared by

South East Archaeology

ANNEXURE J

Geotechnical Assessment – Riverbank Stability

prepared by

Coffey Geotechnics Pty Ltd