

**APPLICATION PURSUANT TO SECTION 75W  
OF THE ENVIRONMENTAL PLANNING  
AND ASSESSMENT ACT 1979**

**PROPOSED ALTERATIONS  
AND ASSOCIATED WORKS  
TO APPROVED DDGS DRYERS  
RELATING TO PROJECT APPROVAL MP06\_0228  
SHOALHAVEN STARCHES EXPANSION PROJECT**

**LOTS 62 DP 1078788 and A DP 334511  
BOLONG ROAD  
BOMADERRY  
and  
LOTS 1 DP 131008 and 4 DP 610696  
HANIGANS LANE  
BOMADERRY**

Prepared for

**Shoalhaven Starches Pty Ltd**

October 2016



Prepared by:

*COWMAN STODDART PTY LTD*

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Ref. 15/70

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**COWMAN STODDART PTY LTD**

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

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**ENVIRONMENTAL ASSESSMENT  
PREPARED BY**

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CPP, MPIA

Address: Cowman Stoddart Pty Ltd  
31 Kinghorne Street  
NOWRA NSW 2541

in respect of

---

**PROJECT TO WHICH PART 3A APPLIES**

Proponent Name: Shoalhaven Starches Pty Ltd

Proponent Address: Bolong Road, Bomaderry

Land to be developed: Address Bolong Road, Bomaderry and Hanigans Lane,  
Bomaderry

Lot No., DP/MPS, Vol/Fol etc. Lots 62 DP 1078788 and A DP 334511 (Bolong Road)  
and Lots 1 DP 131008 and 4 DP 610696 (Hanigans  
Lane)

Project Development: Shoalhaven Starches Expansion Project (MP 06\_0228)

Proposed Modification to Project: Proposed modifications to Project Approval  
(MP06\_0228) involving alterations to approved DDGS  
Dryers and associated works.

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**Environmental Assessment** An Environmental Assessment is attached

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**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 75W 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:

28 October 2016

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## **EXECUTIVE SUMMARY**

Shoalhaven Starches is a member of the Manildra Group of companies. The Manildra Group is a wholly Australian owned business and the largest processor of wheat in Australia. It manufactures a wide range of wheat based products for food and industrial markets both locally and internationally.

The Shoalhaven Starches factory located on Bolong Road, Bomaderry produces a range of products for the food, beverage, confectionary, paper and motor transport industries including: starch, gluten, glucose and ethanol.

In 2009 the Minister for Planning issued Project Approval to increase the ethanol production capacity at the Shoalhaven Starches factory site to meet the expected increase in demand for ethanol arising from the NSW Government's ethanol mandate. This Project Approval enables Shoalhaven Starches to increase its ethanol production in a staged manner at its Bomaderry Plant from the 126 million litres per year to 300 million litres per year subject to certain conditions.

The Project Approval also consolidated all previous approvals into the one Project Approval.

Following the Minister's determination Shoalhaven Starches have been implementing and commissioning works in accordance with this approval.

Shoalhaven Starches now propose to undertake modifications to the approved Dried Distillers Grains Syrup (DDGS) Dryers located on the western side of the factory site including reducing the number of DDGS Dryers from 6 to 4. The proposed modification will also include:

- slight modification to the footprint of the DDGS Dryer Building;
- relocation of cooling towers within the site;
- the provision of an additional two Biofilters;
- construction of a forklift maintenance building;
- provision of a container preparation and storage areas; and
- regularisation and expansion of existing emergency coal and woodchip storage areas located within on-site storage on the Environmental Farm.

The modified proposal will not result in any increase in production from the site over that which has been the subject of past approvals. The proposal will not involve any change in the amount of raw products that will be utilised; nor will it involve any changes in the amount of waste waters that will need to be treated and disposed.



The application is made pursuant to Section 75W of the Environmental Planning & Assessment Act 1979.

The preparation of this Environmental Assessment has been undertaken following consultation with the Department of Planning and Environment.

This Environmental Assessment has been prepared to address issues detailed in these requirements.

The EA is supported by expert assessments addressing:

- Noise Impacts – the EA is supported by a Noise Impact Assessment prepared by Harwood Acoustics which includes recommendations to ensure that this proposal will achieve the noise limits as outlined under the Environmental Protection Licence that applies to the site. It is recommended that a construction noise management plan should be provided in accordance with NSW EPA's Interim Construction Noise Guideline and to satisfy Condition 13 of the Project Approval.
- Air Quality Impacts and including Odours – the EA is supported by an Air Quality Impact Assessment prepared by GHD Pty Ltd. This assessment concludes that no discernible increase in perceived odour impacts would be evident as a result of the proposed modifications to the plant. GHD predict that any increase in particulate emissions as a result of the proposed modifications would be negligible and that there would be no adverse dust impacts.
- Flooding Impacts – the EA is supported by a report addressing the flooding impacts of the proposal prepared by WMA Water.
- Preliminary Hazard Analysis (PHA) – prepared by Pinnacle Risk Pty Ltd that assesses and compares the risks associated with the proposal against the Department of Planning's risk criteria and in summary finds that the development will have no adverse off-site impacts and all relevant risk criteria are expected to be satisfied.
- A Geotechnical Assessment – prepared by Coffey Geotechnics that addresses the implications of the proposal for river bank stability for the banks of the adjacent Shoalhaven River, Bomaderry Creek and Abernethy's Creek. This assessment considers that the impact of the proposed modification to the existing DDGS Dryers on river bank stability would be insignificant.

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 Minister's approval is sought for the modification application.

## **1.0 INTRODUCTION**

### **1.1 BACKGROUND TO SHOALHAVEN STARCHES**

Shoalhaven Starches is a member of the Manildra Group of companies. The Manildra Group is a wholly Australian owned business and the largest processor of wheat in Australia. It manufactures a wide range of wheat based products for food and industrial markets both locally and internationally.

The Shoalhaven Starches factory produces a range of products for the food, beverage, confectionary, paper and motor transport industries including: starch, gluten, glucose and ethanol. During these processes, treated waste water is produced and spray irrigated 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 Minister for Planning approved a development application (DA223) for the Company's Pollution Reduction Program No. 7. This approval included the extension of the company's irrigation of waste water onto additional farm lands and also enabled ethanol production at the plant to increase from 100 million litres per year to 126 million litres per year.

On the 4<sup>th</sup> October 2007 the then Minister for Planning issued Project Approval MP 07\_0021 for the establishment of a Flour Mill at the factory site. This project enabled the construction and operation of a new flour mill and two grain silos. The Flour Mill was originally approved to produce 265,000 tonnes of industrial grade flour a year for use within the Shoalhaven Starches factory. On the 1<sup>st</sup> March 2016 the Project Approval was modified (Mod.8) to increase the amount of flour produced from this Flour Mill to 400,000 tonnes of industrial grade flour per annum. The Flour Mill is housed in a building on the southern boundary of the factory. The grain silos associated with this previous approval are located within the vicinity of this Flour Mill, and have capacity to store 3600 tonnes of wheat grain.

On the 28th January 2009 the Minister for Planning issued Project Approval MP 06\_0228 for the "Shoalhaven Starches Expansion Project" (SSEP).

The primary objective of the Shoalhaven Starches Expansion Project was to increase the Company's ethanol production capacity by upgrading the existing plant to meet the expected increase in demand for ethanol arising from Federal and State Government policy initiatives to mandate the use of ethanol in fuel supplies.

As a result, the Manildra Group planned to increase its ethanol production capacity to meet the expected increase in demand for ethanol arising from these initiatives by upgrading the existing ethanol plant, located at the Shoalhaven Starches Plant at Bomaderry.

The Project Approval for the Shoalhaven Starches Expansion Project (SSEP), enabled Shoalhaven Starches subject to certain conditions to increase ethanol production in a staged manner at its Bomaderry Plant from the previous approved level of 126 million litres per year to 300 million litres per year.

In addition the Project Approval consolidated all previous approvals for the site, including MP 07\_0021 for the existing Flour Mill into the one Project Approval for the overall site.

To accomplish the increase in ethanol production, the Project Approval enabled Shoalhaven Starches to upgrade plant and increase throughput of raw materials, principally flour and grain. The following additions and alterations have been approved to the existing factory site as part of the Project Approval:

- the provision of an additional dryer for the starch/gluten plant;
- additional equipment and storage vessels for the ethanol plant including 3 additional fermenters, additional cooling towers and molecular sieves; and
- upgrades to the Stillage Recovery Plant including 6 additional Dried Distillers Grains Syrup (DDGS) dryers; 10 decanters; chemical storage and two evaporators.

Since obtaining this Project Approval Shoalhaven Starches have acquired the former Dairy Farmers factory as well as the former Australian Paper Mill complexes further to the east of their factory site.

## **1.2 BACKGROUND TO PROJECT**

The increase in ethanol production associated with the SSEP Project Approval was made in response to the NSW Government's ethanol mandate which increased the mandated ethanol content by volume in petrol in NSW from 2% to 6% in October 2011. The SSEP sought to increase ethanol production capacity at the Shoalhaven Starches site to meet the expected increase in demand for ethanol arising from this. The increase in ethanol production required upgrades to the Stillage Recovery Plant including 6 additional Dried Distillers Grains Syrup (DDGS) dryers.

Demand for ethanol however has not met that which was anticipated following the introduction of the NSW Governments ethanol mandate. Under these circumstances it is

proposed to reduce the number of approved DDGS Dryers from 6 to 4. The reduction in Dryer “footprint” on the site will release land for other development purposes.

In addition to the proposed reduction in number of DDGS dryers from 6 to 4, the Modification Proposal also includes the following:

- The construction of a Forklift Maintenance Building to be located immediately south-west of the proposed relocated DDG Dryers.
- Slight relocation of the footprint of the DDGS Dryer building in a northerly direction by 28 metres to provide more area surrounding the Forklift Maintenance Building and therefore allow for manoeuvring of forklifts within the vicinity of this area.
- Relocation of approved cooling towers located adjacent to the Shoalhaven River frontage of the site to adjacent to the proposed modified DDGS Dryer Building. These cooling towers are presently located within close proximity of the Shoalhaven River and encroach into an area that has been subsequently zoned E2 Environmental Conservation under the Shoalhaven LEP 2014. It is proposed to relocate these cooling towers adjacent to the DDGS Dryer Building, which they will serve. It will also have the advantage of moving them further away from the river and entirely within the industrial zoned portion of the site.
- Relocation of approved but yet constructed cooling towers from their position adjacent to the approved evaporator. These approved cooling towers are located in a position where a Biofilter Odour Recovery Unit Scrubber has been subsequently erected. This Scrubber essentially removes particles and directs odorous air emissions to the biofilters located to the south-west corner of the site. It is proposed to relocate these cooling towers from the western side of these existing cooling towers to the eastern side away from this Scrubber.
- The construction of additional two biofilters. Biofilters treat odorous air emissions from the site. It is Shoalhaven Starches view that the installation of the new DDGS Dryers will potentially necessitate the provision of additional biofilters.
- Provision of Container Preparation and Storage areas within proximity of the proposed Forklift Maintenance Building and south of the proposed relocated DDGS Dryers.
- Regularisation of an existing coal and wood chip storage area located to the west of the relocated DDGS Dryers and continued use of this area on a temporary basis (Stage 1) until this location is required for container storage purposes. All coal and woodchips would then be stored within the Hanigans Lane storage area at (see below).

- Regularisation and expansion of existing emergency coal and woodchip storage area at Hanigans Lane on the north side of Bolong Road within the Environmental Farm. This emergency coal and woodchip storage provides an emergency buffer for circumstances where situations which may arise which prevent supply of these fuel sources to the site such as road closures or flooding.

The modified proposal will not result in any increase in production from the site over that which has been the subject of past approvals. The proposal will not involve any change in the amount of raw products that will be utilised; nor will it involve any changes in the amount of waste waters that will need to be treated and disposed.

### **1.3 THE PROPONENT**

Cowman Stoddart Pty Ltd has prepared this Environmental Assessment on behalf of Shoalhaven Starches Pty Ltd.

Proponent's name: Shoalhaven Starches Pty Ltd

Postal address: PO Box 123, Nowra 2541

ABN No: 94 000 045 045

## 2.0 THE SITE AND SURROUNDING LOCALITY

### 2.1 LOCAL AND REGIONAL CONTEXT

The Shoalhaven Starches factory complex is situated on various allotments of land on Bolong Road, Bomaderry, within the City of Shoalhaven. The factory site is located on the southern side of Bolong Road on the northern bank of the Shoalhaven River. The Shoalhaven Starches site (excluding the former Dairy Farmers site) has an area of approximately 12.5 hectares.

Shoalhaven Starches Environmental Farm is situated to the north of the factory site and comprises over 1000 ha of land. This area is cleared grazing land and is used for spray irrigation of treated effluent from the facility operations as well as wet weather storage ponds. These wet weather storage ponds on the farm 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 cattle grazing.

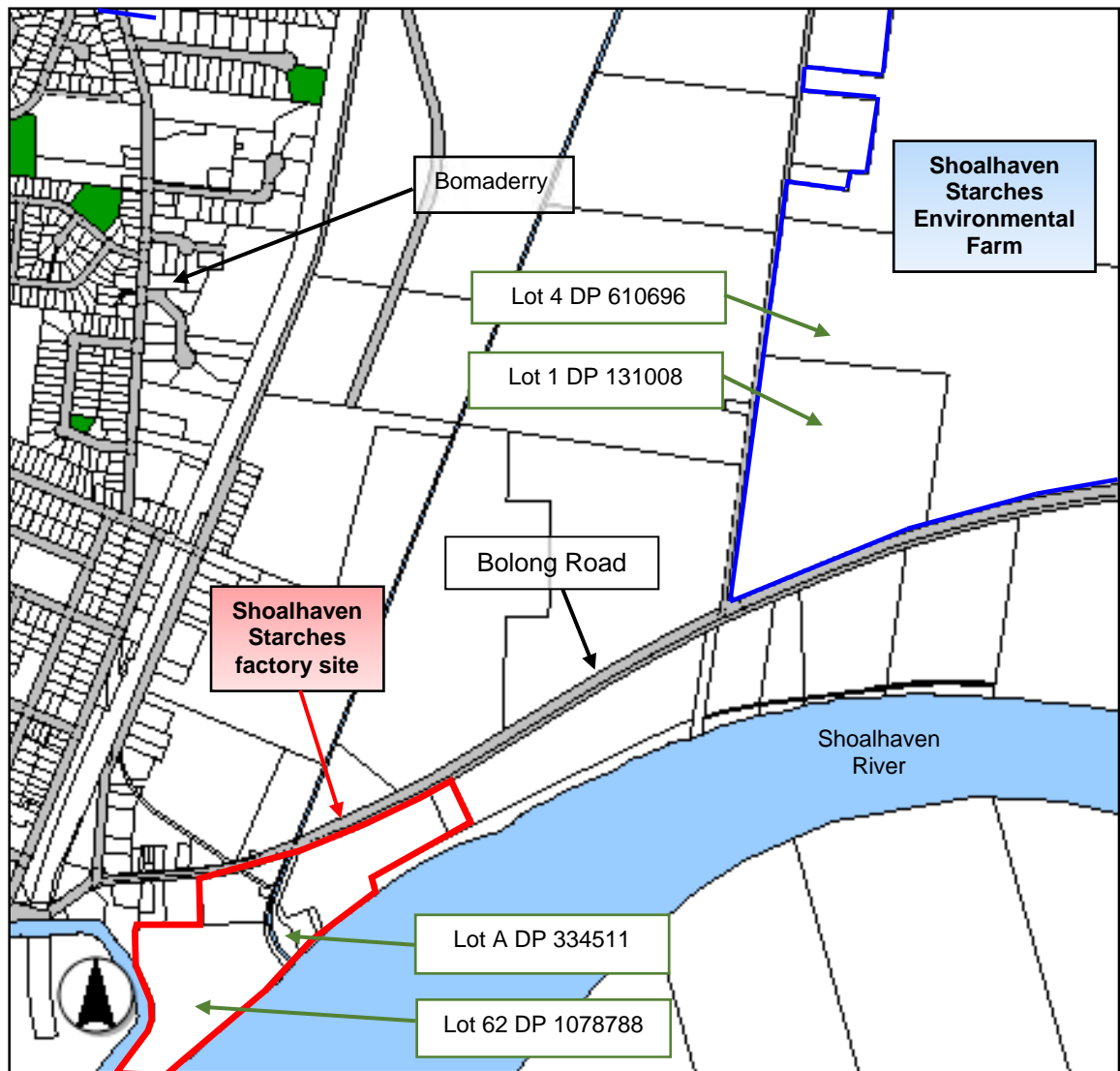
This Modification Proposal largely involves works within Lot 62 DP 1078788, which is situated within the south west part of the factory site.

The modification also includes regularisation of an existing coal and woodchip storage area located at Hanigans lane within Lot 1 DP 131008 and Lot 4 DP 610696, which form part of the Shoalhaven Starches Environmental Farm.

**Figure 1** is a site locality plan.

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. The “Riverview Road” area of the Nowra Township is situated approximately 1000 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. Burruga (Pig) Island is situated between the factory site and the village of Terara and is currently used for dairy cattle grazing.

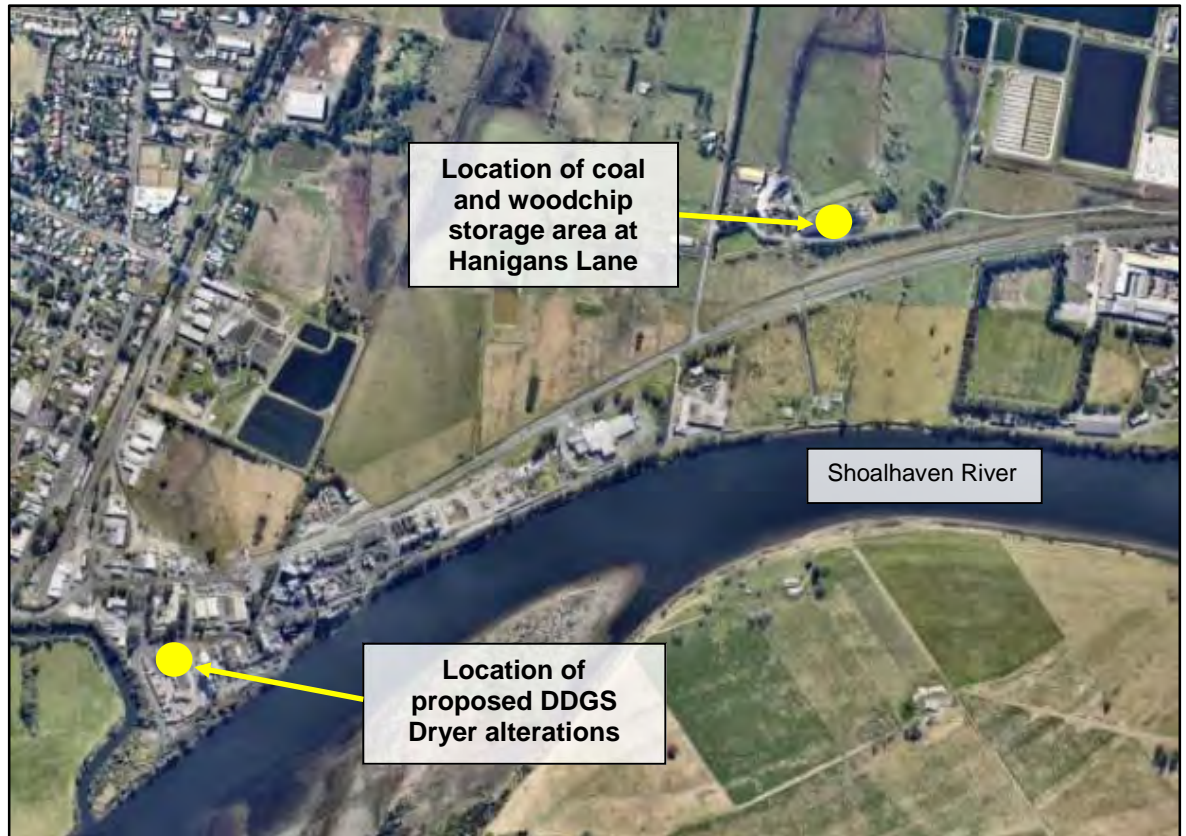


**Figure 1: Site Locality Plan.**

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 and the former 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 to the starches plant.

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.

**Figure 2** is an aerial photograph of the subject site.



**Figure 2: Aerial photograph of the subject site.**



## **3.0 BACKGROUND**

### **3.1 PRODUCTION PROCESSES**

The production process at the Shoalhaven Starches plant has developed over a number of years. Originally the plant 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 flour mills at Manildra, Gunnedah and Narrandera. The trainloads are brought into the plant via the switching yard at Bomaderry.

The Company received approval from the Minister for Planning for the erection of a flour mill on site to enable the milling of part of the Company's flour requirements to be processed directly on the site. This Flour Mill has now been commissioned. The remainder of the Company's flour requirement is sourced from the Company's off-site flour mills.

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.

The 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. Starch is used for fermentation and distillation to produce ethanol.

The 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 other industrial purposes. Liquid starch 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 products can also be used in the ethanol process.

The products 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. Industrial grade ethanol is used in producing pharmaceuticals, printer's ink and methylated spirits.

Ethanol production results in some liquid and solid by-products, which are processed through the stillage recovery process plant (which was approved as part of PRP No. 7 in 2005). The solids in the stillage are recovered as DDGS (Dried Distillers Grains Syrup), dried and sold as a high protein cattle feed with the remaining water used for irrigation. It is this process of the overall operation that forms part of this modification proposal.

The waste water resulting from the ethanol production is treated in the wastewater treatment plant and is re-used in the Starch Plant and the surplus is irrigated onto Shoalhaven Starches Environmental Farm to the north of Bolong Road. This farm land is used for fodder crops, pasture and cattle grazing.

## **3.2 OPERATING WORKFORCE**

### **3.2.1 Operations**

The existing factory operates 24 hours per day, 7 days a week, 365 days of the year.

### **3.2.2 Workforce**

The plant employs a total of around 300 staff, covering all components of production - operators, administrative personnel and maintenance staff. Employee breakdown and hours of shifts are as follows:

A total of around 300 employees	Management, Technical & Administration	60
	Day Workers	65
	Shift Production (spread over 4 shifts)	175

#### Hours of Shifts

Plant:	6:00 am to 6:00 pm	–	88 employees	
	6:00 pm to 6:00 am	–	88 employees	
	Day	–	7:00 am to 3:00 pm but variable	66 employees, 60 Management, Technical & Administration
Farm:	5:00 am to 5:00 pm	–	3 employees	
	5:00 pm to 5:00 am	–	3 employees	
	7:00 am to 3:00 pm	–	3 employees	

Shift work at both the factory and farm is undertaken on a continuous roster basis.

### **3.3 RAW MATERIALS**

Raw material and energy components used in the Shoalhaven Starches processes are flour and wheat for milling; coal, natural gas, Biogas, woodchips, electricity, fresh water and salt water.

Flour is delivered to the site by rail from the Company's mills at Manildra, Gunnedah and Narrandera each day of the week and is also produced on site in the site's flour mill. The flour arrives into the plant by Company owned and hired stainless steel rail wagons. From the silos, the flour is moved into the plant by air as required. The approved flour consumption of the plant is 20,000 tonnes per week.

Grain is delivered to the site by rail. The approved grain consumption is currently 6720 tonnes per week. The grain is milled to produce flour for further processing in the factory. The grain is "dumped" from the train into an underground hopper and conveyed by screw conveyors and bucket elevator into silos.

### **3.4 DEVELOPMENT AND APPROVAL HISTORY**

#### **3.4.1 Development History of Site Prior to Project Approval MP 06\_0228**

The Shoalhaven Starches wheat starch and gluten plant at Nowra was originally constructed in 1970. The Manildra flour mills, at Manildra, Narrandera and Gunnedah, supply the Shoalhaven Starches factory, which currently produces wheat starch, gluten, syrups and ethanol (industrial and fuel grades) and DDG. The Shoalhaven Starches operation provides direct on-site employment for 280 employees. Through the use of contractors it also indirectly creates employment for many more people in the local and regional economies.

In order to address the issue of waste water 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 waste water discharge to the Shoalhaven River.

To further reduce product 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 NSW 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.

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

- a protein isolate plant and DDGS Dryer; and
- a sorghum grinding plant.

Shoalhaven City Council obtained development approval for the construction of a wet weather storage pond (Pond No. 6) on the 27th April 2001. At present, Shoalhaven Starches has a combined waste water storage capacity within the existing ponds of 925 ML. A further wet weather storage pond (Pond No. 7) was approved by the Minister for Planning on the 23 December 2002 and subsequently modified by the approval by the Minister for Planning to form the anaerobic and aerobic parts of the wastewater treatment plant.

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 the then Section 76A(7) of the Environmental Planning & Assessment Act.

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

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

The recovery of the suspended and soluble solids from the waste water could not be undertaken by the dryers in this process, without firstly providing additional coarse solids. Additional coarse solids (grain) 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 to 126 million litres per year. 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 waste water, which was required to be disposed on the environmental farm. In this regard this previous proposal also included an increase in waste water disposal area on the Environmental Farm.

The plant associated with this previous approval has now been substantially installed and commissioned.

Shoalhaven Starches have subsequently received the following development approvals:

- The establishment of a Flour Mill on the factory site. On the 4<sup>th</sup> October 2007 the then Minister for Planning granted Project Approval MP 07\_0021 for a Flour Mill at the factory site. This proposal provides for the transportation of wheat directly to the site by train for processing into industrial grade flour for the use in the production of starch and gluten at the factory site.
- An application pursuant to Section 96 of the Environmental Planning & Assessment Act seeking to modify the development approval for the PRP No. 7 project enabled a DDGS Dryer to be installed in a slightly different location in the same building as previously approved; and the installation of an additional evaporator (a redundant piece of equipment located at the Company's Altona Plant in Victoria) to provide standby capacity for the existing evaporator plant when sections of the existing plant are out of service or cleaning.
- A modification application was also approved for a standby fermenter tank to be installed on the site, to enable the existing fermenter tanks to be taken out of service for maintenance one at a time.

A full list of all approvals that apply to the Shoalhaven Starches site are detailed within Section 3.4 of the EA prepared by our firm, in relation to the Shoalhaven Starches Expansion Project (MP 06\_0228).

#### **3.4.2 Project Approval MP 06\_0228**

On the 28<sup>th</sup> January 2009 the then Minister for Planning, issued Project Approval MP 06\_0228 for the Shoalhaven Starches Expansion Project (SSEP).

The primary objective of the SSEP was to increase the Company's ethanol production capacity to meet the expected increase in demand for ethanol primarily, arising from the NSW Government's mandate to increase ethanol content by volume in petrol in NSW from 2% to 6% from October 2011, by upgrading the existing ethanol plant.

The approval will, subject to certain conditions, enable Shoalhaven Starches to increase ethanol production in a staged manner at its Bomaderry Plant from 126 million litres per year to 300 million litres per year.

To accomplish the increase in ethanol production, the Project Approval enabled Shoalhaven Starches to upgrade plant and increase throughput of raw materials, principally comprising flour and grain.

The following additions and alterations have been approved to the existing factory site as part of this Project Approval:

- the provision of an additional dryer for the starch/gluten plant;
- additional equipment and storage vessels for the ethanol plant including 3 additional fermenters, additional cooling towers and molecular sieves;
- the establishment of a new packing plant, container loading area and a rail spur line; and
- upgrades to the Stillage Recovery Plant including 6 additional Dried Distillers Grains Syrup (DDGS) dryers; 10 decanters; chemical storage and two evaporators. It is this component of the SSEP Project Approval that is subject of this Modified Application.

In addition, as part of the Project Approval, Shoalhaven Starches also undertook comprehensive odour reduction measures for both the existing factory site and the works associated with the SSEP. In 2006, the Land and Environment Court required Shoalhaven Starches to engage a suitably qualified person to conduct a comprehensive environmental audit of the factory and Environmental Farm. This environmental audit was undertaken GHD Pty Ltd. The audit report includes a number of recommendations for the implementation of works to the existing site. These works were included within this Project Approval.

The Project Approval enables a staged implementation of the expansion project. Up to 200 million litres of ethanol will be able to be produced at the Bomaderry Plant and eventually increased up to 300 million litres.

The Project Approval also enables the biological treatment of waste waters from the factory site and the re-use of over half the treated waste water within the factory processes, with the remainder irrigated onto the Company's Environmental Farm.

The Project Approval also consolidated all previous approvals including Project Approval P 07\_0021 (the Flour Mill) into the one Project Approval.

### **3.4.3 Approval History Following MP 06\_0228**

#### ***DA 10/1843 – Upgrade Vehicle Entrance (Former Dairy Farmers Factory Site)***

Project Approval MP 06\_0228 required vehicle access points to the Bomaderry site to be upgraded to the satisfaction of Council and the RMS.

The subsequent upgrading works included the construction of a concrete median along the centre of Bolong Road to the east of Abernethy's drain in such a manner that prevented vehicles travelling east along Bolong Road turning right into the central vehicle access point to the Shoalhaven Starches site and prevented vehicles turning right out from this access point and travelling east along Bolong Road.

These works also prevented vehicles turning right out from the BOC Carbon Dioxide Plant located opposite the Shoalhaven Starches site.

Shoalhaven Starches therefore sought approval from Shoalhaven City Council to upgrade the former Dairy Farmers site vehicular access and relocate the access to enable vehicles to enter Access Point 2 from the east. These works would also allow vehicles wishing to travel west from BOC Carbon Dioxide Plant to leave this site to first travel east; by allowing vehicles to travel to the former Dairy Farmers Factory Complex and using the upgraded access to turn around before travelling west along Bolong Road.

#### ***RA 11/1002 Interim Packing Plant***

Following Project Approval MP 06\_0228 Shoalhaven Starches also obtained a separate development approval to use an existing factory building located at 22 Bolong Road (Lot 21 DP 100265) as an Interim Packing Plant from Shoalhaven City Council (RA 11/1002 dated 26<sup>th</sup> October 2011). This Interim Packing Plant operates in conjunction with the Company's existing Packing Plant which is located within the existing factory site.

As outlined in Section 3.4, Project Approval MP 06\_0228 made provision for a new Packing Plant to be located on land owned by the company on the northern side of Bolong Road.

Following the granting of MP 06\_0228 however the Manildra Group of Companies acquired the former Dairy Farmers factory site located at 220 Bolong Road. The Company has therefore been reconsidering the best location for the future Packing Plant.

In the interim period however the Flour Mill and a new product dryer were commissioned resulting in a subsequent increase in production of dried product from these new plants. Interim Packing Plant facilities were therefore required until the final location for the new packing plant is determined. It is intended that the Interim Packing Plant would operate on a temporary basis until a final location for the new Packing Plant is identified.

Shoalhaven Starches have submitted a separate modification application which seeks to modify the approved Packing Plant. Once the new Packing Plant has been commissioned, the need for the Interim Packing Plant will be reviewed.

#### ***DA 11/1855 – Widening of Driveway***

A further development application (DA 11/1855) was submitted to Shoalhaven City Council on the 4<sup>th</sup> August 2011 seeking approval to widen the driveways serving 22 Bolong Road Bomaderry (i.e. the site of the Interim Packing Plant) to accommodate semi-trailers. This development application was approved by Shoalhaven City Council on the 24<sup>th</sup> August 2011.

#### ***DA 13/1713 – Demolition of Dimethyl Ether Plant***

On the 5<sup>th</sup> July 2013 Shoalhaven Starches submitted a development application to Shoalhaven City Council seeking the demolition of a Dimethyl Ether Plant on the site. This development application was approved by Shoalhaven City Council on the 15<sup>th</sup> July 2013.

#### ***DA 14/2161 – Additional Two (2) Grain Silos***

On the 19<sup>th</sup> September 2014 Shoalhaven Starches submitted a development application to Shoalhaven City Council seeking development consent to erect two additional grain silos on the factory site within the vicinity of the existing Flour Mill. The purpose of these two additional grain silos will be to provide security of raw material storage and supply when there are closures of the Illawarra rail line serving the Shoalhaven Starches site enabling the factory operations to continue during rail line closures. Over recent years there have been occasions when there have been closures of the Illawarra rail line due to track construction work as well as a result of floods, storms and traffic accidents. During these closures the supply of grain and flour to the Shoalhaven Starches site has been interrupted. The additional grain silos associated with this application will provide a buffer for on-site storage and additional security of storage and supply should closures to the rail line occur in the future.

#### ***Other Approvals***

There have been other approvals that have been issued by Shoalhaven City Council that are located on land associated with Shoalhaven Starches operations, but which do not directly relate to the operations of Shoalhaven Starches including:



- DA 11/1936 – Algae Demonstration Plant for evaluation of algae production and processing for alternative fuel and CO<sub>2</sub> sequestration. Proponent – Algae Tec Pty Ltd at 220 Bolong Road (former Dairy Farmers factory site).
- DA 14/1327 – Alterations to existing building (former Dairy Farmers Factory Building) and re-use as a meat processing plant. Proponent – Candal Investments Pty Ltd at 220 Bolong Road (former Dairy Farmers factory site).

## 4.0 STATUTORY SITUATION

### 4.1 PART 3A OF THE EP&A ACT

The introduction of Part 3A to the Environmental Planning & Assessment Act 1979, and the introduction of *State Environmental Planning Policy (Major Development)* in 2005, brought about a change in the regime concerning the assessment of state significant development. Part 3A initially targeted the streamlining of the assessment of projects deemed to be of state significance, including critical infrastructure projects.

Following the 2011 election, the NSW Government implemented measures seeking to change the planning legislative and policy regime applicable to projects previously subject to Part 3A.

Under these legislation changes no new applications for any of the development that was previously identified as Part 3A in the Major Development SEPP will be accepted and assessed during this interim period.

The NSW Parliament subsequently passed amendments to the *Environmental Planning & Assessment Act 1979* (the EP&A Act). These amendments created an alternative assessment system which allows the NSW Government to assess and determine projects which are of State significance.

The amended EP&A Act establishes two separate assessment frameworks for either State Significant Infrastructure (SSI) or State Significant Development (SSD). Projects that fall under these two categories will be assessed by the Department of Planning and Infrastructure (the 'Department').

To this end, the Act largely returns to the situation before Part 3A where two separate assessment pathways were in place for projects to be assessed by the State, namely

- Linear public infrastructure projects such as railways, water supply systems, pipelines and transmission lines, or other development by a State agency which has a significant environmental effect; and
- Significant development types which require consent such as mines, chemical and manufacturing plants, warehousing and distribution facilities, hospitals and associated ancillary development.

The Act also introduced a number of changes to the operation and make-up of the Planning Assessment Commission (PAC) and Joint Regional Planning Panels (Regional Panels), seeking to provide additional transparency and greater local government input.

Supporting regulations and an associated new State Environmental Planning Policy (SEPP) were introduced and came into effect from the 1<sup>st</sup> October 2011. These supporting provisions provide additional detail with respect to the classes and thresholds for development to be considered as State Significant.

The *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) has also been amended to update a number of procedural and administrative arrangements.

The approved Shoalhaven Starches Expansion Project however is termed a *Transitional Part 3A Project* under the amended EP&A legislation.

These circumstances are clarified in Planning Circular PS 11-021 issued by the Department of Planning & Infrastructure on the 30<sup>th</sup> September 2011. This Circular confirms that Part 3A continues to apply to certain projects subject to transitional provisions identified in Schedule 6A of the Act.

Schedule 6A of the *EP&A Act* makes provisions for such projects. Essentially a *Transitional Part 3A Project* includes:

- (a) *an approved project (whether approved before or after the repeal of Part 3A),*
- (b) *a project for which environmental assessment requirements were notified or adopted before the repeal of Part 3A,*
- (c) *a project that is the subject of a Part 3A project application and that the regulations declare to be a transitional Part 3A project.*

As the Shoalhaven Starches Expansion Project was approved on the 28<sup>th</sup> January 2009 this project is considered a *Transitional 3A Project* for the purposes of this legislation.

Clause 3 of Schedule 6A provides for the continuation of Part 3A and Transitional Part 3A projects. Essentially it states that Part 3A continues to apply to and in respect of *Transitional Part 3A* projects. Clause 3 reads:

**3 Continuation of Part 3A – transitional Part 3A projects**

- (1) *Part 3A continues to apply to and in respect of a transitional Part 3A project.*
- (2) *For that purpose:*
  - (a) *any State environmental planning policy or other instrument made under Part 3A, as in force on the repeal of that Part and as amended after that repeal, continues to apply to and in respect of a transitional Part 3A project, and*

- (b) *declarations, orders, directions, determinations or other decisions with respect to a transitional Part 3A project continue to have effect and may continue to be made under Part 3A (including for the purpose of the application or continued application of Part 4 or 5 or other provisions of this Act in relation to the project).*
- (3) *The regulations may modify provisions of Part 3A (and the instruments or decisions referred to in subclause (2)) as they apply to a transitional Part 3A project.*
- (4) *The declaration of development as a project under Part 3A (or as a critical infrastructure project) is revoked if the development is not, or ceases to be, a transitional Part 3A project.*
- (5) *A transitional Part 3A project is not State significant development or State significant infrastructure.*
- (6) *This clause is subject to the other provisions of this Schedule.*

Given these circumstances the “old” Part 3A will continue to apply for the proposed Shoalhaven Starches Expansion Project.

Part 3A continues to apply to the SSEP. State Environmental Planning Policy (Major Projects) continues to support Part 3A of the Act.

Section 75W of the Environmental Planning & Assessment Act makes provision for the modification of Major Projects to which Part 3A applied and continues to apply.

## **4.2 SECTION 75W AND MODIFICATION PROPOSALS**

Section 75W of the EPA Act relates to modifications to approvals issued by the Minister for Planning and states:

### **75W Modification of Minister’s approval**

- (1) *In this section:*

**Minister’s approval** *means an approval to carry out a project under this Part, and includes an approval of a concept plan.*

**modification of approval** *means changing the terms of a Minister’s approval, including:*

- (a) *revoking or varying a condition of the approval or imposing an additional condition of the approval, and*
  - (b) *changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*
- (2) *The proponent may request the Minister to modify the Minister’s approval for a project. The Minister’s approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*

- (3) *The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
- (4) *The Minister may modify the approval (with or without conditions) or disapprove of the modification.*
- (5) *The proponent of a project to which section 75K applies who is dissatisfied with the determination of a request under this section with respect to the project (or with the failure of the Minister to determine the request within 40 days after it is made) may, within the time prescribed by the regulations, appeal to the Court. The Court may determine any such appeal.*
- (6) *Subsection (5) does not apply to a request to modify:*
  - (a) *an approval granted by or as directed by the Court on appeal, or*
  - (b) *a determination made by the Minister under Division 3 in connection with the approval of a concept plan.*
- (7) *This section does not limit the circumstances in which the Minister may modify a determination made by the Minister under Division 3 in connection with the approval of a concept plan.*

This application is made pursuant to Section 75W of the EPA Act.

## **4.3 LOCAL PLANNING PROVISIONS**

### **4.3.1 Shoalhaven Local Environmental Plan (SLEP) 2014**

#### ***Factory Site***

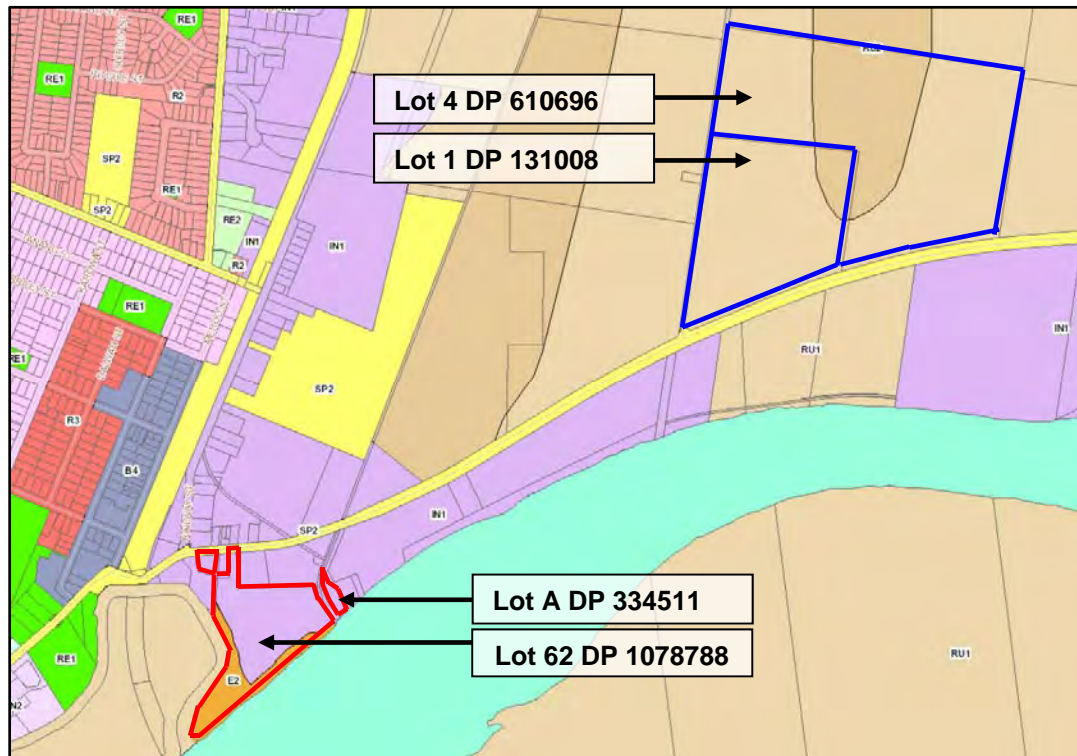
The following zones apply to that part of the subject site located within the Shoalhaven Starches factory site (refer **Figure 3**):

- Lot 62 DP 1078788 is zoned IN1 (General Industrial) and E2 (Environmental Conservation) under the provisions of SLEP 2014; and
- Lot A DP 334511 is zoned IN1 (General Industrial) under the provisions of SLEP 2014.

The objectives of the IN1 zone are:

- *To provide a wide range of industrial and warehouse land uses.*
- *To encourage employment opportunities.*
- *To minimise any adverse effect of industry on other land uses.*
- *To support and protect industrial land for industrial uses.*
- *To allow a diversity of activities that do not significantly conflict with the operation of existing or proposed development.*

- *To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.*



**Figure 3: Zoning provisions applying under Shoalhaven LEP 2014.**

The objectives of the E2 zone are:

- *To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.*
- *To prevent development that could destroy, damage or otherwise have an adverse effect on those values.*
- *To protect water quality and the ecological integrity of water supply catchments and other catchments and natural waterways.*
- *To protect the scenic, ecological, educational and recreational values of wetlands, rainforests, escarpment areas and fauna habitat linkages.*
- *To conserve and, where appropriate, restore natural vegetation in order to protect the erosion and slippage of steep slopes.*

It is our view that the proposal is consistent with the IN1 objectives as the proposal involves alterations and additions to an existing industrial activity. Furthermore the proposal includes measures to minimise the effects of the proposal.

The Modification Proposal will not involve construction or operations within E2 zoned land. The Proposed Modification will only affect the E2 zoned land insofar as it involves relocation of approved cooling towers currently located adjacent to the Shoalhaven River frontage and which encroach into E2 zoned land. It is proposed to relocate these cooling towers adjacent to the DDGS Dryer Building, which they will serve. As such the proposed relocation of the cooling towers will move them further away from the river and entirely within the industrial zoned portion of the site.

**Table 1** identifies the permissible land uses within the IN1 zone under the provisions of the Shoalhaven LEP 2014.

**Table 1**  
**Land Use Permissibility – IN1 Zone (Shoalhaven LEP 2014)**

<b>Permitted without consent</b>	Nil.
<b>Permitted with consent</b>	Bulky goods premises; Depots; Freight transport facilities; General industries; Industrial training facilities; Kiosks; Light industries; Markets; Neighbourhood shops; Roads; Take away food and drink premises; Timber yards; Warehouse or distribution centres; Any other development not specified in item 2 or 4.
<b>Prohibited</b>	Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Correctional centres; Crematoria; Eco-tourist facilities; Educational establishments; Environmental facilities; Exhibition villages; Extractive industries; Farm buildings; Forestry; Function centres; Health services facilities; Highway service centres; Home-based childcare; Home businesses; Home occupations; Home occupations (sex services); Information and education facilities; Marinas; Mooring pens; Moorings; Office premises; Open cut mining; Places of public worship; Registered clubs; Residential accommodation; Respite day care centres; Restricted premises; Retail premises; Sex services premises; Tourist and visitor accommodation; Water recreation structures; Wharf or boating facilities.

The proposed modifications are part of the Shoalhaven Starches operation, which can be described as a heavy industry or a rural industry in accordance with the following definitions provided by SLEP 2014:

***heavy industry*** means a building or place used to carry out an industrial activity that requires separation from other development because of the nature of the processes involved, or the materials used, stored or produced, and includes:

- (a) *hazardous industry, or*
- (b) *offensive industry.*

*It may also involve the use of a hazardous storage establishment or offensive storage establishment.*

**rural industry** means the handling, treating, production, processing, storage or packing of animal or plant agricultural products for commercial purposes, and includes any of the following:

- (a) *agricultural produce industries,*
- (b) *livestock processing industries,*
- (c) *composting facilities and works (including the production of mushroom substrate),*
- (d) *sawmill or log processing works,*
- (e) *stock and sale yards,*
- (f) *the regular servicing or repairing of plant or equipment used for the purposes of a rural enterprise.*

Neither heavy industry nor rural industry are listed as prohibited uses within the IN1 zone and therefore by their exclusion are permissible subject to obtaining development consent. Under these circumstances, that part of the proposal located within the factory site is permissible subject to obtaining development consent.

### ***Environmental Farm***

The proposal also includes the regularisation and expansion of an existing coal and wood chip storage areas located within the Shoalhaven Starches Environmental Farm. The lands associated with this aspect of the modification proposal are zoned RU1 (Primary Production) and RU2 (Rural Landscape); and

The objectives of the RU1 zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To conserve and maintain productive prime crop and pasture land.*
- *To conserve and maintain the economic potential of the land within this zone for extractive industries.*

The objectives of the RU2 zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*



- *To maintain the rural landscape character of the land.*
- *To provide for a range of compatible land uses, including extensive agriculture.*

It is our view that the proposal is consistent with the RU1 and RU2 objectives given that:

- The coal and woodchip storage area is an ancillary activity to an existing rural industry (ie. the Shoalhaven Starches factory operations).
- The storage activity will not result in the fragmentation or alienation of land.
- The proposal will not affect the natural resource base or economic potential of the land.
- The affected site forms part of the wider Shoalhaven Starches Environmental Farm and is compatible with surrounding land uses.
- The rural landscape will not be significantly affected by the proposal (see Section 8.5).

**Tables 2 and 3** identify the permissible land uses within the RU1 and RU2 zones under the provisions of the Shoalhaven LEP 2014.

**Table 2**  
**Land Use Permissibility – RU1 Zone (Shoalhaven LEP 2014)**

<b>Permitted without consent</b>	Extensive agriculture; Forestry; Home occupations.
<b>Permitted with consent</b>	Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Boat building and repair facilities; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Cellar door premises; Cemeteries; Charter and tourism boating facilities; Community facilities; Crematoria; <b>Depots</b> ; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Food and drink premises; Group homes; Helipads; Home-based child care; Home businesses; Home industries; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Marinas; Markets; Mooring pens; Moorings; Offensive industries; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Roads; Roadside stalls; <b>Rural industries</b> ; Rural workers' dwellings; Tourist and visitor accommodation; Veterinary hospitals; Water recreation structures; Water supply systems.
<b>Prohibited</b>	Hotel or motel accommodation; Pubs; Serviced apartments; Any other development not specified in item 2 or 3.

**Table 3**  
**Land Use Permissibility – RU2 Zone (Shoalhaven LEP 2014)**

<b>Permitted without consent</b>	Extensive agriculture; Forestry; Home occupations.
<b>Permitted with consent</b>	Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Boat building and repair facilities; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Charter and tourism boating facilities; Community facilities; Crematoria; <b>Depots</b> ; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Food and drink premises; Freight transport facilities; Funeral homes; Group homes; Hazardous industries; Helipads; Home-based child care; Home businesses; Home industries; Information and education facilities; Marinas; Markets; Mooring pens; Moorings; Offensive industries; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Roads; Roadside stalls; <b>Rural industries</b> ; Tourist and visitor accommodation; Veterinary hospitals; Water recreation structures; Water supply systems.
<b>Prohibited</b>	Hotel or motel accommodation; Pubs; Serviced apartments; Any other development not specified in item 2 or 3.

Depots are permissible within the RU1 and RU2 zones. The Shoalhaven LEP 2014 provides the following definition for a Depot:

***depot** means a building or place used for the storage (but not sale or hire) of plant, machinery or other goods (that support the operations of an existing undertaking) when not required for use, but does not include a farm building.*

The coal and woodchip storage area that is the subject of the proposed regularisation is located within the Environmental Farm and affects land zoned as RU1 and RU2. The storage of coal and woodchips at this location supports the operation of the Shoalhaven Starches factory site. The storage area is considered to be consistent with the above definition of ‘depot’ and is therefore permissible subject to Council’s consent.

The proposal may also be considered permissible given that is an ancillary activity to an existing rural industry (see above). Rural industries are also permissible within the RU1 and RU2 zones.

Under these circumstances, the storage of coal and woodchips at Hanigans Lane is considered to be permissible subject to Council’s consent.

### **Other LEP Provisions**

The SLEP 2014 also has a number of specific provisions that apply to the land. The implications that these provisions have in relation to this proposal are discussed in **Table 4** below. Commentary applies to the entire subject land (ie. that located within the factory site and the environmental farm), unless specified otherwise.

**Table 4**  
**Shoalhaven LEP 2014 Provisions**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
4.3 <i>Height of Buildings</i>	<p>(1) <i>The objectives of this clause are as follows:</i></p> <p>(a) <i>to ensure that buildings are compatible with the height, bulk and scale of the existing and desired future character of a locality,</i></p> <p>(b) <i>to minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development,</i></p> <p>(c) <i>to ensure that the height of buildings on or in the vicinity of a heritage item or within a heritage conservation area respect heritage significance.</i></p> <p>(2) <i>The height of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map.</i></p> <p>(2A) <i>If the Height of Buildings Map does not show a maximum height for any land, the height of a building on the land is not to exceed 11 metres.</i></p>	<p>The proposal involves the installation of additional plant and works within a similar footprint to the approved development. The proposed DDGS Dryer building will have a height above ground level of 22 m, and the exhaust stack serving the Dryer Building will have a height above ground level of 30 m. The proposed Mill feed silo will have a height above ground level of 23 m.</p> <p>Other proposed built components involve:</p> <ul style="list-style-type: none"> <li>• relocation of cooling towers, which will have a height above ground level of 9.4 m;</li> <li>• construction of a forklift maintenance building that will have a height above ground level of approximately 10 m; and</li> <li>• installation of two additional biofilters which have a height above ground level of 2 m.</li> </ul> <p>Although there is no maximum height specified for the subject land part (2a) of Clause 4.3 of SLEP 2014 states no building is to be in excess of 11 metres.</p> <p>As such a submission for an exception to development standards under Clause 4.6 of the SLEP 2014 has been prepared and is attached under <b>Annexure 3</b>.</p>

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
4.6 Exceptions to development standards	<p>(1) <i>The objectives of this clause are as follows:</i></p> <p style="padding-left: 40px;">(a) <i>to provide an appropriate degree of flexibility in applying certain development standards to particular development,</i></p> <p style="padding-left: 40px;">(b) <i>to achieve better outcomes for and from development by allowing flexibility in particular circumstances.</i></p> <p>(2) <i>Development consent may, subject to this clause, be granted for development even though the development would contravene a development standard imposed by this or any other environmental planning instrument.</i></p> <p style="padding-left: 40px;"><i>However, this clause does not apply to a development standard that is expressly excluded from the operation of this clause.</i></p> <p>(3) <i>Development consent must not be granted for development that contravenes a development standard unless the consent authority has considered a written request from the applicant that seeks to justify the contravention of the development standard by demonstrating:</i></p> <p style="padding-left: 40px;">(a) <i>that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case, and</i></p> <p style="padding-left: 40px;">(b) <i>that there are sufficient environmental planning grounds to justify contravening the development standard.</i></p> <p>(4) <i>Development consent must not be granted for development that contravenes a development standard unless:</i></p> <p style="padding-left: 40px;">(a) <i>the consent authority is satisfied that:</i></p> <p style="padding-left: 80px;">(i) <i>the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3), and</i></p> <p style="padding-left: 80px;">(ii) <i>the proposed development will be in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out, and</i></p> <p style="padding-left: 40px;">(b) <i>the concurrence of the Director-General has been obtained.</i></p> <p>(5) <i>In deciding whether to grant concurrence, the Director-General must consider:</i></p>	<p>The height of the proposed dryer building, stack and mill feed silo exceeds the 11 metre maximum as specified in (2A) of Clause 4.3 Height of Buildings of the SLEP 2014.</p> <p>Given the nature and scale of the proposal, and as the proposed modifications to the approved DDGS Dryers will be located within the existing industrial complex, it is not expected that the new development will have an undue effect due to its height.</p> <p>A submission for an exception to development standards has been prepared and is attached to the EA under <b>Annexure 3</b>.</p>

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
4.6 continued	<p>(a) whether contravention of the development standard raises any matter of significance for State or regional environmental planning, and</p> <p>(b) the public benefit of maintaining the development standard, and</p> <p>(c) any other matters required to be taken into consideration by the Director-General before granting concurrence.</p> <p>(6) Development consent must not be granted under this clause for a subdivision of land in Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone RU3 Forestry, Zone RU4 Primary Production Small Lots, Zone RU6 Transition, Zone R5 Large Lot Residential, Zone E2 Environmental Conservation, Zone E3 Environmental Management or Zone E4 Environmental Living if:</p> <p>(a) the subdivision will result in 2 or more lots of less than the minimum area specified for such lots by a development standard, or</p> <p>(b) the subdivision will result in at least one lot that is less than 90% of the minimum area specified for such a lot by a development standard.</p> <p>Note. When this Plan was made it did not include all of these zones.</p> <p>(7) After determining a development application made pursuant to this clause, the consent authority must keep a record of its assessment of the factors required to be addressed in the applicant's written request referred to in subclause (3).</p> <p>(8) This clause does not allow development consent to be granted for development that would contravene any of the following:</p> <p>(a) a development standard for complying development,</p> <p>(b) a development standard that arises, under the regulations under the Act, in connection with a commitment set out in a BASIX certificate for a building to which State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 applies or for the land on which such a building is situated,</p> <p>(c) clause 5.4,</p> <p>(ca) clause 6.1 or 6.2.</p>	

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
5.5 <i>Development within the coastal zone</i>	<p>(1) <i>The objectives of this clause are as follows:</i></p> <p>(a) <i>to provide for the protection of the coastal environment of the State for the benefit of both present and future generations through promoting the principles of ecologically sustainable development,</i></p> <p>(b) <i>to implement the principles in the NSW Coastal Policy, and in particular to:</i></p> <p>(i) <i>protect, enhance, maintain and restore the coastal environment, its associated ecosystems, ecological processes and biological diversity and its water quality, and</i></p> <p>(ii) <i>protect and preserve the natural, cultural, recreational and economic attributes of the NSW coast, and</i></p> <p>(iii) <i>provide opportunities for pedestrian public access to and along the coastal foreshore, and</i></p> <p>(iv) <i>recognise and accommodate coastal processes and climate change, and</i></p> <p>(v) <i>protect amenity and scenic quality, and</i></p> <p>(vi) <i>protect and preserve rock platforms, beach environments and beach amenity, and</i></p> <p>(vii) <i>protect and preserve native coastal vegetation, and</i></p> <p>(viii) <i>protect and preserve the marine environment, and</i></p> <p>(ix) <i>ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and</i></p> <p>(x) <i>ensure that decisions in relation to new development consider the broader and cumulative impacts on the catchment, and</i></p> <p>(xi) <i>protect Aboriginal cultural places, values and customs, and</i></p> <p>(xii) <i>protect and preserve items of heritage, archaeological or historical significance</i></p>	<p>The subject land is located within the coastal zone.</p> <p>The proposal is not considered to adversely affect the coastal zone based on the following:</p> <ul style="list-style-type: none"> <li>• The proposal does not affect or impinge on public access to or along the coastal foreshore.</li> <li>• The proposed development is situated adjacent to existing industrial development and also includes a component (coal and woodchip storage) located within a site that forms part of the Shoalhaven Starches Environmental Farm.</li> <li>• The proposal is considered to be suitable development given its type, location and design.</li> <li>• The development is consistent with the zoning objectives for the land.</li> <li>• The development will not lead to overshadowing of foreshore areas.</li> <li>• The scenic qualities of the area will not be significantly diminished. Visual impact is further addressed in Section 8.5 of this EA.</li> <li>• The proposal will not lead to adverse impacts on threatened fauna and flora.</li> </ul>

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
5.5 continued	<p>(2) <i>Development consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority has considered:</i></p> <p>(a) <i>existing public access to and along the coastal foreshore for pedestrians (including persons with a disability) with a view to:</i></p> <p>(i) <i>maintaining existing public access and, where possible, improving that access, and</i></p> <p>(ii) <i>identifying opportunities for new public access, and</i></p> <p>(b) <i>the suitability of the proposed development, its relationship with the surrounding area and its impact on the natural scenic quality, taking into account:</i></p> <p>(i) <i>the type of the proposed development and any associated land uses or activities (including compatibility of any land-based and water-based coastal activities), and</i></p> <p>(ii) <i>the location, and</i></p> <p>(iii) <i>the bulk, scale, size and overall built form design of any building or work involved, and</i></p> <p>(c) <i>the impact of the proposed development on the amenity of the coastal foreshore including:</i></p> <p>(i) <i>any significant overshadowing of the coastal foreshore, and</i></p> <p>(ii) <i>any loss of views from a public place to the coastal foreshore, and</i></p> <p>(d) <i>how the visual amenity and scenic qualities of the coast, including coastal headlands, can be protected, and</i></p> <p>(e) <i>how biodiversity and ecosystems, including:</i></p> <p>(i) <i>native coastal vegetation and existing wildlife corridors, and</i></p> <p>(ii) <i>rock platforms, and</i></p> <p>(iii) <i>water quality of coastal waterbodies, and</i></p> <p>(iv) <i>native fauna and native flora, and their habitats, can be conserved, and</i></p>	

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
5.5 continued	<p>(f) <i>the cumulative impacts of the proposed development and other development on the coastal catchment.</i></p> <p>(3) <i>Development consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority is satisfied that:</i></p> <p>(a) <i>the proposed development will not impede or diminish, where practicable, the physical, land-based right of access of the public to or along the coastal foreshore, and</i></p> <p>(b) <i>if effluent from the development is disposed of by a non-reticulated system, it will not have a negative effect on the water quality of the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and</i></p> <p>(c) <i>the proposed development will not discharge untreated stormwater into the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and</i></p> <p>(d) <i>the proposed development will not:</i></p> <p>(i) <i>be significantly affected by coastal hazards, or</i></p> <p>(ii) <i>have a significant impact on coastal hazards, or</i></p> <p>(iii) <i>increase the risk of coastal hazards in relation to any other land.</i></p>	
5.10 Heritage Conservation	<p>(1) <i>The objectives of this clause are:</i></p> <p>(a) <i>to conserve the environmental heritage of Shoalhaven; and</i></p> <p>(b) <i>to conserve the heritage significance of heritage items and heritage conservation areas including associated fabric, settings and views; and</i></p> <p>(c) <i>to conserve archaeological sites; and</i></p> <p>(d) <i>to conserve Aboriginal objects and Aboriginal places of heritage significance.</i></p> <p>(2) <i>Development consent is required for any of the following:</i></p> <p>(a) <i>demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):</i></p>	There are no heritage items within the subject land. And the subject site is not located within a heritage conservation area.



**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
5.10 continued	<ul style="list-style-type: none"> <li>(i) a heritage item,</li> <li>(ii) an Aboriginal object</li> <li>(iii) a building, work, relic or tree within a heritage conservation area,</li> <li>(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,</li> <li>(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,</li> <li>(d) disturbing or excavating an Aboriginal place of heritage significance,</li> <li>(e) erecting a building on land: <ul style="list-style-type: none"> <li>(i) on which a heritage item is located or that is within a heritage conservation area;</li> <li>(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,</li> </ul> </li> <li>(f) subdividing land: <ul style="list-style-type: none"> <li>(i) on which a heritage item is located or that is within a heritage conservation area, or</li> <li>(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.</li> </ul> </li> </ul>	
7.1 Acid sulfate soils	<ul style="list-style-type: none"> <li>(1) The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.</li> <li>(2) Development consent is required for the carrying out of works described in the Table to this subclause on land shown on the Acid Sulfate Soils Map as being of the class specified for those works, except as provided by this clause.</li> </ul>	<p><b>Factory Site</b></p> <p>Acid Sulfate Soils mapping supporting the SLEP 2014 identifies the majority of the subject land located within the factory site as Class 4 land.</p> <p>Geotechnical reports undertaken by Coffey Geotechnics have been</p>

**Table 4 (continued)**

SLEP 2014 Clause	Provisions	Comments												
7.1 continued	<table><tr><th>Class of Land</th><th>Works</th></tr><tr><td>1</td><td>Any works.</td></tr><tr><td>2</td><td>Works below the natural ground surface. Works by which the watertable is likely to be lowered.</td></tr><tr><td>3</td><td>Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.</td></tr><tr><td>4</td><td>Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.</td></tr><tr><td>5</td><td>Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.</td></tr></table> <p>(3) Development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority.</p> <p>(4) Despite subclause (2), development consent is not required under this clause for the carrying out of works if:</p> <p>(a) a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works, and</p> <p>(b) the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.</p>	Class of Land	Works	1	Any works.	2	Works below the natural ground surface. Works by which the watertable is likely to be lowered.	3	Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.	4	Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.	5	Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.	<p>undertaken in the past for the subject site. This assessment included an assessment of ASS soils.</p> <p>Coffey advised that acid sulfate soils exist at depths greater than 3 m at the site. At shallower depths, there is a low risk that acid sulfate soils are present.</p> <p>Coffey have previously noted that if the proposed development involves excavation of soils from depths greater than 3 m at the site, an Acid Sulfate Soils Management Plan (ASSMP) should be developed beforehand.</p> <p>An ASSMP will present the approach and methodology of acid sulfate soil management at the site during the construction phase of the project which is to be followed by Manildra and/or their subcontractors. The ASSMP should be prepared in accordance with the relevant sections of the 1998 ASS Manual prepared by ASSMAC.</p> <p>The detail of the ASSMP can be refined based on the likely volumes to be extracted. For small volumes a simple work plan may be sufficient. If possible, avoidance of disturbing the ASS is preferred.</p> <p><b>Environmental Farm</b></p> <p>Acid Sulfate Soils mapping supporting the SLEP 2014 identifies the subject land located within the environmental farm as Class 2 and 3 land.</p>
Class of Land	Works													
1	Any works.													
2	Works below the natural ground surface. Works by which the watertable is likely to be lowered.													
3	Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.													
4	Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.													
5	Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.													

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
7.1 continued	<p>(5) <i>Despite subclause (2), development consent is not required under this clause for the carrying out of any of the following works by a public authority (including ancillary work such as excavation, construction of access ways or the supply of power):</i></p> <ul style="list-style-type: none"> <li>(a) <i>emergency work, being the repair of the works of the public authority required to be carried out urgently because the works have been damaged, have ceased to function or pose a risk to the environment or to public health and safety,</i></li> <li>(b) <i>routine management work, being the periodic inspection, cleaning, repair or replacement of the works of the public authority (other than work that involves the disturbance of more than 1 tonne of soil).</i></li> <li>(c) <i>minor work, being work that costs less than \$20,000 (other than drainage work).</i></li> </ul> <p>(6) <i>Despite subclause (2), development consent is not required under this clause to carry out any works if:</i></p> <ul style="list-style-type: none"> <li>(a) <i>the works involve the disturbance of less than 1 tonne of soil, and</i></li> <li>(b) <i>the works are not likely to lower the watertable.</i></li> </ul>	<p>This part of the subject land is used as a coal and woodchip storage area and does not involve any earthworks. Under these circumstances the provision of this clause will not apply to this part of the subject land.</p>
7.3 Flood Planning	<p>(1) <i>The objectives of this clause are as follows:</i></p> <ul style="list-style-type: none"> <li>(a) <i>to minimise the flood risk to life and property associated with the use of land,</i></li> <li>(b) <i>to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,</i></li> <li>(c) <i>to avoid significant adverse impacts on flood behaviour and the environment.</i></li> </ul> <p>(2) <i>This clause applies to:</i></p> <ul style="list-style-type: none"> <li>(a) <i>land identified as "Flood Planning Area" on the Flood Planning Area Map, and</i></li> <li>(b) <i>other land at or below the flood planning level.</i></li> </ul> <p>(3) <i>Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:</i></p> <ul style="list-style-type: none"> <li>(a) <i>is compatible with the flood hazard of the land, and</i></li> </ul>	<p>The <i>Flood Planning Area Map</i> that accompanies the SLEP 2014 identifies the subject land as flood prone land.</p> <p>The application is supported by a Flood Impact Assessment undertaken by WMA (<b>Annexure 4</b>). This issue is discussed further in Section 8.4 of this EA.</p>

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
7.3 continued	<p>(b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and</p> <p>(c) incorporates appropriate measures to manage risk to life from flood, and</p> <p>(d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and</p> <p>(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding, and</p> <p>(f) will not affect the safe occupation or evacuation of the land.</p> <p>(4) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this clause.</p> <p>(5) In this clause: <b>flood planning level</b> means the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard.</p>	
7.4 Coastal Risk Planning	<p>(1) The objectives of this clause are as follows:</p> <p>(a) to avoid significant adverse impacts from coastal hazards,</p> <p>(b) to ensure uses of land identified as coastal risk are compatible with the risks presented by coastal hazards,</p> <p>(c) to enable the evacuation of land identified as coastal risk in an emergency,</p> <p>(d) to avoid development that increases the severity of coastal hazards.</p> <p>(2) This clause applies to the land identified as "Coastal Risk Planning Area" on the Coastal Risk Planning Map.</p> <p>(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:</p> <p>(a) will avoid, minimise or mitigate exposure to coastal processes, and</p> <p>(b) is not likely to cause detrimental increases in coastal risks to other development or properties, and</p>	<p>The Coastal Risk Planning Map that accompanies the SLEP 2014 does <u>not</u> identify the subject land as a "Coastal Risk Planning Area".</p> <p>The provisions of this clause therefore do not apply to the subject site.</p>

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
7.4 continued	<p>(c) is not likely to alter coastal processes and the impacts of coastal hazards to the detriment of the environment, and</p> <p>(d) incorporates appropriate measures to manage risk to life from coastal risks, and</p> <p>(e) is likely to avoid or minimise adverse effects from the impact of coastal processes and the exposure to coastal hazards, and</p> <p>(f) provides for the relocation, modification or removal of the development to adapt to the impact of coastal processes and coastal hazards, and</p> <p>(g) has regard to the impacts of sea level rise.</p> <p>(4) A word or expression used in this clause has the same meaning as it has in the NSW Coastal Planning Guideline: Adapting to Sea Level Rise (ISBN 978-1-74263-035-9) published by the NSW Government in August 2010, unless it is otherwise defined in this clause.</p> <p>(5) In this clause: <b>coastal hazard</b> has the same meaning as in the Coastal Protection Act 1979.</p>	
7.5 Terrestrial Biodiversity	<p>(1) The objective of this clause is to maintain terrestrial biodiversity, by:</p> <p>(a) protecting native flora and fauna,</p> <p>(b) protecting the ecological processes necessary for their continued existence, and</p> <p>(c) encouraging the recovery of native flora and fauna, and their habitats.</p> <p>(2) This clause applies to land:</p> <p>(a) identified as “Biodiversity—habitat corridor” or “Biodiversity—significant vegetation” on the Terrestrial Biodiversity Map, and</p> <p>(b) situated within 40m of the bank (measured horizontally from the top of the bank) of a natural waterbody.</p> <p>(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:</p> <p>(a) whether the development is likely to have:</p> <p>(i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and</p>	<p><b>Factory Site</b></p> <p>The Terrestrial Biodiversity Map that accompanies the SLEP 2014 does <u>not</u> identify the subject land located within the factory site as including areas of Biodiversity - habitat corridor and/or Biodiversity - significant vegetation.</p> <p>Given the nature of the subject land at this location and that the proposal affects existing developed areas only, the proposal will not have any adverse impacts on the ecological value of the land.</p> <p>There is no vegetation of importance located on the land.</p> <p><b>Environmental Farm</b></p> <p>The Terrestrial Biodiversity Map that accompanies the SLEP 2014 does <u>not</u> identify the subject land located within</p>

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
7.5 continued	<p>(ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and</p> <p>(iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and</p> <p>(iv) any adverse impact on the habitat elements providing connectivity on the land, and</p> <p>(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.</p> <p>(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:</p> <p>(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or</p> <p>(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or</p> <p>(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.</p> <p>(5) For the purpose of this clause:</p> <p><b>bank</b> means the limit of the bed of a natural waterbody.</p> <p><b>bed</b>, of a natural waterbody, means the whole of the soil of the channel in which the waterbody flows, including the portion that is alternatively covered and left bare with an increase or diminution in the supply of water and that is adequate to contain the waterbody at its average or mean stage without reference to extraordinary freshets in the time of flood or to extreme droughts.</p>	<p>the environmental farm as including areas of <i>Biodiversity</i> - <i>habitat corridor</i> and/or <i>Biodiversity</i> - <i>significant vegetation</i>.</p> <p>The area that is used for coal and woodchip storage comprises cleared land.</p> <p>Under these circumstances, the proposed storage area will not have any adverse impacts on the ecological value of the land.</p>
7.6 Riparian land and watercourses	<p>(1) The objective of this clause is to protect and maintain the following:</p> <p>(a) water quality within watercourses,</p> <p>(b) the stability of the bed and banks of watercourses,</p> <p>(c) aquatic and riparian habitats,</p> <p>(d) ecological processes within watercourses and riparian areas.</p>	<p>The <i>Riparian Lands and Watercourses Map</i> that accompanies the SLEP 2014 identify: a class 1 watercourse, (Shoalhaven River) to the south of the subject site; a class 1 watercourse, (Bomaderry Creek) to the west of Lot 62</p>

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
7.6 continued	<p>(2) <i>This clause applies to all of the following:</i></p> <ul style="list-style-type: none"> <li>(a) <i>land identified as “Riparian Land” on the Riparian Lands and Watercourses Map,</i></li> <li>(b) <i>land identified as “Watercourse Category 1”, “Watercourse Category 2” or “Watercourse Category 3” on that map,</i></li> <li>(c) <i>all land that is within 50 metres of the top of the bank of each watercourse on land identified as “Watercourse Category 1”, “Watercourse Category 2” or “Watercourse Category 3” on that map.</i></li> </ul> <p>(3) <i>Before determining a development application for development on land to which this clause applies, the consent authority must consider:</i></p> <ul style="list-style-type: none"> <li>(a) <i>whether or not the development is likely to have any adverse impact on the following:</i> <ul style="list-style-type: none"> <li>(i) <i>the water quality and flows within the watercourse,</i></li> <li>(ii) <i>aquatic and riparian species, habitats and ecosystems of the watercourse,</i></li> <li>(iii) <i>the stability of the bed and banks of the watercourse,</i></li> <li>(iv) <i>the free passage of fish and other aquatic organisms within or along the watercourse,</i></li> <li>(v) <i>any future rehabilitation of the watercourse and its riparian areas, and</i></li> </ul> </li> <li>(b) <i>whether or not the development is likely to increase water extraction from the watercourse, and</i></li> <li>(c) <i>any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.</i></li> </ul> <p>(4) <i>Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:</i></p> <ul style="list-style-type: none"> <li>(a) <i>the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or</i></li> <li>(b) <i>if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or</i></li> </ul>	<p>DP 1078788; and a class 2 watercourse, (Abernethy’s Creek) to the east of Lot 62 DP 1078788 and to the west of Lot A DP 334511.</p> <p>This EA is supported by a Geotechnical Assessment carried out by Coffey Geotechnics (<b>Annexure 8</b>), which includes an assessment of potential impacts associated with riverbank stability (see Section 8.6 of this EA).</p>

**Table 4 (continued)**

SLEP 2014 Clause	Provisions	Comments
7.6 continued	<p>(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.</p> <p>(5) For the purpose of this clause:</p> <p><b>bank</b> means the limit of the bed of a watercourse.</p> <p><b>bed</b>, of a watercourse, means the whole of the soil of the channel in which the watercourse flows, including the portion that is alternatively covered and left bare with an increase or diminution in the supply of water and that is adequate to contain the watercourse at its average or mean stage without reference to extraordinary freshets in the time of flood or to extreme droughts.</p>	
7.7 Landslide risk and other land degradation	<p>(1) The objective of this clause is to maintain soil resources and the diversity and stability of landscapes, including protecting land:</p> <p>(a) comprising steep slopes, and</p> <p>(b) susceptible to other forms of land degradation.</p> <p>(2) This clause applies to the following land:</p> <p>(a) land with a slope in excess of 20% (1:5), as measured from the contours of a 1:25,000 topographical map, and</p> <p>(b) land identified as “Sensitive Area” on the Natural Resource Sensitivity—Land Map.</p> <p>(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider any potential adverse impact, either from, or as a result of, the development in relation to:</p> <p>(a) the geotechnical stability of the site, and</p> <p>(b) the probability of increased erosion or other land degradation processes.</p> <p>(4) Before granting consent to development on land to which this clause applies, the consent authority must be satisfied that:</p> <p>(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or</p> <p>(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or</p> <p>(c) if that impact cannot be minimised – the development will be managed to mitigate that impact.</p>	<p>The Natural Resource Sensitivity Map that accompanies the SLEP 2014 identifies Lot A DP 334511 as a sensitive area.</p> <p>This EA is supported by a Geotechnical Assessment carried out by Coffey Geotechnics (<b>Annexure 8</b>), which includes an assessment of potential impacts associated with riverbank stability (see Section 8.6 of this EA).</p>



**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
7.7 continued	(5) <i>In this clause, topographical map means the most current edition of a topographical map, produced by Land and Property Information, a division of the Department of Finance and Services, that identifies the Council's local government area and boundary.</i>	
7.8 Scenic protection	<p>(1) <i>The objective of this clause is to protect the natural environmental and scenic amenity of land that is of high scenic value.</i></p> <p>(2) <i>This clause applies to land identified as "Scenic Protection" on the Scenic Protection Area Map.</i></p> <p>(3) <i>In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must:</i></p> <p style="padding-left: 20px;">(a) <i>consider the visual impact of the development when viewed from a public place and be satisfied that the development will involve the taking of measures that will minimise any detrimental visual impact, and</i></p> <p style="padding-left: 20px;">(b) <i>consider the number, type and location of existing trees and shrubs that are to be retained and the extent of landscaping to be carried out on the site, and</i></p> <p style="padding-left: 20px;">(c) <i>consider the siting of the proposed buildings.</i></p>	<p>The subject land is <u>not</u> identified as being within a "Scenic Protection" area by Scenic Protection Area Mapping that accompanies the SLEP 2014.</p> <p>The provisions of this clause therefore do not apply to the subject site.</p> <p>However the development site is adjacent to the northern bank of the Shoalhaven River which is identified as being within a Scenic Protection area. The visual impact associated with this proposal is discussed in Section 8.5 of this EA.</p>
7.15 Development in the vicinity of extractive industries and sewerage treatment plants	<p>(1) <i>The objective of this clause is to protect the operational environment of certain industries operating on the land to which this clause applies.</i></p> <p>(2) <i>This clause applies to land identified as "Extractive Industry" and "Sewage Treatment Plant" on the Buffers Map.</i></p> <p>(3) <i>Development consent must not be granted to the carrying out of development on land to which this clause applies unless the consent authority has:</i></p> <p style="padding-left: 20px;">(a) <i>made an assessment of the impact of noise, odour and other emissions from any industry carried out on that land, and</i></p> <p style="padding-left: 20px;">(b) <i>considered the potential impact of noise, odour and other emissions associated with that industry on any activities that will be associated with the development, and</i></p>	<p>The Buffers Map that accompanies the SLEP 2014 identifies the subject land is located within the vicinity of a sewerage treatment plant.</p> <p>The SEE is supported by an Air Quality Modelling (<b>Annexure 5</b>) and a Noise Impact Assessment that make recommendations for the development.</p>

**Table 4 (continued)**

<b>SLEP 2014 Clause</b>	<b>Provisions</b>	<b>Comments</b>
7.15 continued	(c) <i>considered any opportunities to relocate the development outside that land, and</i>  (d) <i>has considered whether the development would adversely affect the operational environment of that industry.</i>	

#### **4.4 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT**

The existing Shoalhaven Starches factory site and Environmental Farm 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.

## **5.0 THE MODIFICATION PROPOSAL**

### **5.1 INTRODUCTION**

The Modification Proposal seeks approval for the following:

- reducing the number of approved DDGS Dryers from 6 to 4;
- slight modification to the footprint of the DDGS Dryer Building and relocating it slightly in a northerly direction on the site;
- relocation of cooling towers within the site;
- the provision of an additional two Biofilters;
- construction of a forklift maintenance building;
- provision of container preparation and storage areas;
- regularisation and expansion of existing coal and woodchip storage areas.

### **5.2 THE APPROVED DDGS DRYERS**

Project Approval MP06\_0228 was granted by the Minister for Planning on the 28<sup>th</sup> January 2009 for the Shoalhaven Starches Expansion Project.

The Shoalhaven Starches Expansion Project (SSEP) sought to increase ethanol production at the Bomaderry plant in a staged manner from 126 million litres per year to 300 million litres per year. To accomplish the increase in ethanol production, the project required a series of plant upgrades and increase in throughput of raw materials, principally flour and grain. The SSEP included upgrades to the Stillage Recovery Plant, including 6 additional DDGS Dryers to be installed within the western part of the site.

The DDGS dryer is essentially a barrel in which a bundle of steam heated tubes are rotated at low speed. Evaporator concentrate (syrup) and decanter concentrate (wet insoluble solids) are fed into one end of the barrel and traversed through to the other end by shovels. Heat from the tubes removes moisture.

Dried DDGS is removed from the barrel and conveyed to the storage room for loading into trucks. The product from the drying process results in a dry product that is sold for use as stock feed.

Discharges to air from the dryers are collected and ducted to biofilters for treatment.

The approved project under SSEP included 6 Dryers with a height above ground level of approximately 20 m and a stack serving the building with a height above ground level of 25 m.

### **5.3 PROPOSED MODIFICATIONS TO THE APPROVED DDGS DRYERS**

The increase in ethanol production associated with the SSEP Approval was made in response to the NSW Government's ethanol mandate which increased the mandated ethanol content by volume in petrol in NSW from 2% to 6% in October 2011. The SSEP sought to increase ethanol production capacity at the Shoalhaven Starches site to meet the expected increase in demand for ethanol arising from this. As mentioned the increase in ethanol production required upgrades to the Stillage Recovery Plant including 6 additional DDGS dryers.

Demand for ethanol however has not met that which was anticipated following the introduction of the NSW Governments ethanol mandate. Under these circumstances it is proposed to reduce the number of approved DDGS Dryers from 6 to 4. The reduction in Dryer "footprint" on the site will release land for other development purposes.

In addition to the proposed reduction in number of DDGS dryers from 6 to 4. The Modification Proposal also includes the following:

- The construction of a Forklift Maintenance Building to be located immediately south-west of the proposed relocated DDG Dryers. This building will have a height above ground level of 10 m.
- Slight relocation of the footprint of the DDGS Dryer building in a northerly direction by 28 metres to provide area for the Forklift Maintenance Building and allow for manoeuvring of forklifts within the vicinity of this area.
- The stack serving the Dryer Building will have a height above ground level of 30 m, which is higher than that anticipated under SSEP (ie. 25 m).
- Relocation of approved cooling towers located adjacent to the Shoalhaven River frontage of the site to adjacent to the proposed modified and relocated DDGS Dryer Building. These cooling towers are presently located within close proximity of the Shoalhaven River and encroach into an area that has been subsequently zoned E2 Environmental Conservation under the Shoalhaven LEP 2014. It is proposed to relocate these cooling towers adjacent to the DDGS Dryer Building, which they will serve. It will also have the advantage of moving them further away from the river and entirely within the industrial zoned portion of the site.

- Relocation of approved but yet to be constructed cooling towers from their position adjacent to the approved evaporator. These approved cooling towers are located in a position where a Biofilter Odour Recovery Unit Scrubber has been subsequently erected. This Scrubber essentially removes particles and directs odorous air emissions to the biofilters located to the south-west corner of the site. It is proposed to relocate these cooling towers from the western side of these existing cooling towers to the eastern side away from this Scrubber.
- Ability to construct an additional two biofilters. Biofilters treat odorous air emissions from the site. It is Shoalhaven Starches view that the installation of the new DDGS Dryers will potentially necessitate the provision of these additional biofilters.
- Provision of a Container Preparation area on a hard stand area to be located to the east of the proposed Forklift Maintenance Building and south of the proposed relocated DDGS Dryers.
- Provision of a Container Storage area on a hard stand area to be located generally to the west of the relocated DDGS Dryers.
- Regularisation of an existing coal and wood chip storage area located to the west of the relocated DDGS Dryers and continued use of this area on a temporary basis (Stage 1) until this location is required for container storage purposes.
- Regularisation and expansion of an existing emergency coal and woodchip storage area located within the Environmental Farm on the north side of Bolong Road. This emergency coal and woodchip storage provides an emergency buffer for circumstances where situations which may arise which prevent supply of these fuel sources to the site such as road closures or flooding.

The modified proposal will not result in any increase in production from the site over that which has been the subject of past approvals. The proposal will not involve any change in the amount of raw products that will be utilised; nor will it involve any changes in the amount of waste waters that will need to be treated and disposed.

Plan details of the proposed modifications to the approved DDGS Dryers are provided in **Annexure 1**.

### ***Construction Works***

The construction phase is estimated to take place over a period of six (6) months.

The construction works will require up to 20 construction staff on-site daily and up to two (2) construction material carrying heavy vehicles per day for the first month of construction.

## **5.4 ENERGY AND UTILITIES**

The existing plant has the capacity to produce up to 220 t/h of process steam by seven boilers. The boilers are fuelled by gas, coal and biogas.

The site currently uses approximately 31 MVA of electricity and has approval to increase this to 39 MVA.

The Company also currently utilises 2 Petajoules of Natural Gas.

The proposed DDGS Dryer alterations are estimated to require an additional 1.5 MVA of power for each new dryer.

## 6.0 CONSULTATION

During the preparation of this EA consultation has been undertaken with the Department of Planning and Environment.

Shoalhaven Starches have consulted with staff from the Department of Planning and Environment with respect to this proposal. The Secretary of the Department of Planning has issued requirements for this EA. In framing these requirements the Department also consulted with the EPA. These requirements, including correspondence from the EPA form **Annexure 2** to this EA.

## **7.0 RISK ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS**

The purpose of this section of the EA is to provide a risk assessment of the potential environmental impacts associated with the project. This section (**Table 5**) compares the potential impacts from the proposed modification against the approved project. The comparison uses the key environmental impacts assessed in the EA and summarises the relative change in environmental impacts associated with the proposed modification.



**Table 5**  
**Risk Assessment**

<i><b>Issue</b></i>	<i><b>Relative Change in Environmental Impact</b></i>	<i><b>Additional Management or Mitigation Measures Required</b></i>	<i><b>Significance of Issue with this Modification Proposal</b></i>
Air Quality (including Odour) Assessment	One of the primary issues that was addressed in the original EA for the Shoalhaven Starches Expansion Project concerned air quality impacts and in particular the need for a comprehensive odour assessment as part of the project.  GHD Pty Ltd (GHD) have been engaged by Shoalhaven Starches to undertake an Air Quality and Odour Impact Assessment (AQIA) with respect to this Modification Proposal. A copy of GHD's assessment is included as <b>Annexure 5</b> to this EA.	An AQIA prepared by GHD ( <b>Annexure 5</b> ) addresses the cumulative impacts of the approved ethanol expansion project development and the proposed DDGS Dryer modifications and does not propose any specific management or mitigation measures.	Air quality impacts are further addressed in Section 8.3 of this EA.
Greenhouse Gas Emissions	Greenhouse gas emissions from the proposed DDGS Dryer modifications would be predominantly associated with the electrical energy required for the operation of the plant, equipment and lighting.  Given the proposed reduction in the number of DDGS Dryers from 6 to 4 it is anticipated that the modification proposal is unlikely to result in an increase in greenhouse gas emissions when compared to the approved project.	No additional management or mitigation measures proposed.	Not a key issue.
Wastewater Treatment	The proposed modification to the approved DDGS Dryers will not result in any change to the amount of wastewater generated from the site nor that which will require treatment.  No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed.	Not a key issue.

**Table 5 (continued)**

<i><b>Issue</b></i>	<i><b>Relative Change in Environmental Impact</b></i>	<i><b>Additional Management or Mitigation Measures Required</b></i>	<i><b>Significance of Issue with this Modification Proposal</b></i>
Effluent Irrigation and Storage	The proposed modification to the approved DDGS Dryers will not result in any change to the amount of wastewater generated from the site and that will require to be irrigated onto the Company's Environmental Farm. No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed.	Not a key issue.
Water and Soils	<p>The proposed modification to the approved DDGS Dryers will have no additional environmental impact in terms of:</p> <ul style="list-style-type: none"> <li>• Water supply;</li> <li>• Erosion and Sediment Control;</li> <li>• Acid Sulfate Soils;</li> <li>• Stormwater management; and</li> <li>• Site contamination.</li> </ul> <p>No change in environmental impacts from that originally identified in EA.</p> <p><b>Riverbank Stability</b></p> <p>The northern bank of the Shoalhaven River is located to the south of the proposed two additional biofilters.</p> <p>The proposed Silo and relocation of cooling towers currently adjacent to the Biofilter Scrubber are within close proximity to the banks of Abernethy's Creek.</p> <p>The proposed Container Storage Area is located within proximity of the eastern banks of Bomaderry Creek.</p> <p>Consideration is therefore required to be given to the potential effects of the proposed modifications on the stability of the respective river banks.</p>	<p>No additional management or mitigation measures proposed.</p> <p>A Geotechnical Assessment prepared by Coffey Geotechnics addresses the implications of the proposal on river bank stability for the banks of the adjacent Shoalhaven River, Bomaderry Creek and Abernethy's Creek. The assessment considers that the impact of the proposed modification on river bank stability would be insignificant and does not propose any specific management or mitigation measures.</p>	<p>Not a key issue.</p> <p>River Bank Stability is further addressed in Section 8.6 of this EA.</p>

**Table 5 (continued)**

<i><b>Issue</b></i>	<i><b>Relative Change in Environmental Impact</b></i>	<i><b>Additional Management or Mitigation Measures Required</b></i>	<i><b>Significance of Issue with this Modification Proposal</b></i>
Noise	<p>Shoalhaven Starches are licensed under the POEOP Act (Environment Protection Licence No. 883) which sets noise limits for the operation of the overall factory complex. Noise goals have been designed for the site to ensure existing noise levels are not increased by additional plant. The noise goals for any new plant are 10 dBA below the EPL noise limits and range between 28 and 32 dBA depending upon the residential receptor location.</p> <p>The EA is supported by a Noise Impact Assessment prepared by Harwood Acoustics. A copy of this assessment is included in <b>Annexure 6</b> to this EA. Noise Impacts are further addressed in Section 8.2 of this EA.</p> <p>Harwood Acoustics conclude in summary that the modification proposal will comply with the design noise goal limits imposed on the overall Shoalhaven Starches factory complex by the EPL for the site.</p>	The Noise Impact Assessment prepared by Harwood Acoustics makes recommendations regarding building construction, additional mechanical plant and equipment and cooling tower sound barrier screens.	<p>This issue has been identified by the SEARs.</p> <p>Noise impacts are further addressed in Section 8.2 of this EA.</p>
Transport & Traffic	<p>It is anticipated that the proposed modifications to the DDGS Dryers will not significantly alter the vehicle generation of the site, or by association result in any adverse impacts on the local road system.</p> <p>However, there are potential impacts associated with additional heavy vehicle trip generation to Hanigans Lane where an existing coal and woodchip storage area is located. The first stage of the proposal involves the regularisation of existing coal and wood chip storage areas within the factory site and at the environmental farm (Stage 1). The second stage of the proposal will involve the existing coal and wood chip storage area within the factory site becoming unavailable for this purpose as it will be required for container storage</p>	No additional management or mitigation measures proposed.	Traffic impacts are further addressed in Section 8.7 of this EA.

**Table 5 (continued)**

<b>Issue</b>	<b>Relative Change in Environmental Impact</b>	<b>Additional Management or Mitigation Measures Required</b>	<b>Significance of Issue with this Modification Proposal</b>
<i>Transport &amp; Traffic (continued)</i>	purposes. All coal and woodchips would then be stored at the Hanigans Lane storage area. The EA is supported by a Traffic Assessment prepared by ARC Traffic and Transport. A copy of this assessment is included in <b>Annexure 9</b> to this EA. Traffic impacts are further addressed in Section 8.7 of this EA.		
Hazards	The SEARs for this project have identified that a Preliminary Hazard Analysis (PHA) is required to be undertaken in relation to this proposed modification which in effect updates the existing PHA with the new processes and additional equipment.	The PHA prepared by Pinnacle Risk includes a range of recommendations in relation to this Modification Application.	Key issue – addressed further in Section 8.1 of this EA.
Flooding	The SEARs for this project have identified that a flood assessment is required to be undertaken in relation to this proposed modification.  The EA is supported by a Flood Impact Assessment prepared by WMAwater ( <b>Annexure 4</b> ).	No additional management or mitigation measures proposed.	This is a key issue identified by SEARs. Flooding is further addressed in Section 8.4 of this EA.
Waste Management	The proposed DDGS Dryer modifications will not alter the way waste is managed on the site.  No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed	Not a key issue.
Visual Impact	The proposal involves the installation of additional plant and works within a similar footprint to the approved development. The proposed DDGS Dryer building will have a height above ground level of 22 m, and the exhaust stack serving the Dryer Building will have a height above ground level of 30 m. The proposed Mill feed silo will have a height above ground level of 23 m.	It is a recommendation of this EA that where appropriate and possible, the proposed modifications to the approved DDGS Dryers should be constructed of similar materials as those previously approved and be of a non-reflective nature. Colours should blend with existing structures on the site to ensure	Key issue – addressed further in Section 8.5 of this EA.

**Table 5 (continued)**

<b>Issue</b>	<b>Relative Change in Environmental Impact</b>	<b>Additional Management or Mitigation Measures Required</b>	<b>Significance of Issue with this Modification Proposal</b>
<i>Visual Impact (continued)</i>	<p>Other proposed components involve relocation of cooling towers, which will have a height above ground level of 9.4 m, a forklift maintenance building with a height above ground level of 10m and installation of two additional biofilters which have a height above ground level of 2 m.</p> <p>Given that the proposal will have a similar footprint to the approved development, it is not expected that the proposed modifications will have a significant visual impact within the site or within the broader landscape.</p> <p>The proposal also involves regularisation of an existing coal and woodchip storage area at Hanigans Lane on the north side of Bolong Road within the Environmental Farm.</p>	<p>visual harmony. Consideration should be given to incorporating a cladding colour if possible which will match existing development on the site.</p> <p>To minimise the visual impact of the proposed coal and wood chip storage area at Hanigans Lane the following recommendations are made:</p> <ul style="list-style-type: none"> <li>• consideration should be given to supplementary planting to the immediate south of the storage area in order to enhance screening provided by the existing Norfolk Island Pines.</li> <li>• vegetative screening should be provided to the north of the proposed storage area in order to minimise the visual impact of the proposal from the north along Hanigans Lane.</li> </ul>	
Flora and Fauna	<p>Given the nature of the site and that the proposal will affect existing areas of developed land and also existing cleared grazing land (within the Environmental Farm), the proposal will not have any adverse impacts on the ecological value of the land.</p> <p>The original Flora and Fauna Assessment carried out by Kevin Mills &amp; Associates for the Expansion Project did not identify any specific ecological constraints with the affected part of the subject site that is located within the factory site.</p> <p>Overall there is no change in environmental impacts from that originally identified in EA.</p>	No additional management or mitigation measures proposed.	Not a key issue.

**Table 5 (continued)**

<b><i>Issue</i></b>	<b><i>Relative Change in Environmental Impact</i></b>	<b><i>Additional Management or Mitigation Measures Required</i></b>	<b><i>Significance of Issue with this Modification Proposal</i></b>
Heritage and Archaeological Issues	<p>The factory site was not previously identified by the EA for the Shoalhaven Expansion Project as an area subject to either Aboriginal or European cultural heritage significance. The original Aboriginal Archaeological Assessment that supported the EA prepared by South East Archaeology did not identify any constraints with respect to this part of the site or this project. The proposed DDGS Dryer modifications will have no additional impact in terms of indigenous or non-indigenous heritage.</p> <p>The affected area within the Environmental Farm comprises cleared grazing land. The proposed woodchip and coal storage area at this location will not include any earthworks or construction works.</p> <p>No change in environmental impacts from that originally identified in EA.</p>	No additional management or mitigation measures proposed.	Not a key issue.

Following the above risk assessment of the potential environmental impacts of the proposed modification the key issues for assessment are:

- Preliminary hazard analysis;
- Noise impacts;
- Air quality (and including odour) impacts;
- Flooding;
- Visual impact;
- Riverbank stability; and
- Traffic.

## 8.0 KEY ISSUES

### 8.1 PRELIMINARY HAZARD ANALYSIS

This Modification Application is supported by a PHA prepared by Pinnacle Risk Management Pty Ltd (“Pinnacle”). A copy of the PHA forms **Annexure 7** to this EA. This section of the EA is based upon the findings of this assessment.

The PHA prepared by Pinnacle assesses the credible and potential hazardous events and corresponding risks associated with the proposed modifications to the DDG dryers and associated equipment and facilities, with the potential for off-site impacts only. This includes any intermediate risks associated with the staging of the project.

In accordance with the approach recommended by the DoPE in *Hazardous Industry Planning Advisory Paper (HIPAP) 6 – Hazard Analysis* the underlying methodology of the PHA is risk-based, that is, the risk of a particular potentially hazardous event is assessed as the outcome of its consequences and likelihood.

The PHA prepared by Pinnacle was conducted as follows:

- Initially, the proposed modified DDG dryers and associated equipment and facilities and their location were reviewed to identify credible, potential hazardous events, their causes and consequences. Proposed safeguards were also included in this review.
- As the potential hazardous events are located at a significant distance from other sensitive land users, the consequences of each potential hazardous event were estimated to determine if there are any possible unacceptable off-site impacts.
- Included in the analysis is the risk of propagation between the proposed equipment and the adjacent processes; and
- If adverse off-site impacts could occur, assess the risk levels to check if they are within the criteria as outlined in the DoPE’s *HIPAP 4 – Risk Criteria for Land Use Safety Planning*.

#### 8.1.1 Hazard Identification

##### ***Process Materials***

The hazardous materials for this proposal are summarised as follows:

- DDG;
- Syrup;



- Starch and gluten (within the freight containers). According to PHA, if the starch and gluten is released and ignited, a smouldering fire is the most likely outcome;
- Cooling water dosing chemicals (the chemicals are yet to be determined but these will be Minor Quantities); and
- Coal and woodchip. These are combustible solids that form smouldering fires if ignited.

#### DDG

This is the bran or outer layer from wheat husks, ie. it is mostly fibre. Any dust with the bran is a potentially an explosive dust. Whilst the DDG is combustible when exposed to strong ignition sources, eg. open flames, it typically burns as a smouldering type of fire and therefore do not pose significant radiant heat hazards.

#### Syrup

Syrup is a dark brown soluble liquid fraction that remains after grains have been fermented in the process of producing bioethanol in combination with yeasts and enzymes. It is not a Dangerous Good or hazardous material. It poses no significant hazardous events on release.

#### Potential Hazardous Incidents Review

In accordance with the requirements of HIPAP 6 it is necessary to identify hazardous events associated with the facility's operations. As recommended in HIPAP 6, the PHA prepared by Pinnacle focuses on "*atypical and abnormal events and conditions. It is not intended to apply to continuous or normal operating emissions to air or water*".

In keeping with the principles of risk assessments, credible, hazardous events with the potential for off-site effects have been identified by Pinnacle. That is, "*slips, trips and falls*" type events are not included nor are non-credible situations such as an aircraft crash occurring at the same time as an earthquake.

The identified credible, significant incidents with the potential for off-site impacts for the proposed facility are summarised in the PHA prepared by Pinnacle. These potential events are based on known incidents and dust process safety and were derived by Pinnacle via a Hazardous Event Identification workshop conducted at the site. Only the potential hazardous events that could cause significant consequences are addressed in the PHA.

### 8.1.2 Risk Analysis

The assessment of risks to both the public as well as to operating personnel around the modified DDG dryers and associated equipment and facilities requires an analysis technique commensurate with the nature of the risks involved. Risk analysis could be qualitative, semi-quantitative or quantitative.

The typical risk analysis methodology attempts to take account of all credible hazardous situations that may arise from the operation of processing plants etc.

Having identified all credible, significant incidents, risk analysis requires the following general approach for individual incidents:

$$\text{Risk} = \text{Likelihood} \times \text{Consequence}$$

The risks from all individual potential events are then summated to get cumulative risk.

For QRA and hazard analysis, the consequences of an incident are calculated using standard correlations and probit-type methods which assess the effect of fire radiation, explosion overpressure and toxicity to an individual, depending on the type of hazard.

The approach adopted by Pinnacle to assess the risk of the identified hazardous events is scenario based risk assessment. The reasons for this approach are according to Pinnacle:

1. *The distance from the new equipment to residential and other sensitive land users is large and hence it is unlikely that any significant consequential impacts, e.g. due to radiant heat from fires, will have any significant contribution to off-site risk; and*
- 2.. *There are a limited number of process safety events. The main events of interest are dust explosions and fire events. Therefore, these are analysed in the PHA provided by Pinnacle.*

#### Equipment Dust Explosions

According to Pinnacle, new equipment where potential dust explosions could occur is summarised below.

- DDG dryers (low risk event);
- Mill feed silo (low risk given mill feed is fibrous bran);
- Bucket elevator. Note: low conveyor speeds and belt tracking with limit switches will be used to minimise the risk of ignition, and air purging to the baghouse filters is designed to keep the dust concentration below the lower explosive limit;

- Blowline (low risk event given the dense phase conveying and ignition source controls); and
- Baghouse filters. Dust explosions are to be vented via explosion vents.

Design data for the proposed dust explosion vents is not yet available. Therefore, modelling of the potential vented dust explosion has not been performed by Pinnacle. This is to be performed as part of the Final Hazard Analysis for this project. According to Pinnacle, provided the dust explosion vents are either flameless or directed to a safe location then propagation risks will be acceptable. This is to be confirmed during the detailed design stage.

#### *Building Explosions*

According to Pinnacle it is possible that dust explosions could occur in the new DDG Dryer building, eg. deposited dust is not removed due to failure of the housekeeping program.

This hazard exists at the site now for the existing dryer buildings.

The primary means to prevent this event is to design for containment, ie. do not release combustible dust into the building. This is the basis for the design of the DDG dryers.

Should losses of containment of combustible dust occur, then controls such as housekeeping, hazardous zoning and permits to work are required. These are important measures to lower the risk of dust explosions within the existing building. As this hazard exists now on-site and the new equipment is being designed to the same standard as the existing equipment then no further safeguarding is recommended for this scenario.

#### *Dust Explosion Safeguarding*

For equipment processing a potentially explosive dust, it is generally not possible to always ensure the concentration of the dust is below the lower explosive limit. Rather, safeguarding is required to prevent and/or control the potential explosions as discussed below.

There are no mandatory standards or regulations that dictate the design criteria and features for equipment where dust explosions can occur. However, the main means for safeguarding against dust explosions according to Pinnacle include:

- Dust Free Process;
- Dust Control;
- Control of Ignition Sources;
- Inerting;

- Explosion Containment;
- Explosion Isolation;
- Explosion Suppression;
- Explosion Venting;
- Equipment Separation.

With respect to this modification proposal Pinnacle indicate in practice the assessment of dust explosion hazards is bound to be subjective because the problem is too complex for quantitative analytical methods to yield an indisputable answer. Therefore, the acceptable safeguards for any given design will vary from company to company. Based upon references reviewed by Pinnacle most of the dust explosion hazards in the grain, feed and flour industry can be eliminated by soft means such as training, motivation, improving the organisation, good housekeeping and proper maintenance. All of these safeguards are in-place at Shoalhaven Starches.

When these are combined with the additional measures proposed for the new equipment then further risk reduction is achieved. According to Pinnacle these additional measures include all equipment handling potentially explosive dust is to be designed to relevant standards including rotary valves, explosion vents, spark arrestors, interlocks to prevent only dry feed to the paddle mixers, metal trap to minimise the risk of ignitions in the pin mill, equipment bonding and earthing, minimisation of horizontal surfaces in the buildings where dust can collect, screw feeders to contain plugs to prevent flame propagation, steam quenching and hazardous area zoning with the electrics and instruments to suit the requirements.

### Fires

According to Pinnacle, it is possible to ignite the combustible material involved in the process, i.e. DDG, starch, gluten, coal and woodchip, if a strong ignition source is present.

According to Pinnacle, fires have occurred previously with these types of processes and are typically of a smouldering nature given the moisture content of the material and confinement within silos and other equipment.

Based upon references reviewed by Pinnacle, fires involving flammable or combustible powder are not believed to place the public at risk but could be a threat to employees. This is the same for coal and woodchip as the fires are of a smouldering type.

Given that the potential areas where smouldering fires can occur then the risk criteria in HIPAP 4 will be satisfied.

### *Aircraft Impact and Other External Events*

According to Pinnacle previous risk assessments have shown that the likelihood of an aircraft crash is acceptably low within Australia. Typical frequencies associated with aircraft crashes are:

- Scheduled aircraft  $1 \times 10^{-8}$ /year; and
- Unscheduled aircraft  $4 \times 10^{-7}$ /year.

The likelihood of this type of event according to Pinnacle is acceptably low for a site of this size and location.

Other external events that may lead to propagation of incidents on any site include:

Subsidence	Landslide
Burst Dam	Vermin/insect infestation
Storm and high winds	Forest fire
Storm surge	Rising water courses
Earthquake	Storm water runoff
Breach of security	Lightning
Tidal waves	

These events were reviewed by Pinnacle and none of them were found to pose any significant risk to the new facility given the proposed safeguards. Flooding can occur at this site, however according to Pinnacle, the structural design for the new buildings and equipment includes allowances for this hazard.

### *Cumulative Risk*

The PHA demonstrates that the proposed modification will have negligible impact on the cumulative risk results for the local area as the significant radiant heat levels and explosion overpressures are local to the equipment.

Pinnacle concludes that the development does not make a significant contribution to the existing cumulative risk in the area.

A review of the potential propagation risks was conducted by Pinnacle.

For the confined equipment dust explosions, provided the dust explosion vents are either flameless or directed to a safe location then propagation risks will be acceptable. As discussed previously, this is to be confirmed during the detailed design stage.

According to Pinnacle, should the combustible dust containment systems fail in the existing or new equipment and the safety management systems, e.g. equipment not rated to the hazardous zones, also fail then ignition can occur with a dust explosion within the building. This could cause damage to the adjacent structures as well, eg. the existing Pellet Plant and DDG storage area. Building dust explosions are a known hazard and both hardware (eg. design for containment and electrics and instruments rated for hazardous zones) and safety management systems (eg. housekeeping) are required to lower the risk to an acceptable level. These measures are used in the processing buildings to lower the risk of propagation.

According to Pinnacle, for the smouldering fires, it is possible that a coal fire could propagate to the new cooling towers between Stages 1 and 2 of the proposed modifications. This is a business impact event only, ie. no process safety issues. This risk is to be managed by separation and control of ignition sources (as currently used at the site). According to Pinnacle and based on the layout plans provided, there are no obvious fire propagation risks for the proposed coal and woodchip stockpiles on the north side of Bolong Road.

#### Societal Risk

According to Pinnacle the abovementioned criteria for individual risk do not necessarily reflect the overall risk associated with any proposal. In some cases for instance, where the 1 pmpy contour approaches closely to residential areas or sensitive land uses, the potential may exist for multiple fatalities as the result of a single accident. One attempt to make comparative assessments of such cases involves the calculation of societal risk.

Societal risk results are usually presented as F-N curves, which show the frequency of events (F) resulting in N or more fatalities. To determine societal risk, it is necessary to quantify the population within each zone of risk surrounding a facility. By combining the results for different risk levels, a societal risk curve can be produced.

In this study of the DDG dryers and associated equipment, the risk of fatality does not extend significantly from the equipment and is therefore well away from the residential areas or other populated areas. According to Pinnacle, the concept of societal risk applying to residential population or other off-site receptors is therefore not applicable for this proposal.

#### Risk to the Biophysical Environment

The main concern for risk to the biophysical environment generally concerns effects on whole systems or populations.

There can be small releases of cooling tower dosing chemicals. According to Pinnacle, this is to be mitigated with secondary containment and hence the environmental risk is low.

There will also be the cooling tower blowdown (typical requirement for all cooling towers). In this proposal, the cooling tower blowdown is to be directed to the Manildra farm for processing.

Biofilters can leak: according to Pinnacle, as the liquid quantity is limited then the effect on the environment is also limited. This scenario is typically corrected through maintenance repairs.

Whilst fires can also effect the environment due to combustion products, according to Pinnacle these events are low likelihood given the history of these types of processes. Importantly, any spilt material will be contained in the area or via the environmental farm.

The vapour evaporating from the mill feed and syrup mixture during the drying process is to be extracted by the leakage air fan to the wet scrubber for processing. Wet vapour will flow from the top of the wet scrubber to the condenser while the sludge is to be collected at the bottom of the scrubber and sent to the existing evaporator. Failure of the scrubber and/or condenser can result in excess water emissions with mill feed (no significant environmental impacts identified by Pinnacle).

Water runoff from the coal and woodchip stockpiles has the potential to carry coal and woodchips to the environment. In this proposal, there is to be a hard stand area with all runoff water directed to a stormwater treatment device.

Whereas any adverse effect on the environment is obviously undesirable, according to Pinnacle the risk of losses of containment impacting the environment is broadly acceptable.

The PHA identified no incident scenarios where the risk of whole systems or populations being affected by a release to the atmosphere, waterways or soil is intolerable.

#### Transport Risk

There are no Dangerous Goods of significant quantities involved with the modified dryers.

Whilst it is proposed to relocate the coal and woodchip stockpiles, the net number of trucks delivering these feedstocks to site will remain the same.

According to Pinnacle, given the low frequency for Dangerous Good transport then transport risk is deemed broadly acceptable.

### 8.1.3 PHA Conclusion and Recommendations

The PHA prepared by Pinnacle in relation to the proposed modified DDG dryers and associated equipment and facilities concludes:

*The risks associated with the proposed DDG dryers and associated equipment at the Shoalhaven Starches Bomaderry site have been assessed and compared against the DoP risk criteria.*

*In summary:*

- *The potential hazardous events associated with the DDG dryers and associated equipment are dust explosions and smouldering fires. Given the adequate separation distances to public land then no adverse off-site impacts are expected;*
- *All risk criteria in HIPAP 4 is expected to be satisfied for this proposal;*
- *Propagation to neighbouring equipment is not expected given that the potential dust explosions are either to be vented to atmosphere at a safe, elevated location or of limited consequential impact and the potential fires are of a smouldering nature; and*
- *Societal risk, environmental risk and transport risk are all considered to be broadly acceptable.*

The PHA prepared by Pinnacle makes the following recommendations in relation to this modification proposal:

- *All dust explosion vents are to be either flameless or directed to a safe location to ensure propagation risks will be acceptable; and*
- *Review the need for installing temperature sensors in the bucket elevator for fire detection and/or the installation of deluge or fire suppression system (Inergen). Operator detection of issue required plus response, e.g. opening a valve to initiate the deluge.*

## 8.2 NOISE IMPACTS

The area surrounding Shoalhaven Starches is a mix of commercial, industrial and residential premises.

The nearest residential locations to the complex (refer **Figure 4**) are as follows:

- Location 1 – Nobblers Lane, Terara approximately 1500 metres to the south east;
- Location 2 – Riverview Road, Nowra approximately 845 metres to the south west;
- Location 3 – Meroo Street, Bomaderry approximately 470 metres to the north west;
- Location 4 – Coomea Street, Bomaderry approximately 565 metres to the north west.

The Shoalhaven Starches site, surrounding area and receptor locations are shown in **Figure 4**.





**Figure 4: Location plan and closest receptors to subject site as per EPL (Harwood Acoustics).**

The Environmental Assessment Requirements as issued by the NSW DoPE for this project require noise impacts associated with the proposal to be addressed.

This Modification Application is supported by an Environmental Noise Impact Assessment prepared by Harwood Acoustics. A copy of the Environmental Noise Impact Assessment prepared by Harwood Acoustics forms **Annexure 6** to this EA. This section of the EA is based upon the findings of this assessment.

### **8.2.1 Acoustic Criteria**

This section presents the noise guidelines applicable to this proposal and establishes the project specific noise criteria.

#### ***Department of Planning and Environment***

##### ***Existing Project Approval***

Project Approval for Application No. 06\_0228, provided by the Minister for Planning, dated January 2009, Schedule 2, Condition 2, 'Terms of Approval' states:

*“The proponent shall carry out the project generally in accordance with the:*

- a) EA and associated site plans;*
- b) Statement of commitments; and*
- c) Conditions of this approval.”*

The original Project Approval incorporates noise mitigation measures recommended in the ‘*Acoustical Assessment, Proposed Ethanol Upgrade, Shoalhaven Starches*’ – prepared by The Acoustic Group Pty Ltd, ref. 38.3849.R52:ZJM, dated 26 June 2008. This document forms part of the EA and statement of commitments and it is implicit that the noise control recommendations within this document are required to be implemented as part of the Project Approval.

Schedule 3, Conditions 11 to 14 inclusive of the Project Approval, also refer to noise emission and are summarised as follows:

- Condition 11 relates to restricted hours of construction activities.
- Condition 12 reiterates the noise limits contained with Environmental Protection Licence 883.
- Condition 13 requires that all feasible and reasonable noise mitigation measures must be implemented during the construction phase of the project.
- Condition 14 required the preparation of a noise management plan.

#### ***EPA’s Requirement for Modification Assessment***

In response to a request for information relating to noise emission from the proposed modification to the DDG dryer approval, the NSW Environment Protection Authority, states:

**“Noise Impacts:**

*A noise impact assessment in accordance with the Industrial Noise Policy (EPA 2000) will need to be prepared that assesses the potential operational noise impacts of the proposal (again noted this has been identified in the supplied document from Cowman Stoddart. The noise impact assessment should identify whether the proposal will comply with the existing noise limits in the EPL and if not, provide details of all reasonable and feasible mitigation measures that will be implemented to ensure compliance.*

*Potential construction noise impacts from the proposal will need to be assessed and determined in accordance with the provisions of the Interim Construction Noise Guideline (DECC209).”*

### **Environment Protection Licence 883**

Shoalhaven Starches operates under Environment Protection Licence 883 issued by the NSW Environment Protection Authority.

Section L5 'Noise Limits' of the licence states:

*"L5.1 the  $L_{A10}$  (15min) sound pressure level contribution generated from the premises must not exceed the following levels when measured at or near the boundary of any residential premises:*

- a) 38 dBA at locations in Terara on the south side of the Shoalhaven River;*
- b) 38 dBA at locations in Nowra on the south side of the Shoalhaven River;*
- c) 42 dBA at locations in Meroo Street, Bomaderry;*
- d) 40 dBA at other locations in Bomaderry."*

These noise limits apply to the overall operation of the Shoalhaven Starches complex.

### **Shoalhaven Starches Noise Management Plan**

The previous Project Approval for the SSEP, required the preparation of a Noise Management Plan for addressing and managing noise emission from the expansion project.

The Shoalhaven Starches Noise Management Plan originally prepared 31 October 2009 and revised 7 September 2010 addresses, among other things, acoustic criteria relating to the Shoalhaven Starches complex and any new developments. Section 3 of the plan lists noise limits from the Environmental Protection Licence as shown in Section 4.1 above and states:

*"Compliance testing conducted on a regular basis on behalf of the Mill [Shoalhaven Starches complex] has found noise emission from the premises satisfies the EPA criteria as a result of works on the Shoalhaven Starches site. In order to ensure that there is no increase in noise emission from the subject premises, with respect to the noise criteria nominated by the EPA in License Condition 6.3 [now 5.1], the design goal for such additional plant should be at least 10 dB below the criteria nominated by the EPA."*

### **EPA Construction Noise Guideline**

The NSW EPA published the *Interim Construction Noise Guideline* in July 2009. While some noise from construction sites is inevitable, the aim of the Guideline is to protect the majority of residences and other sensitive land uses from noise pollution most of the time.

The Guideline presents two ways of assessing construction noise impacts; the quantitative method and the qualitative method.

The quantitative method is generally suited to longer term construction projects and involves predicting noise levels from the construction phase and comparing them with noise management levels given in the guideline.

The qualitative method for assessing construction noise is a simplified way to identify the cause of potential noise impacts and may be used for short-term works, such as repair and maintenance projects of short duration.

In this instance the entire construction phase may take six months although significant noise producing aspects, such as piling, if required, will last a total of approximately two weeks. Consideration is given by Harwood Acoustics to the potential for noise impact from construction activities on residential receptors.

Table 2 in Section 4 of the Guideline sets out noise management levels at affected residences and how they are to be applied during normal construction hours. The noise management level is derived from the rating background level (RBL) plus 10 dB in accordance with the Guideline. This level is considered to be the 'noise affected level' which represents the point above which there may be some community reaction to noise.

Harwood Acoustics has carried out numerous noise surveys in Nowra, Bomaderry and Terara and has found daytime background noise levels range between 33 and 40 dBA depending on the location, as shown in **Table 6** below.

**Table 6**  
**Rating Background Levels**

<b>Noise Measurement Location</b>	<b>Time Period</b>	<b>Rating Background Level</b>
135 Terara Road, Terara March 2012	Day (7:00 am to 6:00 pm)	<b>33 dBA</b>
55 Terara Road, Nowra February 2015	Day (7:00 am to 6:00 pm)	<b>36 dBA</b>
Cambewarra Road, Bomaderry July 2010	Day (7:00 am to 6:00 pm)	<b>40 dBA</b>
Shoalhaven Village Caravan Park, Nowra - March 2012	Day (7:00 am to 6:00 pm)	<b>40 dBA</b>

For the purpose of determining the potential for community reaction to noise emission from construction activities, previously measured background noise levels in the vicinity of each receptor location have been used to determine the noise management levels as shown in **Table 7** below.

**Table 7**  
**L<sub>eq</sub> Noise Management Levels from Construction Activities**

<b>Receptor Location</b>	<b>Noise Management Level</b>	<b>How to Apply</b>
Location 1 (Terara)	<b>43 dBA</b> (33 + 10)	<p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <ul style="list-style-type: none"> <li>Where the predicted or measured LAeq (15 min) noise level is greater than the noise affected level, the proponent should apply all feasible and reasonable* work practices to meet the noise affected level.</li> <li>The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.</li> </ul>
Location 2 (Nowra)	<b>50 dBA</b> (40 + 10)	
Locations 3 & 4 (Bomaderry)	<b>48 dBA</b> (38 + 10)	
	<b>Highly noise affected</b> <b>75 dB(A)</b>	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <ul style="list-style-type: none"> <li>Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: <ol style="list-style-type: none"> <li>times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences)</li> <li>if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ol> </li> </ul>

\* Section 6, “work practices” of The Interim Construction Noise Guideline, states:

*“there are no prescribed noise controls for construction works. Instead, all feasible and reasonable work practices should be implemented to minimise noise impacts. This approach gives construction site managers and construction workers the greatest flexibility to manage noise”.*

Definitions of the terms feasible and reasonable are given in Section 1.4 of the Guideline.

The ‘highly noise affected’ level of 75 dBA represents the point above which there may be strong community reaction to noise. This level is provided in the Guideline and is not based on the RBL.

### **Project Specific Noise Criteria**

Harwood Acoustics indicate the most stringent noise criteria for the proposed modification are as follows:

Operational Phase (Environment Protection Licence noise limits less 10 dB):

- 28 dBA ( $L_{10, 15 \text{ minute}}$ ) at locations in Terara on the south side of the Shoalhaven River;
- 28 dBA ( $L_{10, 15 \text{ minute}}$ ) at locations in Nowra on the south side of the Shoalhaven River;
- 32 dBA ( $L_{10, 15 \text{ minute}}$ ) at locations in Meroo Street, Bomaderry;
- 30 dBA ( $L_{10, 15 \text{ minute}}$ ) at other locations in Bomaderry.

**Construction Phase Noise Management Levels:**

- 43 dBA ( $L_{eq, 15 \text{ minute}}$ ) at locations in Terara;
- 48 dBA ( $L_{eq, 15 \text{ minute}}$ ) at locations in Bomaderry; and
- 50 BA ( $L_{eq, 15 \text{ minute}}$ ) at locations in Nowra.

The criteria apply at the most-affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the most-affected point within 30 metres of the residence. For upper floors, the noise is assessed outside the nearest window.

### **8.2.2 DDG Dryers and Associated Development – Operational Noise Emission**

The main sources of noise associated with the proposed modification will be DDG Dryers and associated cooling towers.

An equipment list of the individual noise producing components of the DDG dryers has been supplied by the manufacturers along with noise data for low noise cooling tower options.

**Table 8** below provides a schedule of overall 'A' frequency weighted sound power levels, in decibels re: 1 pW, of noise sources associated with proposed modification.

**Table 8**  
 **$L_{10}$  Sound Power Levels – Plant and Equipment**

<i>Description</i>	<i><math>L_{10, 15 \text{ minute}}</math> Sound Power Level (dBA)</i>
<b><i>DDG Dryer Components (Shoalhaven Starches' reference)</i></b>	
Condenser Tank Pump (40A103)	<b>80</b>
High Speed Mixer Motor (40R191)	<b>81</b>
Leakage Air Fan (40V261)	<b>71<sup>1</sup></b>
Manual Condenser Pump (40P183)	<b>70</b>
Dryer Drive Motor (40D200)	<b>89</b>
Wet Scrubber Pump (40F120)	<b>80</b>
Vapour Fan (40V260)	<b>83<sup>1</sup></b>
DDG Dryer Components Combined	<b>91</b>

**Table 8 (continued)**

<i>Description</i>	<i>L<sub>10, 15 minute</sub> Sound Power Level (dBA)</i>
<b><i>Other Plant and Equipment</i></b>	
Cooling Towers (Low Noise – Baltimore)	<b>87</b>
Truck Movement	<b>100</b>
Front End Loader Movement	<b>105</b>

1. Housing / casing sound power level

Harwood Acoustics advise that the DDG dryers are closed system and as such there are no external air intake or discharge outlets for the fans associated with each dryer. Consequently, the sound power levels used in calculations are based on the manufacturer's data for casing noise and not the sound power levels ascribed to the inlet or discharge side of either fan.

### **8.2.3 Noise Level Predictions**

#### ***Modelling Equations***

For all outdoor noise sources, the external noise level at each receptor has been calculated by Harwood Acoustics from the formula:-

$$L_{eq} = L_w + Dc - A$$

Where:  $L_w$  is the sound power level of the noise source;  
 $Dc$  is directivity correction; and  
 $A$  is the attenuation that occurs during the propagation from source to receiver.

The term  $A$  in the equation includes attenuation from geometric divergence (distance loss), atmospheric absorption, ground absorption, barrier effects and miscellaneous other effects.

This model derives from the International Standard ISO 9613-2 (1996(E)) '*Acoustic – Attenuation of sound during propagation outdoors Part 2 General method of calculation*'.

The method described in the Standard is general in the sense that it may be applied to a wide variety of noise sources, and covers the major mechanism of sound attenuation.

The method allows for propagation conditions with the wind blowing from the source to the receiver.

### ***Predicted Noise Levels***

Given the nature of the potential staging of the proposal, the following scenarios have been acoustically modelled by Harwood Acoustics and the results are shown in **Tables 9** and **10** below:

- Stage 1 (**Table 9**):
  - One DDG dryer constructed only, initially; and
  - Cooling towers located adjacent to the dryer.
- Stage 2 (**Table 10**):
  - Following Stage 1, with an additional three (3) dryers and associated cooling towers constructed; and
  - Relocation of the coal and woodchip storage area to the corner of Hannagan's Lane and Bolong Road (see **Figure 4**) and the occasional use of a loader with associated truck movements in this location alternatively.

Predictions in **Tables 9** and **10** do not include noise controls.

The above scenarios include all noise producing aspects of the proposed modification.

The modification also includes the establishment of the container preparation and storage areas adjacent to the DDG dryer location and further seeks to formalise the existing location of the coal and woodchip storage area. Noise sources associated with these two aspects, including the use of forklifts to move containers, front end loader to transport fuel to the boiler house and trucks delivering fuel to the storage area all form part of existing operations in these locations. These activities form part of the existing level of noise emission from the overall operation of the site and are included in 6 monthly noise compliance assessments to date. There will be no significant increase in these activities as a result of this modification applicant.

Consideration is however give to noise emission arising from the use of a loader and truck movements at the proposed coal and woodchip area near to the corner of Bolong Road and Hannagan's Lane in the future.

The bio-filters remove odour causing compounds from waste gas streams by filtering waste gas through woodchip. There are no significant noise producing activities associated with this aspect of the modification application.

Similarly, the forklift maintenance building will provide protection from the elements to maintenance staff performing tasks currently undertaken at the site. There will be no noise producing activities associated with this aspect of the modification application.



**Table 9**  
**Predicted Noise Levels at Receptor Locations – Stage 1**

<b>Description</b>	<b>Predicted Noise Level <math>L_{10, 15 \text{ minute}}</math> (dBA) at Receptor Location</b>			
	<b>Location 1</b>	<b>Location 2</b>	<b>Location 3</b>	<b>Location 4</b>
DDG dryer	19	23	28	26
Cooling Towers (adjacent)	>10	22	28	26
Combined	19	26	31	30
Design Noise Goal ( $L_{10, 15 \text{ minute}}$ )	28	28	32	30
Complies	✓	✓	✓	✓

**Table 10**  
**Predicted Noise Levels at Receptor Locations – Stage 2**

<b>Description</b>	<b>Predicted Noise Level <math>L_{10, 15 \text{ minute}}</math> (dBA) at Receptor Location</b>			
	<b>Location 1</b>	<b>Location 2</b>	<b>Location 3</b>	<b>Location 4</b>
DDG dryers (4)	25	29	34	32
Cooling Towers (4 x 2)	>15	28	34	32
Coal Storage at Hannagan's Lane (truck & loader)	18	21	17	20
Combined	26	32	37	36
Design Noise Goal ( $L_{10, 15 \text{ minute}}$ )	28	28	32	30
Complies	✓	No + 4	No + 5	No + 6

The calculations and predictions in **Tables 9** and **10** consider distance loss to each receptor as well as the following:

- Two 'cooling towers' with a sound power level of 87 dBA each are assumed to be associated with each dryer;
- Barrier attenuation from existing site structures for various items of plant and equipment;
- Manufacturer's sound power levels are achieved as detailed in Section 6; and

- Ground absorption to receptors R1, R3 and R4 for the coal and woodchip area in Stage 2 only.

It can be seen from the predicted noise levels in **Tables 9 and 10** that the design noise goals for this proposal can be met without the need for additional noise controls, this is providing that the assumed power levels for individual plant and equipment are achieved.

It can be seen from **Table 10** that there is a potential for an exceedance of the noise design goals for the potential future inclusion of the additional three (3) dryers and associated cooling towers at a later stage.

However according to Harwood Acoustics the predicted exceedances are not considered to be excessive and noise control recommendations are proposed by Harwood Acoustics to reduce the level of noise emission to within acceptable limits for both stages.

#### **8.2.4 Construction Noise Emission**

The construction process will involve earthworks and site preparation, pouring of concrete slabs and erection of the DDG Dryers, cooling towers, and construction of the forklift maintenance building.

**Table 11** below shows a schedule of sound power levels for typical construction equipment.

**Table 12** below shows the predicted level of noise emission from construction activities at each of the receptor locations.

**Table 11**  
**Construction Equipment –  $L_{eq}$  Sound Power Levels**

<i><b>Description</b></i>	<i><b><math>L_{eq}</math> Sound Power Level (dBA)</b></i>
Piling Rig	118
Mobile Crane (Diesel)	110
Excavator – 30 T	110
Concrete Truck / Pump	105
Grinder	105
Power Saw	101

**Table 12**  
**Predicted Noise Levels at Receptor Locations – Construction Phase**

<b>Description</b>	<b>Predicted Noise Level <math>L_{eq, 15 \text{ minute}}</math> (dBA) at Receptor Location</b>			
	<b>Location 1</b>	<b>Location 2</b>	<b>Location 3</b>	<b>Location 4</b>
Construction Activity*	39 - 45	45 - 51	41 – 47	39 - 45
Acceptable Noise Limit ( $L_{eq, 15 \text{ minute}}$ )	43	50	48	48
Complies	<b>No</b> <b>Up to +2dB</b> <b>during piling</b>	<b>No</b> <b>Up to +1dB</b> <b>during piling</b>	✓	✓

\* The range provided is with and without piling activity.

### 8.2.5 Noise Control Recommendations

The noise impact assessment prepared by Harwood Acoustics makes the following recommendations in relation to this project:

*It can be seen from the noise modelling and predictions in Section 4.2 that the noise design goals can be met for Stage 1 without the need for additional noise controls. This is providing that manufacturer's sound power levels for individual items of plant are achieved.*

*Noise controls are likely to be required for the subsequent installation of an additional three dryers as considered in Stage 2.*

#### **STAGE 1**

*The initial dryer may be constructed in the open, without a building or acoustical screening based on the manufacturer's sound power levels provided.*

*Cooling towers may be installed adjacent to the dryer, as shown in Appendix A, without the need for additional noise controls.*

*This is providing that the maximum combined sound power level ( $L_w$ ) of the cooling towers does not exceed **90 dBA**.*

*This equates to, for example:-*

- *Two cooling towers with a sound power level of 87 dBA each; or*
- *Four cooling towers with a sound power level of 84 dBA each.*

*Once the final selection of plant is made and / or the DDG dryer and cooling towers installed, a final compliance assessment should be undertaken prior to commissioning of the plant to ensure the noise design goals are achieved.*

#### **STAGE 2**

*Stage 2 involves the installation of an additional three (3) DDG dryers and their associated cooling towers.*

*Based on the manufacturer's sound power levels provided in Table 8 of this report being achieved, a further reduction of a minimum **6 dB** will be required for each of the DDG dryers and the cooling towers including the dryer and cooling towers installed initially as part of Stage 1.*

*The required reduction may be achieved through a combination of the judicious selection of low noise plant and localised acoustical treatment.*

*A final assessment will be required prior to installation or commissioning of the additional three plant and equipment, to ensure the most appropriate and cost-effective noise controls are implemented if and where required.*

### **CONSTRUCTION NOISE**

*The Project Approval prescribes allowable operation hours for construction activities in Clause 11 and Clause 13, which states:-*

*"During construction, the Proponent shall prepare and implement all reasonable and feasible measures to minimise the construction noise impacts of the project."*

*It can be seen from Table 8 that the construction noise management levels are likely to be met at each receptor location during general construction activity, with the exception of piling. During piling (if required) there is potential for the noise management levels to be exceeded at Receptors L3 and L4, by up to 2 dB, on some occasions. This is not considered a significant exceedance during day time hours for short and sporadic duration.*

*However, a Construction Noise Management Plan may be provided in accordance with NSW EPA's Interim Construction Noise Guideline and to satisfy Condition 13 of the Project Approval.*

*Construction noise mitigation measures are included in the Construction Safety & Environmental Management Plan prepared the Shoalhaven Starched Project Manager.*

#### **8.2.6 Conclusion**

The Noise Impact Assessment prepared by Harwood Acoustics makes the following conclusion in relation to this proposal:

*"An assessment of the potential noise impact from the proposed construction and operation of the approved DDG dryers, associated cooling towers, container preparation and storage area, forklift maintenance building and coal and wood chip storage area at Shoalhaven Starches site on Bolong Road, Bomaderry, NSW has been undertaken.*

*Calculations show that the level of noise emission from the modification to this approved proposal will be within the noise design goals derived from Environment Protection Licence 883 noise limits at each receptor location providing noise control recommendations made in Section 6 of this report are implemented and adhered to.*

*The level of noise emission from the construction phase of the project will be within the noise management levels set by the NSW EPA's Interim Construction Noise Guideline."*

### 8.3 AIR QUALITY (INCLUDING ODOUR IMPACTS)

The Environmental Assessment Requirements as issued by the (DoPE) for this project required:

*“A detailed air quality, odour and noise assessments in accordance with relevant EPA guidelines. For the relocation of approved infrastructure, the assessments need to provide a comparative analysis against the approved impacts of the ethanol expansion project.”*

The Environmental Assessment Requirements as issued by the NSW Department of Planning & Environment (DoPE) for this project require air quality and odour impacts to be addressed by this proposal. In addition, the consultation response from the NSW Environment Protection Authority (EPA) required:

*“An air quality impact assessment in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC 2005) will need to be prepared (noted this has been identified in the supplied document from Cowman Stoddard dated 07/12/15). This will need to include specific assessment and modelling of potential odour impacts from the proposed reconfigured DDG driers. A comparative analysis of the odour results/modelling from the proposed reconfigured driers with the odour impacts predicted in the original EA for the Shoalhaven Starches Ethanol Expansion will be required to be included. This should also be further contrast with the odour results/modelling obtained from the most recent independent odour audits for the premises. Should it be identified that the odour results/modelling predict impacts from the current proposal are greater than those contained in the original EA, details of all reasonable and feasible measures to mitigate odour impacts (to a level of impact no greater than that predicted in the original EA) will also need to be included.*

*It is also understood that air emissions from the proposed reconfigured DDG driers are to be treated via the construction of two new biofilters at the premises. It is important that the air quality impact assessment demonstrate that the proposed new biofilters will be sufficiently sized to adequately treat the volume and strength of odorous air streams to be conveyed from the reconfigured DDG driers.*

*As we have discussed, the original Environmental Odour Audit, conducted by GHD in 2007 identified the DDG driers as the most significant factory odour source at the premises and so it is critical that the air quality impact assessment for the proposal provide a detailed and robust assessment of potential odour impacts.”*

This Modification Application is supported by an Odour and Air Quality Assessment prepared by GHD Pty Ltd (GHD) in response to the EPA and DoPE's requirements. A copy of GHD's report forms **Annexure 5** to this EA. This section of the EA is based upon the findings of this assessment.

### 8.3.1 Background

The odour assessment undertaken by GHD is a Level 2 assessment as defined in the DEC Modelling Guideline (ie. *“refined dispersion modelling technique using site-specific input data”*).

It should be noted that some new odour sources in the proposed Packing Plant and the Flour Mill areas have been characterised by third parties (in terms of source dimensions and odour emission rate) and these have been adopted by GHD in this modelling.

The air quality and odour assessment undertaken by GHD is based on previous site visits, measured and estimated odour emission rates at the site, emission rate databases, an examination of local meteorology, and the outputs of odour dispersion modelling using CALMET/CALPUFF models.

The assessment has been conducted with reference to:

- *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales* (Department of Environment and Conservation, 2005)
- *Assessment and Management of Odour from Stationary Sources in New South Wales* (Department of Environment and Conservation, 2006)

### 8.3.2 Site Location and Context

The site is proximate to a number of sensitive receptors. The township of Bomaderry lies to the northwest of the factory and west of the Packing Plant. Nowra is situated south of the plant. The nearest receptors to the factory, Packing Plant and environmental farm are identified in **Figure 5** and **Table 13**. These receptors were selected by GHD to be consistent with previous odour assessments of the plant and qualify as sensitive receptors, as defined in the DEC odour assessment guideline as *“a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area”* (Department of Environment and Conservation, 2006).



**Figure 5: Site context and sensitive receptors.**  
(Source: GHD)

**Table 13**  
**Location of Identified Sensitive Receptors**

<i>Receptor</i>	<i>Range, m</i>	<i>To nearest odour source</i>	<i>Direction</i>	<i>Easting (m)</i>	<i>Northing (m)</i>
R1	150	Packing Plant	W	281,430	6140,610
R2	1300	Factory	SW	280,400	6139,650
R3	700	Factory	S	281,510	6139,310
R4	1300	Factory	SE	283,000	6139,450

### 8.3.3 Assessment Criteria

#### **Odour**

A detailed description of the background to the assessment criteria for odour is provided in Section 4.1 of **Annexure 5**. **Table 14** provides a summary of the odour criterion used by GHD for the assessment of odour.

**Table 14**  
**Odour criterion for the Assessment of Odour**

<i>Population of affected community</i>	<i>Odour performance criteria (nose response odour certainty units at 99<sup>th</sup> percentile)</i>
Single residence ( $\leq \sim 2$ )	7
~ 10	6
~ 30	5
~ 125	4
~ 150	3
Urban (~2,000)	2

### **Dust**

GHD advise that dust impacts can be assessed against several criteria, namely:

- Total suspended particles (TSP);
- Deposited dust; and
- Fine particulate matter less than 10 micron equivalent aerodynamic diameter PM<sub>10</sub>.

**Table 15** below summarises the criteria for pollutants relevant to the operation of the plant from the *Approved Methods for the Modelling and Assessment of Air Pollutants* (Department of Environment and Conservation, 2005).

**Table 15**  
**Air Quality Impact Assessment Criteria – Other Pollutants**

<i>Pollutant</i>	<i>Averaging period</i>	<i>Criterion</i>
Particulate Matter PM <sub>10</sub>	24 hours	50 µg/m <sup>3</sup>
	Annual	30 µg/m <sup>3</sup>
TSP	Annual	90 µg/m <sup>3</sup>
Deposited Dust	Annual	4 g/m <sup>2</sup> /month

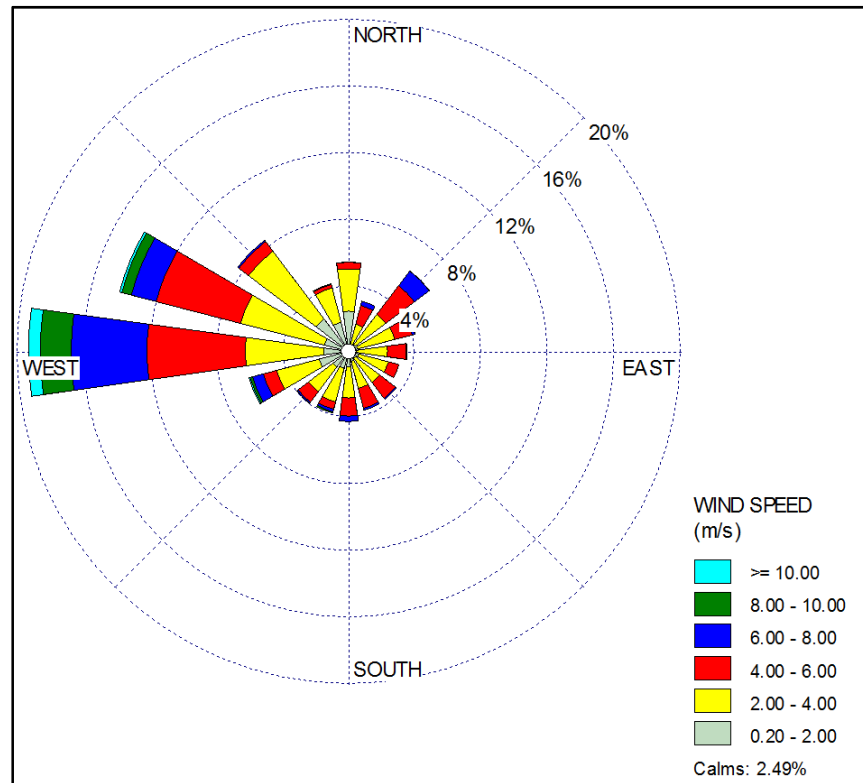
### **8.3.4 Meteorological Data**

A 12-month dataset was constructed using the 3D prognostic modelling package, TAPM and the diagnostic 3D meteorological model, CALMET for the period from January to December 2004. This 12 month period was chosen by GHD to be consistent with previous modelling undertaken for the 2008 Air Quality Assessment, approved at the time by EPA and to allow to a direct comparison to previous modelling.



Further detail regarding the selection and construction of the meteorological dataset used by GHD in the modelling is provided in Appendix A of **Annexure 5** of this SEE.

An annual wind rose generated using CALMET is provided in **Figure 6** to show the wind field at the factory.



**Figure 6: CALMET wind rose for the factory.**  
(Source: GHD)

According to GHD, the following trends are evident from **Figure 6**:

- Annual average wind speed of 3.2 m/s.
- Winds are most prevalent from the west and west northwest, accounting for around one third of all winds.
- Winds are least prevalent along the north-south axis.
- Light winds (shown in grey) are more prevalent from the northwest.
- Drainage flows occurring during stable conditions at night time are dominated by the following distinct features (in order of scale):
  - Shoalhaven River running west to east through the site;
  - Browns Mountains to the northwest of the site; and
  - Yalwal State Forest mountain range to the west.

### 8.3.5 Emission Inventory

#### 8.3.5.1 Odour

##### ***Source Identification***

Odour emanating from Shoalhaven Starches is comprised of a complex mixture of primarily odorous volatile organic compounds (VOCs). According to GHD, VOC speciation data from a range of principal odour sources indicates that the individual VOCs within the mixture tend to be classified under odour-based air quality criteria rather than toxicity-based criteria. Therefore, the identified sources of odour are modelled collectively as odour.

Consistent with the 2008 Air Quality Assessment undertaken by GHD, the following sources contribute to the majority of the odour impacts from the Shoalhaven Starches sites, in order of significance:

- Environmental farm (effluent treatment and storage system);
- DDG Plant (including Pellet Plant exhaust stack and biofilters);
- Starch Plant (Gluten and Starch Dryers); and
- Ethanol Plant (yeast propagators and retention tank).

A number of other minor odour sources contribute to the remainder of the plant's odour impact. These are detailed in Appendix B of **Annexure 5**.

##### ***Proposed Modifications***

###### ***Approved and Existing (Baseline) Operations***

GHD advise that the approved and existing operations consists of all odour sources at the Shoalhaven Starches plant, including EPA monitored sources and all minor sources, conservatively scaled for a 300 ML per year production. The baseline operations assessed by GHD also includes approved operations that are sources of odour, but are yet to be constructed. These consist of:

- Silos at the proposed Packing Plant. The Air Quality Impact Assessment: Modifications to Packing Plant conducted by SEMA (Stephenson Environmental Management Australia, 2015), calculated a maximum modelled odour concentration of 0.7 OU from a combined OER of the silo vents of 1,882 OU m<sup>3</sup>/s.

- Proposed upgrades to the flour mills. The Air Quality Impact Assessment: Modifications to Existing Flour Mill conducted by SEMA (Stephenson Environmental Management Australia, 2015) calculated a maximum modelled odour concentration of 0.3 OU from a combined OER of the mill baghouses of 471 OU m<sup>3</sup>/s.
- Starch Dryer 5, to be constructed in the factory building on Bolong Road near the (proposed) Maintenance Workshop. The Air Quality Impact Assessment: Dryer 5 Relocation conducted by SEMA (Stephenson Environmental Management Australia, 2015) calculated a maximum modelled odour concentration of 0.54 OU from an increase in OER of 6,800 OU m<sup>3</sup>/s associated with Dryer 5.

GHD advise that the following assumptions and additions apply to the audit modelling:

- Average odour emission rates were taken from the odour monitoring conducted by SEMA between May 2015 and February 2016 (four quarters) for EPA ID sources
- Specific odour emission rates from the effluent storage dams were based on most recent testing (May 2015) in conjunction with historical results
- Odour emission rates were assumed to be unchanged for sources originally measured in 2008 that have not been measured since

GHD identify the following new sources:

- Pellet plant exhaust stack, taking odorous air from the pellet coolers, drag chains, container loading/aspiration channel, DDG cyclones and DDG silos.
- No. 5 starch dryer.
- Seven silos for the new Packing Plant.
- Pellet plant fugitives, consisting of the wheat silos, barley intake fan, barley silo fan, barley grinding fan and bulk bag aspiration fan (non-DDG odour sources).

*Scenario 1 and 2: DDG dryers installed, with the cooling tower relocation*

GHD advise that Scenario 1 consists of the installation of one new DDG dryer (DDG dryer 4) and Mill Feed silo, along with the relocation of the eastern cooling towers and the addition of the building to house the dryers (included in the model to update building wake effects).

Scenario 2 consists of the installation of an additional three dryers as well as DDG dryer 4, all to be ducted and captured via the two new biofilters. This incorporates the following additional sources:

- Western cooling towers adjacent to the new DDG dryer building, assumed to have the same odour emissions and source characteristics as from the existing cooling towers.
- Two new biofilters, adjacent to the existing biofilters.

GHD advise that at present, two biofilters operate on a combined design air flow of 15,000 m<sup>3</sup>/h, with the flow split between two biofilters, each with a surface area of 110 m<sup>2</sup>. The biofilters receive air from a combination of odorous sources in the existing DDG plant, including DDG dryers 1 to 3, feed dump, condensate, finish feed, finisher pump tank, dryer feed tank, feed holding tank and CIP (fresh caustic).

Air leakage from DDG Dryer 4 is to be captured and ducted to the existing biofilter. The air leakage is estimated to be 1500 kg/h at 54°C. At a density of air, this equates to 0.38 m<sup>3</sup>/s of additional exhaust air to feed to the biofilters. Each biofilter is designed for an air intake/treatment of 15,000 m<sup>3</sup>/h (4.17 m<sup>3</sup>/s).

A summary of the existing biofilter operations is provided below in **Table 16**.

GHD advise that if the odour concentration of 50,000 odour units is exceeded, the surface loading requires an update in the design to cope with the additional odour.

**Table 16**  
**Summary of Biofilter Operations**

<i>Parameter</i>	<i>Unit/measure</i>	<i>Parameter</i>
Exhaust air flow rate ducted to biofilter (2014/2015)	Flow rate	2.9 to 5.0 m <sup>3</sup> /s
Current total odour emission rate ducted to biofilter (2014/15)	Odour concentration	9,000 to 11,000 OU
Biofilter A	Area	110 m <sup>2</sup> (55% split)
	Air flow split	55 %
Biofilter B	Area	110 m <sup>2</sup>
	Air flow split	45 %
Max capacity for one biofilter	Flow rate	15,000 m <sup>3</sup> /hour
		4.17 m <sup>3</sup> /s
Bed depth	Length	1.8 m
Contact time	Time	48 s
Spare capacity (at maximum observed flow rate 2014/15)	Flow rate	3.3 m <sup>3</sup> /s
Additional exhaust air from DDG dryer 4 (proposed)	Flow rate	0.38 m <sup>3</sup> /s
Additional exhaust air likely from DDG dryers 5 to 7 (proposed)	Flow rate	Up to 5.0 m <sup>3</sup> /s

According to GHD, the biofilter design for a bed depth of 1.8 m gives a contact time of 48 seconds; this is considered by GHD to be more than adequate to allow either biofilter to accept double the load while its' sister biofilter is off-line for replacement of the bed matrix.

According to GHD, with the two existing biofilters operating at around 50% of capacity, an additional 0.38 m<sup>3</sup>/s of exhaust air could be absorbed by the two existing biofilters, resulting in no changes required to connect DDG dryer 4 to the system for Scenario 1.

According to GHD, the addition of DDG dryers 5 to 7 (Scenario 2) is expected to also involve the addition of numerous decanters and other potential odour sources which are yet to be fully defined. As a result, for this scenario it is assumed that the new system would be equivalent to the existing system for the DDG building and will require an additional two biofilters (with flow splitting) on site.

### ***Source summary***

#### ***Existing and Approved (Baseline) scenario***

Modelling undertaken by GHD for the approved baseline scenario comprised the following sources:

- 49 point sources (each assumed at constant OER) throughout the factory area;
- Three point sources with variable emissions within the factory area;
- 11 area sources (consisting of two biofilters and the effluent treatment ponds); and
- Five volume sources within the factory area.

***Scenario 1*** (addition of DDG 4 and the buildings) has the following additional two sources:

- Cooling towers located on the western side of the proposed DDG building, adding an additional 0.1% (172 OUm<sup>3</sup>/s, based on measurements from the existing on-site cooling towers) to total existing OER from the plant.
- Mill feed silo, located to the south of the existing DDG building, adding an additional 0.1% (173 OUm<sup>3</sup>/s, based on measurements from the existing Gluten 1 B silo) to total existing OER from the plant.

***Scenario 2*** (addition of DDG dryers 5 to 7) has the following additional sources:

- Two biofilters, located adjacent to the existing biofilters in the southwest corner of the plant, adding an additional 0.4% to total existing OER from the plant (based on doubling the current OER from the two existing biofilters).

These sources are detailed in Appendix B of **Annexure 5**.

### ***Comparison of Site Total Odour Emissions for Nominated Scenarios***

GHD have summarised total odour emissions from the Shoalhaven Starches operations for the following scenarios - see **Table 17**:

- Shoalhaven Starches ethanol expansion (2008) – Scenario C;
- Previous odour audit from 2015;
- The existing and approved scenario ; and
- The proposed scenarios (Scenario 1 and Scenario 2) presented in this report.

#### **Comparison of Scenario C to Scenario 1 and 2**

GHD advise that, as evident from **Table 17**, total OER has decreased significantly from the 2008 assessment, by around 10.5 %. According to GHD, this is due to a number of changes to plant configuration and odour sources since 2008.

#### **Comparison of Odour audit to Scenario 1 and 2**

As the odour audit does not consider approved sources that are yet to be constructed, the OER from the previous 2015 odour audit is significantly less than the total OER for the proposed Scenarios 1 and 2.

#### **Comparison of Existing and Approved scenario to proposed Scenarios 1 and 2**

GHD advise that **Table 17** shows that the addition of the proposed cooling towers, reconfigured DDG dryers, mill feed silo and two new biofilters in Scenario 2 result in a marginal increase in total plant OER of 0.5% from the existing and approved scenario.

**Table 17**  
**Total Site-wide Emissions**

<b><i>Modelled Scenario</i></b>	<b><i>Description</i></b>		<b><i>Total OER – OU.m<sup>3</sup>/s</i></b>
<b>Comparison to previous assessments</b>			
C	2008 AQ assessment – factory odour Stage 1 plus upgrade (scenario C): after control *does not include environmental farm sources		207,897 (factory + upgrade) 192,147 (boilers and scrubber) <b>TOTAL – 328,252</b>
	Odour audit – existing sources July 2015	EPA sources	127,590
		All existing sources, at 300 ML	243,790

**Table 17 (continued)**

<i>Modelled Scenario</i>	<i>Description</i>	<i>Total OER – OU.m<sup>3</sup>/s</i>
<b>This assessment – Proposed modification to DDG dryers, cooling towers and biofilters</b>		
<b>Existing and Approved</b>	Existing and approved operations (Baseline scenario) – 300 ML	<b>291,350 total</b>
<b>Scenario 1</b>	Proposed operations (Scenario 1)	<b>291,690</b>
<b>Scenario 2</b>	Proposed operations (Scenario 2)	<b>292,910</b>
Percentage increase in total OER from approved/existing scenario to Scenario 2		0.5%

### 8.3.5.2 Dust Emissions

#### *Source Identification*

The main sources of dust, consisting of TSP, PM<sub>10</sub> and PM<sub>2.5</sub>, are listed below:

- Gluten and starch dryers.
- Boilers:
  - Boiler 1 – Gas fired;
  - Boiler 2 – Wood fired;
  - Boiler 3 – Gas fired;
  - Boiler 4 – Gas fired (converted from coal);
  - Boiler 5/6 – Coal fired; and
  - Boiler 7 – Gas fired.
- Flour Mill baghouses.
- DDG Pellet Plant exhaust stack.
- Product silos.
- Coal and woodchip stockpiles.

GHD advise that no dust emissions are expected to arise from a normal-functioning biofilter, which acts as an impassable filtration device due to the density of its matrix. As a consequence, all new emissions from the proposed DDG dryer 4 (and subsequent DDG Dryers 5 to 7) are expected to be captured in the biofilters. No net increase in particulate emissions from the plant as a result of the proposed modifications is therefore predicted by GHD. The addition of the cooling towers and mill feed silo are also expected to add negligible particulate emissions to the current footprint of the plant.

GHD advise that the relocation of the coal and wood chip storage area is expected to improve predicted dust impacts caused by wind erosion of unstable/uncovered surfaces. At present, the coal stockpiles cover an area of approximately 550 m<sup>2</sup>. The relocation of the storage area to the environmental farm north of Bolong Road will increase the distance to sensitive receptors R1 to R4, along with the town of Bomaderry. With appropriate dust controls, including currently used practices of watering and suitable design dimensions, it is predicted by GHD that this would result in lower levels of dust due to wind erosion encountered at nearby sensitive receptors.

As dust impacts are only predicted to improve as a result of the proposed modifications, no modelling was undertaken by GHD.

### **8.3.6 Dispersion Modelling**

The odour dispersion modelling was conducted by GHD using the US EPA regulatory Gaussian puff model CALPUFF Version 5.8. According to GHD, this model is also a recognised regulatory model in NSW. Where the modelling of odour dispersion is in complex terrain (as is the case at the Shoalhaven site), CALPUFF is recommended for use under NSW Guidelines. CALPUFF is especially suited for modelling light to calm wind conditions.

Details of the model configuration, parameter selection and building wake effects are provided in Section 7 of **Annexure 5**.

#### ***Odour assessment***

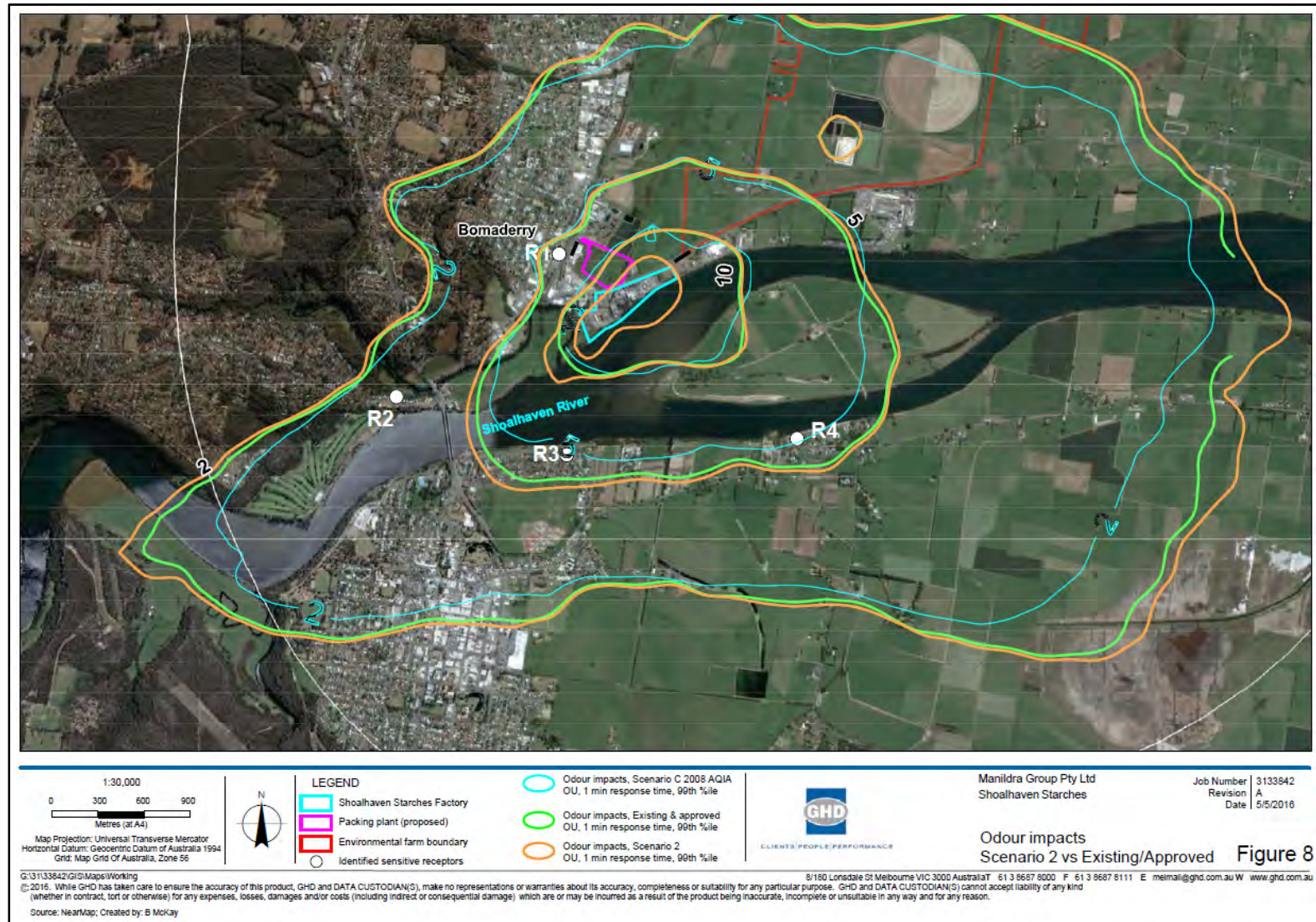
**Table 18** shows the predicted odour levels for the existing situation and the two proposed scenarios.

**Figure 7** shows the predicted 99th percentile odour impacts (one minute nose-response time) for the existing and approved operations at the plant and environmental farm when compared to the incremental impact from the additional odour sources modelled in scenario 2 (incorporating the additional biofilters, cooling towers and mill feed silo).



**Table 18**  
**Predicted Peak (99th percentile, short term averaged) Odour Impact at Nearby Receptors**

<i>Receptor</i>	<i>Range, m</i>	<i>To nearest odour source</i>	<i>Direction</i>	<i>Odour criterion</i>	<i>Odour impact, OU, 99th percentile, nose-response time</i>			
					<i>Existing (Baseline) Scenario</i>	<i>Scenario 1</i>	<i>Scenario 2</i>	<i>% increase</i>
R1 Bomaderry	150	Packing Plant	W	6	6.2	6.3	6.4	3%
R2 North Nowra	1300	Factory	SW	3	2.9	2.9	3.0	3%
R3 Nowra	700	Factory	S	5	6.0	6.0	6.3	5%
R4 Terara	1300	Factory	SE	5	5.9	5.9	6.0	2%



**Figure 7: Odour impacts – Scenario 2 vs Existing/Approved Scenario**  
 (Source: GHD)

*Proposed changes from Scenario 1 to existing/approved scenario*

According to GHD, there is no discernible increase in predicted odour impacts as a result of Scenario 1 from the Existing and Approved Scenario, due to the low percentage contribution of the cooling towers and Mill feed silo. As such Scenario 1 is not shown in **Figure 7**.

*Proposed changes from Scenario 2 to existing/approved scenario*

As evident from **Figure 7**, the actual increase in predicted peak odour impact between the existing/approved baseline scenario and the proposed Scenario 2 is marginal, with the impact zones almost superimposed. According to GHD, the slight extension of the odour impacts out to the south west indicate that the biofilters, as ground based sources, are likely to be the main contributing factor. However, the actual differences in odour concentration at receptors between the scenarios are highly unlikely to be distinguishable as an increase in perceived odour intensity.

*Predicted exposure at nearby residences*

According to GHD, with only the cooling towers and mill feed silo as additional sources for Scenario 2, only a small increase in odour impacts at the receptors is predicted at 2 to 5% for all receptors. GHD consider it highly unlikely that this small increase in odour impacts would be detected at the sensitive receptor locations. The predicted impacts at receptor R1 is exceeded by 0.4 OU, while receptor R2 meets the criteria set. The predicted impacts at R3 and R4 exceed the criteria by 1.3 OU and 1 OU respectively.

*Comparison to odour impacts predicted in the original EA for the SSEP (Scenario C, 2008)*

The 2008 predicted odour impacts from the modelled scenario C are shown in **Figure 7** as the light blue line. GHD advise that when comparing the predicted impacts of Scenario C (2008) to the two scenarios modelled in GHD's assessment, the following trends are evident:

- Similar odour impacts at the 5 OU impact zone to the north and west.
- Slight extensions of the impacts by 100 to 200 metres to the south and up to 270 metres to the southwest compared to scenario C (2008).
- A very slight retraction in odour impacts at the 5 OU impact zone to the northwest, towards the town of Bomaderry.

As such, GHD advise that the odour impacts predicted in 2008 for Scenario C are similar to the impacts predicted at present, for the approved/existing scenario and for the proposed Scenario 2.

**Table 18** indicates this further, with predicted odour concentrations at the sensitive receptors very similar to the levels predicted in 2008, with exception to a 1 OU increase at receptors R3 and R4. However, these impacts are marginally lower than the most exposed sensitive receptor R1. According to GHD, the slight extension in predicted ground-level odour impacts, despite the decrease in overall OER, is due to; (i) variations in the physical dispersion characteristics of a number of odour sources, and (ii) substitution/and/or replacement of some odour sources when compared to 2008.

Comparison to odour audit results – EPA sources and 300 ML

The predicted odour exposure from the last odour audit conducted in July 2015 is shown in Appendix C of **Annexure 5**. GHD advise that an increase in odour impact is evident when comparing the predicted 99th percentile odour level pattern in Appendix C to the existing/approved operations and proposed (Scenario 2) operations (**Figure 7**).

According to GHD, the difference is due to a number of sources with high OERs having been added to the model for approved (but not yet constructed) operations. As expected, the addition of these sources increases the odour impacts of the plant.

### **8.3.7 Conclusions**

GHD make the following conclusions to their assessment:

*“The addition of the proposed sources of the DDG dryers requires the duplication of the two existing biofilters, taking the total number of on-site biofilters to four, in order to meet treatment requirements.*

*A marginal increase of less than 0.5% was observed in predicted odour impacts as a result of the addition of two biofilters, relocated cooling towers and the Mill feed silo when compared with existing operations plus those operations already approved. It is considered highly unlikely that this increase in odour would be detected at sensitive receptors.*

*As a result, it is predicted that no discernible increase in perceived odour impacts would be evident as a result of the proposed modifications to the plant.*

*Additionally, odour impacts were compared with previous odour assessments of the plant, with the following features observed from odour measurements and modelling results:*

- *An overall decrease in total odour emissions from the plant by around 10.5 % to the modelled Scenario C in the ethanol expansion assessment in 2008.*
- *Odour impacts from Scenario 2 are similar to those predicted in 2008; with the exception of a slight extension of impacts to the south, as a result of small changes to the layout of the plant. As such the current model validates those impacts predicted in 2008, with no significant differences between impacts as a result of changes to the plant design since 2008.*

- *Differences shown in the modelling between the most recent odour audit (July 2015) and the predicted Existing and approved scenario are the result of the addition of odour sources. These sources have been approved but are not yet constructed. Once these additional sources are constructed, they may be included in the odour audit to assess previous model predictions and assumptions."*

## **8.4 FLOODING**

The Environmental Assessment Requirements as issued by the DoPE for this project required flooding impacts to be addressed by this proposal.

This Modification Application is supported by a Flood Impact Assessment report prepared by WMAwater (WMA) prepared in response to the Departments requirements. A copy of WMA's report forms **Annexure 4** to this EA. This section of the EA is based upon the findings of this assessment.

### **8.4.1 Approach**

#### ***Background***

Each development on the floodplain has the potential to cause an impact upon flood levels. The potential impacts of works within the floodplain on hydraulic characteristics are twofold – firstly a loss of temporary floodplain storage volume and secondly a loss of flow area. It is the loss of flow area which produces the greatest impact, as the area of floodplain storage lost due to all works since 1990, represents approximately less than 1% of the total available floodplain storage area for the northern floodplain (say 3000+ hectares).

Whilst the individual impacts (eg. construction of a road) may be small the cumulative increases from several developments may be significant. Therefore, the proposed works in 2008 needed to be assessed in the context of total cumulative impacts of all development within the immediate area. It is not possible to itemise all of the developments on the floodplain and their effects since white settlement. For the purposes of reporting, the nominal starting date for the assessment of cumulative effects is 1990. This date was agreed previously and approximately corresponds to the floodplain development status at the time when the current design flood level information was established (1990 Lower Shoalhaven River Flood Study).

For the above reasons the impacts assessed in the May 2008 Proposed Ethanol Production Upgrade Report represented the cumulative increases for all development by Shoalhaven Starches and others since 1990 and not just the incremental effects of the proposed ethanol upgrade and odour reduction works in 2008.

The impacts can be subdivided into hydraulic (changes in flood level, flow and velocity), social, economic and environmental. An assessment of such impacts is required in order to advise the proponent of the possible damages to the existing and proposed structures making up the plant, and also to advise the consent authorities of the likelihood of any increase in risk to other occupiers or users of the floodplain. It should be noted that the three main floodplain users (Shoalhaven Starches, Dairy Farmers and the Paper Mill (both now owned by the Manildra group of companies)) have previously worked in conjunction or co-operation with each other. Each have swapped or sold land on the adjoining floodplain in recent times to suit their commercial needs.

Shoalhaven Starches and the Paper Mill “share” the railway line which passes through all three properties. Shoalhaven Starches also supplied product to the Paper Mill in the past. These two plants are located on the banks of the river in order to distance themselves from the urban environment and to be close to an unlimited supply of water. They also require a large amount of “flat” land for their operation with good road and rail access. Shoalhaven Starches makes excellent use of the floodplain by irrigating and farming the land using recycled water from the plant.

### ***Approach Adopted in Flood Assessment***

#### ***May 2008 Proposed Ethanol Production Upgrade Report***

The May 2008 Proposed Ethanol Production Upgrade Report undertook a detailed hydraulic analysis using the CELLS model of all the works proposed as part of this program.

The works on the subject site (west of Abernethy’s Drain and south of Bolong Road), which would impact on flooding (ie. excluding the overhead gantry) as part of this assessment included:

- 6 DDG dryers and associated works;
- extension to DDG loadout and pellet plant;
- bio scrubber vessels;
- gas co-generation plant;
- additional cooling towers;
- chemical store; and
- evaporator.

It should be noted that the western cooling towers, twin bio-filters and MCC room were not included in the above assessment but were subsequently approved.

### 2016 Modification Application

Under this Modification Application it is proposed to undertake the following works, which would impact on flooding:

- Reduce the number of DDG Dryers from 6 to 4;
- Slightly relocate the DDG Dryers on the site;
- Relocate the eastern and western cooling towers;
- Provide two additional bio-filters;
- Construct a forklift maintenance building;
- Relocate the MCC room;
- Provide a container storage and preparation areas; and
- Regularise and expand an emergency coal and woodchip storage area on the environmental farm site located on the northern side of Bolong Road.

### Assessment of Impact of Proposed Works on Flooding

The loss of hydraulic conveyance depends on the extent of the restriction to a flowpath caused by the works. Prior to construction of the Shoalhaven Starches plant at Bomaderry there would have been significant flow through the site during a flood, as there is across any river bank. However, since approximately 1960 the ongoing construction of the plant has effectively severely limited the flow path through the site. This issue has been investigated by WMA Water in their report titled "*Further Development within the Manildra starches Plant off Bolong Road, Bomaderry - Hydraulic Assessment*". In summary an agreement was reached that any future development within the intensively built-up area, as indicated on **Figure 8** below (taken from that report) would not require hydraulic modelling to quantify the hydraulic impacts and cumulative effects.







There is no other suitable land available within the local area outside of a high hazard area which can be used for the proposed purposes.

Shoalhaven Starches has a Flood Evacuation Plan and this should ensure that the occupants (and all other personnel at the plant) will be safely evacuated from the floodplain prior to the flood peak arriving.

#### **8.4.2 Flood Impact Assessment**

##### ***Increase in 1% AEP Flood Levels***

The following four design scenarios have been investigated by WMA Water:

- **Scenario A:** Reflects the impacts of the relocation of existing approved works not yet built, namely; the western and eastern cooling towers, the MCC room and reduction / relocation of the number of DDG dryers from 4 to 6;
- **Scenario B1:** Reflects the effects of Scenario A plus two additional bio-filters, the forklift maintenance building and the container storage and preparation area;
- **Scenario B2:** Reflects the effects of Scenario B1 but with part of the container storage area (temporarily) occupied by the coal and woodchip storage area;
- **Scenario C:** Reflects the effects of Scenario B1 plus a coal and woodchip storage area on the east side of Hanigans Lane.

The effects of each of the above four scenarios has been compared against the current (January 2016) approved works on the floodplain namely;

- all approved and constructed plant operated by Shoalhaven Starches;
- all approved and yet to be constructed plant operated by Shoalhaven Starches as located in the original approval;
- construction of all works as outlined in Flood Impact Assessment Reports prepared by WMA Water for :
  - proposed modifications to the existing flour mill;
  - proposed modification involving relocation of Product Dryer; and
  - proposed modification to the approved packing plant.

In addition the effects of each of the above four scenarios has been compared against the assumed 1990 conditions on the floodplain. In this way the cumulative effects of all known developments on the northern floodplain can be evaluated.

*Effect of Scenario A - Relocation of Existing Approved Works not yet Built*

The increase in the 1% AEP flood level due to the relocation of existing approved works is shown on Figure 3 (compared to current - 2016 floodplain conditions) and Figure 7 (compared to 1990 floodplain conditions) of WMA Water's Flood Risk Assessment (**Annexure 4**). Figure 3 indicates that the relocation of existing approved works produces only a minor increase in level along the northern bank of the Shoalhaven River and a minor decrease in level to the north of the subject site.

According to WMA Water, in effect the relocation has produced a minor "blocking" of the inflows through the subject site and thus there will also be a small increase in flow and level in the Shoalhaven River but as this impact is "spread" across the entire river it is below the threshold level of 0.01 m shown on Figure 3 (of WMA Water's Flood Risk Assessment).

In summary, WMA conclude that Scenario A produces no significant incremental (beyond that which exists at January 2016) increase in the flood levels on surrounding properties.

*Effect of Scenario B1 - Additional Buildings to Scenario A*

The increase in the 1% AEP flood level due to the proposed increase in buildings as well as the relocation of existing approved works (Scenario A) are shown on Figure 4 (compared to current - 2016 floodplain conditions) and Figure 8 (compared to - 1990 floodplain conditions) of WMA Water's Flood Risk Assessment (**Annexure 4**). Figure 4 indicates that Scenario B1 produces similar effects to Scenario A (ie. a minor increase in level along the northern bank of the Shoalhaven River and a minor (but greater than Scenario A) decrease in level to the north of the subject site). According to WMA Water, whilst the addition of the large container store and preparation area might suggest an increase in level its hydraulic effects are to a large extent nullified by the presence of the relocated DDG dryers (Scenario A) and the approved gas co-generator building.

According to WMA Water, in effect the combined changes have produced a minor additional (to Scenario A) "blocking" of the inflows through the subject site and thus there will also be a small additional increase in flow and level in the Shoalhaven River. However as this impact is "spread" across the entire river it is below the threshold level of 0.01 m shown on Figure 4 (of WMA Water's Flood Risk Assessment).

In summary WMA conclude that Scenario B1 produces no significant incremental (beyond that which exists at January 2016) increase in the flood levels on surrounding properties.

*Effect of Scenario B2 - Inclusion of Temporary Coal and Woodchip Storage Area to Scenario B1*

The increase in the 1% AEP flood level due to the inclusion of the temporary coal and woodchip storage area plus the proposed increase in buildings (Scenario B1) and the relocation of existing approved works (Scenario A) are shown on Figure 5 (compared to current - 2016 floodplain conditions) and Figure 9 (compared to - 1990 floodplain conditions) of WMA Water's Flood Risk Assessment (**Annexure 4**). Figure 5 indicates that the additional impacts of the temporary coal and woodchip storage area to Scenario B1 produces very similar effects to Scenario B1 (ie. a minor increase in level along the northern bank of the Shoalhaven River and a minor (but greater than Scenario A) decrease in level to the north of the subject site).

In summary WMA conclude that Scenario B2 produces no significant incremental (beyond that which exists at January 2016) increase in the flood levels on surrounding properties.

*Effect of Scenario C - Inclusion of Coal and Woodchip Storage Area at Hanigans Lane to Scenario B1*

Scenario C represents the extent of the proposed developments at this time and assumes Scenario B1 plus the permanent coal and woodchip storage area on the east side of Hanigans Lane. This proposed storage area will occupy approximately 4 hectares (325 m by 125 m) and is located to the immediate south west of the existing storage ponds.

The increase in the 1% AEP flood level due to the inclusion of the permanent coal and woodchip storage area plus the proposed increase in buildings (Scenario B1) and the relocation of existing approved works (Scenario A) are shown on Figure 6 (compared to current - 2016 floodplain conditions) and Figure 10 (compared to - 1990 floodplain conditions) of WMA Water's Flood Risk Assessment (**Annexure 4**). Figure 6 indicates that the additional impacts of the permanent coal and woodchip storage area (on the east side of Hanigans Lane) to Scenario B1 produces very similar effects to Scenario B1 near the plant however produces over a 0.1m increase on the south side of the proposed permanent coal and woodchip storage area.

*Summary of Increase in 1% AEP Flood Levels*

WMA Water make the following conclusions with respect to the increase in 1% AEP Flood Levels:

- *Blocking the flow path of flood waters (at the Shoalhaven Starches plant) in the 1% AEP event into the northern floodplain due to the proposed works will slightly increase flood levels in the immediate upstream area but also results in less flood water entering the northern floodplain and slightly lower flood levels downstream.*
- *In the 5% AEP event (an event of similar magnitude to the March 1978 flood) there will be no increase in flood level (or consequent changes in extent of inundation etc.) as a result of the constructed and proposed works on the floodplain since 1990 as the northern bank is not overtopped to any great extent. This means that in the smaller more frequent events, up to a 5% AEP, the proposed works on the floodplain have minimal impact. In these small events there is little flow into the northern floodplain from the Shoalhaven River and the floodplain predominantly acts as a flood storage area. In these smaller floods (up to the 5% AEP) the northern floodplain is largely filled by local catchment runoff and particularly from Broughton Creek.*
- *It should be noted that the incremental effect of the proposed works is small with the majority of the impact occurring on land and buildings owned by Shoalhaven Starches.*

### **Other Hydraulic Impacts**

#### Increase in Frequency of Inundation

An increase in the frequency of inundation occurs as a result of an increase in flood level. For example, a rise in flood level of 0.1m within the 2% to 1% AEP flood range (4.93 m AHD to 5.25 m AHD at the old Paper Mill) would represent an approximate 10 year increase in frequency of inundation (say from a 1 in 70 year to a 1 in 60 year occurrence). This impact is of particular importance in the smaller more frequent floods (say in less than the 5% AEP). However, according to WMA Water, in the 5% AEP and smaller events, there will be no impact on flood levels and thus the frequency of inundation, as the northern bank of the Shoalhaven River is not overtopped until approximately a 5% AEP event.

#### Increase in Duration of Inundation

According to WMA Water, there will be some increase in the extent of inundation at peak levels but this will depend upon the nature of the flood event (quickly rising and falling event or one that rises and falls slowly).

Figure 15 of WMA's Flood Assessment Report provides a Stage (height) hydrograph at the confluence with Bomaderry Creek for the 1% AEP (between 1990 conditions and Scenario C) and indicates that a change in the peak level makes no significant difference to the duration of inundation.

### *Increase in Extent of Inundation*

According to WMA Water, the northern floodplain is low lying land (ground levels at 2 m AHD or below with no areas of high ground except around the perimeter). It is entirely inundated by floodwaters in say the 5% AEP event and greater. Thus any increase in flood level, caused by development, will only result in an increase in the extent of inundation around the perimeter of the floodplain. The increased area of inundation will vary between floods and depends upon the grade of the topography at the perimeter and the length of the perimeter. A flat grade will result in a large increase in area, whilst a steep grade will result in only a small increase. The following preliminary assessment by WMA Water provides an indication of the likely extent of any increase.

According to WMA Water, assuming a 0.1 m rise in flood level and a consequent lateral increase in extent of 2 m over approximately 3 kilometres of perimeter will produce an area increase of approximately 6,000 m<sup>2</sup>.

### *Increase in Velocity of Floodwaters*

According to WMA Water, comparison of velocities between different floodplain conditions is more complex than comparison of peak levels. The main difference being that the peak flood velocity may not necessarily occur at the same time as the peak flood height. More often than not it will occur when floodwaters first enter an area at a time of very small flow. This velocity is generally not relevant for comparison purposes. A more appropriate velocity is generally that which is experienced at peak flood height since, in combination with the deepest floodwaters this is likely to represent the greatest flood hazard. It should be noted that local velocities between obstructions may be higher than this average velocity obtained from the TUFLOW model.

Figure 16 of WMA's Flood Assessment Report indicates the change in the 1% AEP peak velocity (between 1990 conditions and Scenario C). According to WMA Water, the changes in peak velocity are generally less than +/- 0.5m/s except near the storage ponds where the "throttling" of the flow paths caused by the storage ponds and proposed coal and woodchip storage area increases the peak velocities by up to 2 m/s.

### ***Consequences of Increases in 1% AEP Flood Level***

The consequences of an increase in flood level is reflected in an increase in:

- social impacts (stress, risk to life);
- environmental impacts;

- tangible damages at private and public properties. Largely this is due to an increase in above floor level inundation.

### Social Impacts

Social impacts (intangible damages) from flooding include stress and anxiety, risk to life, disruption to work and services, isolation and depression. According to WMA Water, the majority of the buildings in this area are for commercial and/or industrial purposes and thus the social impacts of flooding for these properties relate primarily to loss of productive work and the increase in stress associated with it. However most of the businesses would already be shut down before the cumulative increases produced a significant effect in this regard.

The residential properties experience greater social impacts because of the personal loss involved. For the residential properties affected by the cumulative increases in flood level, there may be increases in damages due to the existing and proposed works. However, according to WMA Water, it is unlikely that the relative increases in level (less than 0.1 m in events up to and including the 1% AEP) will invoke a significant social impact in any particular flood.

On this basis WMA Water conclude that there will be no significant or sudden increase in the risk to life as a result of the cumulative increases.

### Environmental Impacts

Flooding is a natural part of the life cycle of a floodplain and sustains the ecosystem by providing nutrients to the environment. Prior to European settlement the area around Bolong Road would have been inundated by floods and the flora and fauna would have adapted to this regime. The majority of the area is now developed for rural purposes (primarily by Shoalhaven Starches) with the remainder being used for industrial purposes. The area to the north of Bolong Road consists of cultivated rural grasslands which are irrigated from the storage ponds. There are three main issues with regard to the impacts of flooding on the environment. The first is the duration of inundation, the second is the depth of inundation and the third is the velocity of flow. The latter has not been addressed in this investigation as the cumulative works have negligible impacts upon velocities.

During floods, water can remain over the land for several days causing the non-water tolerant flora species on the floodplain to rot, impacting on the water quality of the runoff. According to WMA Water, the existing and proposed works do not affect the rate of low flow runoff. Thus any increases in flood levels will not impact upon the process of flora species decaying as a result of inundation.

According to WMA Water, the entire northern floodplain is inundated by of the order of three metres of water in a major event, the increase (of typically less than 0.1 m) caused by the cumulative works represents only a small percentage of this. The potential impacts on plants occurs when their roots are submerged for some time which causes non water tolerant species to rot and ultimately die. In this case, the increases in flood levels will not cause a significant increase in the number of plants affected by water inundation.

Therefore, based on the available information WMA Water conclude that this environment will not sustain any significant ecological impact from an extra 0.1 m depth of floodwaters due to the works.

A further issue is whether the cumulative increases will cause environmental impacts elsewhere. Potentially, flooding causes industrial wastes and gross pollutants to wash downstream. These types of impacts could be attributed to overflows from process plants or solid wastes washing away during floods. According to WMA Water, generally these types of impacts would occur at the beginning of a flood event (frequency of about 5% AEP), at which time there would be no impacts from the existing since 1990 and proposed works.

Of possible concern is the release of coal and woodchip from the storage area. However these goods are generally not toxic.

The storage of goods on the western side of Abernethy's Drain in the proposed container preparation and storage area could potentially increase the level of environmental harm if pollutants are released as a result of inundation during a flood. According to WMA Water this risk is considered to be low as the material is stored in containers which are unlikely to result in significant "leakage" during a flood. Also the material stored is of a non-toxic nature.

#### *Increase in Tangible Damages at Properties*

Flood damages can be subdivided into Tangible (for which a monetary value can be assigned) and Intangible (for which a monetary value cannot be assigned – Social and Environmental Impacts referred to above). The flood assessment undertaken by WMA Water has focussed on the potential increases in tangible damages to the nearby largely commercial and industrial buildings. The main tangible damages to these operations and private houses are:

- structural damages to buildings;
- water damage to equipment, carpets, household furniture;
- loss of production because of inundation or restricted access;
- loss/damages to stock;

- loss of wages to workers or the cost to the company of paying staff;
- clean up costs.

Each of the above factors contributes to the economic losses caused by flooding. A significant factor affecting the actual extent of damages experienced is the level of preparedness and responsiveness of the owner to flooding.

WMA Water have assumed in their assessment that the relatively minor increases in flood levels caused by existing and proposed works would have a negligible impact on the likely structural damages to any building. There are formulae and depth v damages graphs for estimating flood damages based upon surveys carried out after past floods. These are appropriate for use on residential properties, but are of less relevance for commercial and industrial properties due to the large range of possible usages and consequent damages (concrete batching plant versus an electrical store, for example).

The increase in damages will depend upon the pre works depth of the above floor inundation. For example, the greatest % increase in damages will occur if the increase in flood level occurs when the peak level is just above the floor (say less than 0.1 m) as opposed to when there is already 1 m depth of water above the floor.

The increases in the depth of above floor inundation (above the existing peak depth from 1990 to January 2016 and for the proposed Scenarios) as well as the reduction in clearance of the floor above the 1% AEP flood level are shown on Figure 11 to Figure 14 of WMA Waters Flood Assessment Report (**Annexure 4**).

WMA Water conclude that the incremental increase (beyond the impacts at January 2016) in the 1% AEP flood level at the surveyed buildings for each of the proposed scenarios is relatively minor.

#### **8.4.3 Compliance with Shoalhaven City Council's Chapter G9: Development On Flood Prone Land (DCP2014)**

##### ***Council's Flood Certificates***

Council's flood certificates advise that the site at 32 Bolong Road is inundated in the 1% AEP event and is described as High Hazard Floodway. The proposed coal and wood chip bulk storage area at 20 Hanigans Lane is described as High Hazard Flood Storage. It should be noted that Council's description of the hydraulic and hazard categorisation is based on CELLS model results from the 1990 Lower Shoalhaven River Flood Study. However the CELLS model could not accurately define these categorisations due to its limited model structure.



Council's flood certificates indicate that the 2050 projected sea level rise estimate of 0.4 m due to climate change will not increase the 1% AEP flood level at this site as it is too far upstream from the ocean.

### **Compliance**

The Flood Assessment prepared by WMA addresses how the proposal complies with Chapter G9: Development on Flood Prone Land of Council's DCP 2014 (refer **Table 19**). As the works will not involve subdivision of lands compliance with these performance criteria has not been addressed.

**Table 19**  
**Compliance with Chapter G9 – Shoalhaven DCP 2014**

<b>Performance Criteria</b>	<b>Response</b>
<b>P1 Development or work on flood prone land will meet the following:</b>	
<i>The development will not increase the risk to life or safety of persons during a flood event on the development site and adjoining land.</i>	The works are such that their construction will not significantly increase the number of workers on the site (beyond that under Project Approval MP06_0228) or additionally threaten their safety during a flood.
<i>The development or work will not unduly restrict the flow behaviour of floodwaters.</i>	Refer Flood Impact Assessment.
<i>The development or work will not unduly increase the level or flow of floodwaters or stormwater runoff on land in the vicinity. The development or work will not exacerbate the adverse consequences of floodwaters flowing on the land with regard to erosion, siltation and destruction of vegetation.</i>	The works at 32 Bolong Road are within industrial land partially occupied by constructed or approved to be constructed buildings. The development will have no significant impact on erosion, siltation or destruction of vegetation. Neither will the increase in impervious area cause any significant increase in runoff from the site.  The works at 20 Hanigans Lane are on largely grassland but with an adjacent store of used equipment. There is a risk that part of the proposed coal and woodchip store at this location or at the temporary location at 32 Bolong Road may become mobilised.
<i>The structural characteristics of any building or work that are the subject of the application are capable of withstanding flooding in accordance with the requirements of the Council.</i>	A separate structural report will be provided.
<i>The development will not become unsafe during floods or result in moving debris that potentially threatens the safety of people or the integrity of structures.</i>	A separate structural report will be provided.
<i>Potential damage due to inundation of proposed buildings and structures is minimised.</i>	There will potentially be some damage to electrical and other components, including the stored containers and these are considered in Shoalhaven Starches Flood Plan.

<b>Performance Criteria</b>	<b>Response</b>
	Electrical and other water sensitive components should as far as possible be raised above the 1% AEP flood level + 0.50 m.
<i>The development will not obstruct escape routes for both people and stock in the event of a flood.</i>	The works will not occupy escape routes or cause workers to become trapped.
<i>The development will not unduly increase dependency on emergency services.</i>	The works are such that their construction will not significantly increase the number of workers on the site (beyond that under Project Approval MP06_0228), additionally threaten their safety during a flood or increase the need for emergency services.
<i>Interaction of flooding from all possible sources has been taken into account in assessing the proposed development against risks to life and property resulting from any adverse hydraulic impacts.</i>	Refer Flood Impact Assessment.
<i>The development will not adversely affect the integrity of floodplains and floodways, including riparian vegetation, fluvial geomorphologic environmental processes and water quality.</i>	The works will be constructed on land designated as high hazard floodway and high hazard storage in the 1% AEP event. The site at 20 Hanigans Lane is largely vacant land with no existing vegetation apart from grasses and is beyond the influence of normal fluvial geomorphic processes. The site at 32 Bolong Road is cleared earth with no vegetation cover. The works should not exacerbate the integrity of the floodplain beyond what will already occur during large floods.
<b>P2 Filling or excavation on flood prone land will meet the following:</b>	
	The works involve minimal earthwork excavation but the buildings and proposed coal and woodchip store will be the equivalent of filling as they will obstruct the existing flood flows.
<i>High hazard floodway areas are kept free of fill and/or obstructions.</i>	The locations are within a high hazard flood storage and floodway areas, however the location of the works is determined by the nearby rail line and other related plant. There is no other location where the works could be situated. The hydraulic impact of the proposed works is minimised by the proposed coal and woodchip store being located in a flood storage rather than a floodway area. The hydraulic effect of the container store is to some extent minimised by being adjacent to the approved DDG works.
<i>The proposed fill or excavation will not unduly restrict the flow behaviour of floodwaters.</i>	Refer Flood Impact Assessment.
<i>The proposed fill or excavation will not unduly increase the level or flow of floodwaters or stormwater runoff on land in the vicinity, including adjoining land.</i>	Refer Flood Impact Assessment.

**Table 19 (continued)**

<b>Performance Criteria</b>	<b>Response</b>
<i>The proposed fill or excavation will not exacerbate erosion, siltation and destruction of vegetation caused by floodwaters flowing on the land.</i>	The site at 20 Hanigans Lane is largely vacant land with no existing vegetation apart from grasses and is beyond the influence of normal fluvial geomorphic processes. The site at 32 Bolong Road is cleared earth with no vegetation cover. The works should not exacerbate the integrity of the floodplain beyond what will already occur during large floods.
<i>The proposed fill or excavation will not be carried out on flood prone land if sufficient flood free area is available for development within the subject property.</i>	The locations are within a high hazard flood storage and floodway area, however the location of the works is determined by the nearby rail line and other related plant. Other sites have been evaluated and the outcome is that there is no other locations where the works could be situated.
<i>The proposed excavation does not create new habitable rooms, non-habitable storage areas or car parks with floor levels below the existing ground level.</i>	The works do not involve habitable or non-habitable residential storage areas or below ground car parks.

## **8.5 VISUAL IMPACTS**

### **8.5.1 Factory Site**

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 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 overall 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.

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 factory 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.

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 Burruga (Pig) Island and the vegetated riverbanks.

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.

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.

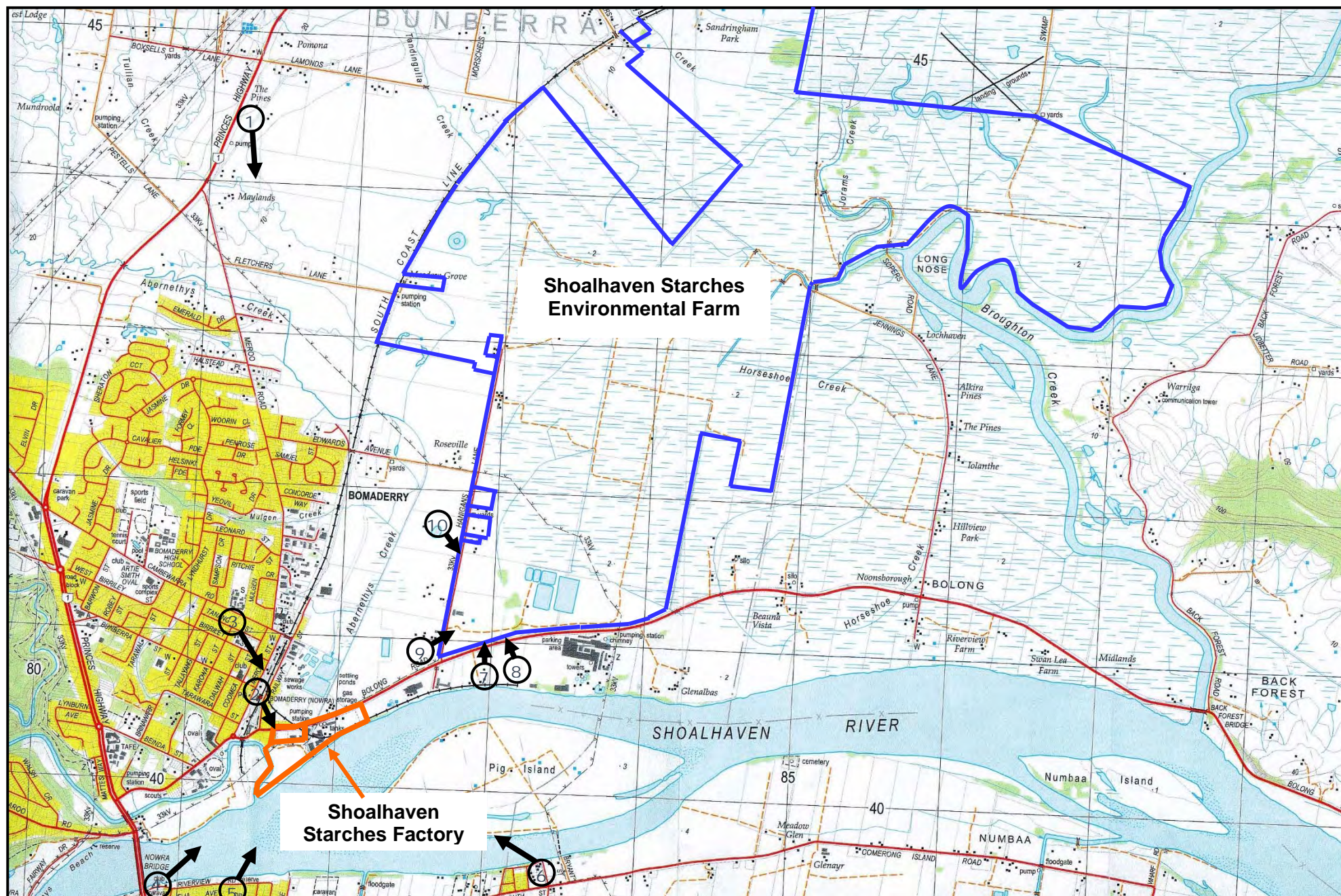
### ***Visual Impact of Proposal***

The proposal will largely involve the installation of additional plant and works within a similar footprint to the approved development. A stack serving the DDGS Dryer building will have a height above ground level of 30 m which is higher than that anticipated under the SSEP (ie. 25 m).

Under these circumstances, the proposed modifications represent only a minor change to the approved DDGS Dryer development.

The visual impact of the proposed modifications from the identified vantage points (refer **Figure 9**) is described as follows.





**Figure 9: Vantage Points for Plates.**



### The Princes Highway

The Shoalhaven Starches factory is mainly visible from a section of the Princes Highway between Boxsells Lane and Devitts Lane, Jaspers Brush (refer **Plate 1**). Due to the configuration of the highway and the siting of the factory, only southbound vehicles view the site. Vantage points along this section of the highway are 4.5 to 5.0 km from the site. The site becomes less exposed and is eventually obscured by a rise in topography further south of Boxsells Lane.

Given the distance from these vantage points the factory site is only barely visible. The rising topography upon which Bomaderry is sited screens the western portion of the site, as does intervening vegetation.

Given the distance of these views, the scale and nature of the proposed modifications and the screening of the site attributed to terrain and vegetation it is considered the developments associated with this modification will not impact on views from this vantage point.



**Plate 1:** View of Shoalhaven Starches Factory from Princes Highway (within vicinity of Boxsells Lane).

### Bolong Road

The existing factory site is clearly visible from Bolong Road by vehicles approaching from the east, and along the frontage of the site. Cleary Brothers concrete batching plant is located along Bolong Road to the west of the factory site (refer **Plate 2**). The location of the main DDG Dryer modification works is set back from Bolong Road to the south of the Cleary Brothers site.



**Plate 2:** View of Shoalhaven Starches factory site from Bolong Road.

The proposed modifications to the approved DDGS Dryers will mainly involve the installation of plant and works within a similar footprint to the approved development. The proposed stack serving the DDGS Dryer Building will be 30 m above ground level, which is only slightly higher than that which has previously been approved (25 m). The proposed works will be situated within proximity of existing industrial structures at this location many of which are higher than the proposed modifications, including the existing DDG Pelletising Plant which has a building height of 29.2 m above ground level and stack height of 49.2 m above ground level. Under these circumstances the proposed structures will create forms similar to existing industrial structures within the vicinity.



The proposed modification works will be partially screened from view along Bolong Road by virtue of existing development sited along the Bolong Road frontage, including the Cleary Brothers concrete batching plant.

Under the above circumstances, it is considered that the proposed modifications will not be out of context in terms of the existing industrial development when viewed from this vantage point.

#### Bomaderry Urban Area

The township of Bomaderry is slightly elevated and some locations within this urban area have extensive views of the site (refer **Plate 3**).



**Plate 3:** View of Shoalhaven Starches factory site from corner of Railway Street and Cambewarra Road, Bomaderry.

The proposed works will be visible from this vantage point as are other similar size and scale structures. In this way the vista from this vantage point will not be significantly altered.

### Nowra Bridge

The view from Nowra Bridge to the east is mainly dominated by the river, riparian vegetation and the floodplain (refer **Plate 4**).



**Plate 4:** View of Shoalhaven Starches factory site from Nowra Bridge over the Shoalhaven River.

The site is largely obscured by riverside vegetation. Although the proposed DDGS Dryer Building and stack are expected to be slightly visible above the existing riverside vegetation, the proposed works will be situated within proximity of existing industrial structures at this location. Many of these existing structures are higher than the proposed modifications, including the existing DDG Pelletising Plant which has a building height of 29.2m above ground level and stack height of 49.2m above ground level.

Under these circumstances the proposed structures will create forms similar to existing industrial structures within the vicinity and will not be out of context when viewed from this vantage point.

### Riverview Road

The main vantage point from where the proposed modifications will be visible will be from residences along Riverview Road directly south of the site (refer **Plate 9**). This view is from a distance of about 750 metres. Riverside vegetation along both the northern and southern banks of the river softens much of the site from view.



**Plate 5:** View of Shoalhaven Starches factory site from Riverview Road area.

Although the proposed modifications will be visible from this vantage point, they will be sited within the overall “silhouette” of the existing factory complex. Under these circumstances, the proposed modifications will not be out of context in terms of the existing factory development when viewed from this vantage point.

It is noted that there is scope for supplementary landscaping and revegetation to take place along the riverbank adjoining the factory site to help soften or obscure views of the site, particularly from the Riverview Road vantage point. This was addressed as part of the Project Approval for the Expansion Project.

### Terara

The village of Terara is approximately 1.5 kilometres from the factory. The view of the Shoalhaven Starches factory site as seen from the banks of the Shoalhaven River adjacent to the village of Terara is shown in **Plate 6**.

Although the proposed DDGS Dryer Building and stack are expected to be slightly visible above the existing riverside vegetation, the proposed works will be situated within proximity of existing industrial structures at this location. Many of these existing structures are higher than the proposed modifications, including the existing DDG Pelletising Plant.



**Plate 6:** View of Shoalhaven Starches factory site from village of Terara.

Under these circumstances the proposed structures will create forms similar to existing industrial structures within the vicinity and will not be out of context when viewed from this vantage point.

#### Cambewarra Lookout

Cambewarra Lookout is situated about 7 km to the northwest of the site. Views from the lookout are from an elevation over 620 m ASL, and encompass the Shoalhaven River floodplain and the coast including Jervis Bay. Whilst the factory site is visible from this vantage point, due to scale of the view, it would be extremely difficult to make out the works associated with the project from this vantage point.

#### Conclusion

Overall it is considered that the proposed modifications will not create a significant adverse visual impact given that the proposed works will be situated within proximity of existing industrial structures at this location, many of which are higher than the proposed modifications. The proposed structures will create forms similar to existing industrial structures within the vicinity and will not be out of context with the existing industrial character of the site. There are however measures which Shoalhaven Starches could undertake to minimise the visual impact of the proposed works.



Where appropriate and possible, the works 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. Consideration should be given to incorporating a cladding colour if possible which will blend with the surrounding locality.

### **8.5.2 Environmental Farm**

The Shoalhaven Starches Environmental Farm is situated to the north of the factory site and comprises over 1000 ha of land. This area is cleared grazing land and also contains spray irrigation lines and wet weather storage ponds. 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 Scenic Character and Environment***

The existing coal and woodchip storage area that is proposed to be regularised as part of this modification is located within the south west corner of the Environmental Farm. The site is adjacent to an area that is currently used for various activities associated with irrigation works on the Environmental Farm and includes a large rural shed.

As described above, the surrounding rural area is generally flat to gently undulating and planted with pasture grasses. The area has a typical rural/agricultural character, common throughout the region.

The most relevant vantage points from where the storage area is visible include Bolong Road (to the south) and Hanigans Lane (to the west).

#### ***Visual Impact of the Proposal***

The proposal involves the bulk storage of coal and woodchips within an area that is part of the Shoalhaven Starches Environmental Farm and is located north of Bolong Road and east of Hanigans Lane.

The visual impact of the proposed modifications from the identified vantage points (refer **Figure 9**) is described as follows.

##### **Bolong Road**

The area used for storage of coal and woodchips is partially screened at this location by existing vegetation located to the immediate south and which generally comprises Norfolk Island Pines.

Although the storage piles are partly visible, they are viewed in the context of other existing Environmental Farm activities at this location and are also generally within the skyline created by the escarpment to the north (see **Plates 7 and 8**).



**Plate 7:** View towards coal and woodchip storage area from Bolong Road looking north.



**Plate 8:** View towards coal and woodchip storage area from Bolong Road looking north.

Under these circumstances the visual impact of the proposed storage area is not considered to be significant.

Notwithstanding this, there is scope for supplementary landscaping to take place along the south of the proposed storage area to help obscure views of the storage area from Bolong Road.

#### Hanigans Lane

The storage area is partly screened at this location by existing vegetation along the eastern side of Hanigans Lane (see **Plate 9**). However, further north along Hanigans Lane the coal and woodchip storage area is clearly visible from the road and from dwellings located along Hanigans Lane at this location (refer **Plate 10**).

Under these circumstances, it is recommended that vegetative screening is provided to the north of the proposed storage area in order to minimise the visual impact of the proposal from the north along Hanigans Lane.





**Plate 9:** View towards coal and woodchip storage area from Hanigans Lane looking east.



**Plate 10:** View towards coal and woodchip storage area from Hanigans Lane (further north) looking east.



## Conclusion

Overall it is considered that the proposed regularisation and expansion of the emergency coal and woodchip storage area at Hanigans Lane will not create a significant adverse visual impact given that the storage area is situated within proximity of existing Environmental Farm activities at this location and will generally be within the skyline created by the escarpment to the north. Further, the storage area is partially screened from view along Bolong Road by existing vegetation. However, to minimise the visual impact of the proposed works the following recommendations are made:

- consideration should be given to supplementary planting to the immediate south of the storage area in order to enhance screening provided by the existing Norfolk Island Pines.
- vegetative screening is provided to the north of the proposed storage area in order to minimise the visual impact of the proposal from the north along Hanigans Lane.

## **8.6 GEOTECHNICAL AND RIVERBANK STABILITY**

This Modification Application is supported by a Geotechnical Report prepared by Coffey Geotechnics ("Coffey's"). This assessment has reviewed issues pertaining to riverbank stability in response to the above requirement of the Department. A copy of Coffey's report forms **Annexure 8** to this EA. This section of the EA is based upon the findings of this assessment.

### **8.6.1 Existing Conditions**

#### ***Biofilters***

The site of the proposed additional biofilters is located approximately 25 to 30 m north of the northern bank of the Shoalhaven River on the western side of the existing biofilters (see Plans provided in **Annexure 1**). The site is near level and has a paved gravel surface. The existing biofilter structures are essentially large tank structures with concrete block walls and concrete floor slabs. According to Coffey's and based on their discussions with Manildra, these structures are supported on high level footings with no piles present.

The land to the west of the site of the proposed additional biofilters is currently vacant and the areas to the north and east are being used for storage of shipping containers with heavy forklift vehicles moving between the containers.

According to Coffey's, on the southern side of the site for the biofilters, there is a wire mesh fence and then a riparian corridor with a medium dense vegetation cover of mostly small to medium trees (3 to 15 years old) and some mature trees up to about 40 years old. The tree covered area extends to the top of the very steep river bank which is near vertical in parts. There is a row of trees along the crest of the river bank. The river bank is about 3 m above the high tide water level of the river and during the heavy rainfall and flood event of August 2015, the river level rose to within about 1 m of the top of bank and the bank was severely eroded with widespread undercutting and collapse of the bank occurring. According to Coffey's, the loss of ground from the bank was up to about 1.5 m. Some sections of the bank have been weakened by this erosion and some further local collapse would be expected, particularly if further significant rainfall events were to occur. Currently the top of the river bank is about 25 m from the fence line adjacent to the biofilters.

### ***Cooling Towers***

The site for the proposed cooling towers is approximately 20 m west of Abernethy's Creek and about 26 m north of the northern bank of the Shoalhaven River, and is adjacent to (east of) the existing cooling towers. According to Coffey's, the western bank of Abernethy's Creek, at its closest point to the proposed cooling towers, is unsupported and has a slope of about 45 degrees. The bank has a thick grass cover which disguises the surface. However, according to Coffey's, there was no visible evidence of any recent instability of the bank. Some improvements to surface drainage along the top of the bank have been made with a concrete strip provided to divert surface runoff to the creek.

The site for the cooling towers is paved partly with an asphalt surfacing and partly gravel surface. The ground surface within and around the site for the cooling towers is near level and comprises paved areas to the east and south, paved areas and some structures to the north with many existing structures to the west and north-west. The site is relatively remote from the northern bank of the Shoalhaven River which is about 26 m to the south of the proposed site for the cooling towers.

### ***Container Storage Area***

The proposed container storage area is located to the west of the DDG Dryer Plant on a near level area and near the western perimeter of the site. Between the proposed container storage area and Bomaderry Creek to the west, the ground surface is slightly undulating to near level over a riparian area about 12 m to 20 m wide. The existing weighbridge is about 12 m from the top of the creek bank at its nearest point.

The nearest stacked shipping containers in the Container Storage area to the eastern bank of Bomaderry Creek will be a further 6 m to the east.

According to Coffey's, the eastern bank of Bomaderry Creek is about 6 m high and is generally very steep with slopes ranging from about 45 degrees to 70 degrees with some near vertical and locally undercut sections. The near vertical or undercut sections of bank generally occur just above the current water level in the creek. Water covered the whole bed of the creek at the time of Coffey's observations. There were a number of trees along the top of the high creek bank and some located on the bank, including a few that are more than 50 years old. According to Coffey's, there were also many smaller trees over the riparian area between the top of the creek bank and the container storage area.

According to Coffey's, there was some evidence of instability and erosion in the eastern bank of Bomaderry Creek having occurred at various stages in the past, including recent erosion and slumping that likely occurred during the significant rain event that occurred in August, 2015. There was no evidence of any recent large scale failure of the creek bank in this area, and the presence of some large trees in this area also indicates that the trees have not been affected by any significant instability of the creek bank.

#### **8.6.2 Potential Impacts on Riverbank Stability**

The assessment and advice provided by Coffey's regarding potential impacts on riverbank stability, are based on their visual assessment of the area and their review of available information.

##### ***Biofilters***

The objective of the assessment undertaken by Coffey's was to assess the effects of the proposed development of the Biofilter structures on the stability of the nearby northern bank of the Shoalhaven River. For this assessment Coffey's considered the proximity of the proposed structures to the river bank, the current profile of the river bank and the site conditions between the river bank and the site for the Biofilters, the subsurface conditions in the vicinity of the Biofilters and the loads implied by the proposed structures. Coffey's have assumed that the new biofilters will be founded at high level (within upper 1 m of the soil profile).

Coffey has assessed that the proposed Biofilters for the DDG Plant will not affect the stability of the river bank due to the relatively low foundation loads applied to the upper soil profile, the setback of the structures from the river bank and the observed surface and inferred subsurface conditions in the vicinity of the site.

Coffey should be advised of any changes to the design of the proposed structures in relation to their position, extent of building footprint and foundation loads.

### ***Cooling Towers and Mill Feed Silo***

For this assessment Coffey's have considered the proximity of the proposed structures to the banks of Abernethy's Creek, the current profile of the banks and the surface conditions between the banks and the sites for the silo and cooling towers, the subsurface conditions in the vicinity of the structures and the loads implied by the proposed structures.

Coffey has assessed that the proposed Silo and Cooling Towers for the DDG Plant will not affect the stability of the banks of Abernethy's Creek due to the relatively low foundation loads implied by the structures to the upper soil profile assuming that heavily loaded structures or concentrated loads will be transferred by deep piles to rock, the setback of the structures from the banks and the observed surface and inferred subsurface conditions between the sites for the structures and the creek banks.

### ***Container Storage Area***

For this assessment Coffey's have considered the proximity of the container storage area to the eastern banks of Bomaderry Creek, the current profile of the creek bank and the surface conditions between the bank and the site for the container storage area, the subsurface conditions in the vicinity of the container storage area and the loads implied by the stacked shipping containers.

Coffey has assessed that the proposed storage of shipping containers to the west of the DDG Dryer Plant will not affect the stability of the banks of Bomaderry Creek due to the relatively uniform distribution of loads implied by the stacked containers to the current fill platform and upper soil profile, the setback of the containers from the eastern bank of Bomaderry Creek, and the general subsurface conditions in this area.

### ***Recommendations***

Coffey's make the following recommendations:

- *In areas where vegetation has been established along the river and creeks, the trees should be maintained.*
- *Drainage from the development should not be concentrated along the top of the creek or river banks that could contribute to erosion or failure of the banks.*
- *No fill should be placed along the tops of the river or creek banks.*
- *Coffey's should be advised of any observed significant changes to the ground surface conditions along the Shoalhaven River bank, the banks of Abernethy's Creek and the eastern bank of Bomaderry Creek.*

## 8.7 TRAFFIC AND TRANSPORT

This Modification Application is supported by a Traffic Impact Assessment prepared by ARC Traffic and Transport (“ARC”). A copy of ARC’s report forms **Annexure 9** to this EA. This section of the EA is based upon the findings of the Traffic Impact Assessment (TIA).

### 8.7.1 Background

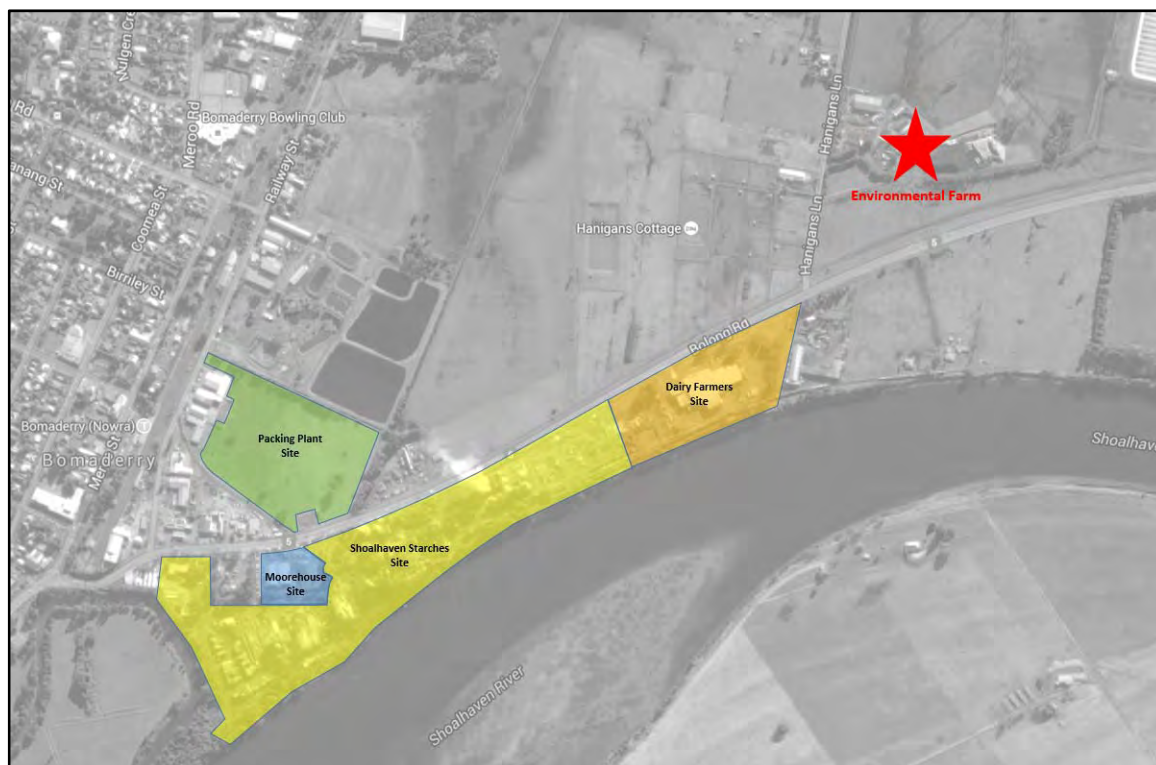
#### ***Shoalhaven Starches Site***

Manildra’s Shoalhaven Starches operations occupy a number of distinct ‘sites’ in Bomaderry. While operations are integrated across all sites, ARC has differentiated these sites in this assessment for ease of reference.

The primary Shoalhaven Starches (SS) Site and immediately adjacent Dairy Farmers Site (DF Site) to the east are located south of Bolong Road. The Environmental Farm Site is located to the east of the SS Site north of Bolong Road off Hanigans Lane. Two other Shoalhaven Starches ‘sites’ will also potentially be generating additional construction trips during the construction period associated with the Modification, being:

- The ‘Moorehouse Site’, where demolition work was recently approved by the DP&E to provide for the (also approved) relocation and construction of Starch Dryer No. 5; and
- The Packing Plant Site (PP Site), a modification for which is currently before the DP&E.

These sites are shown in their local context in **Figure 10**.



**Figure 10: Location plan of Shoalhaven Starches 'sites'.**  
(ARC Traffic & Transport).

### ***Previous Site Approvals***

#### ***Shoalhaven Starches Expansion Project Approval MP06-0228***

The SSEP Approval was granted by the Minister for Planning on the 28th January 2009. The SSEP provides for an increase in ethanol production at Shoalhaven Starches in a staged manner from 126 million litres per year to 300 million litres per year. This approval also encapsulated previous approvals (up to that time) into one overall approval.

Following the SSEP Approval, Manildra acquired the DF Site, and commenced investigations into relocating the Packing Plant from the approved PP Site north of Bolong Road to the DF Site; as an interim measure during these investigations, approval was provided in 2012 for Interim Packing Plant operations at the Interim PP Site.

More recently, Manildra submitted (additional) modification proposals to the DP&E in regard to the demolition of an industrial building on the Moorehouse Site and for the construction of the No. 5 Starch Dryer on the Moorehouse Site. These modifications have both been approved by the DP&E. In addition, Manildra has submitted a modification application for the construction and operation of a Packing Plant and ancillary infrastructure on the approved PP Site.

It is noted that a condition of the SSEP Approval requires the provision of additional staff parking (across the broader SS Site). The DF Site was identified as an appropriate location for this parking, and subsequently a new staff car park on the DF Site – accompanied by significant additional infrastructure at the intersection of Bolong Road and the DF Site access road (DF 1) was approved. It is noted that while much of this intersection and internal infrastructure is now in place at the DF Site, the car park itself has not been constructed.

Finally, the Environmental Farm Site has evolved over time in accordance with appropriate approvals. With specific reference to this Modification, the existing coal and woodchip storage area on the Farm Site provides (minor) capacity for occasions when the SS Site (on-site) stockpile is depleted. With the SS Site stockpile being replenished throughout the week (Monday to Friday), the Farm Site stockpile capacity is generally utilised only on weekends, with a small heavy vehicle (tip truck) looping between the SS Site and Farm Site.

With regard to key access, traffic and parking issues, this generally summarises all Shoalhaven Starches proposals/approvals relating to the SS Site and DF Site to date.

#### *DF Site Meat Processing Plant and SS Site Access Review*

In 2014, a Meat Processing Plant (the Meat Plant) at the DF Site, which utilises the existing on-site buildings generally occupying the eastern portion of the DF Site, was approved by Council. It is noted that the background traffic analysis of the Meat Plant identified a number of access issues relating to the broader SSEP Approval at the DF Site, and specifically the fact that a number of the required infrastructure upgrades (under the SSEP Approval) had not been completed.

This was largely as a result of the fact that the approved staff car park had not be built, and as such the infrastructure required to support the additional movements to/from the staff car park at the intersection of Bolong Road & DF 1 were not [at that time] warranted.

Notwithstanding, and further also to a review of general access at the adjacent SS Site Eastern Access Point (SS AP 1) in consultation with Council, ARC prepared an Access Review as a general supplement to the DF Meat Plant Traffic Impact Assessment, detailing the infrastructure and management measures required to provide compliance with the SSEP Approval, and subsequently to appropriately accommodate the traffic demands of the Meat Plant proposal at the intersection of Bolong Road & DF1, and DF Site internal movements. As stated above, the infrastructure works recommended in the Access Review and the DF Meat Plant TIA, and moreover conditioned upgrades required

under the earlier DF Site approvals, have either been completed, or have been approved by Council [based on final engineering/design plans] to construction.

ARC notes that the Meat Plant has been approved, and is currently operational.

### **8.7.2 Existing Conditions**

#### **Access**

##### **Bolong Road and SS Site Western Access Point (AP 3)**

This intersection will be used by vehicles associated with the construction of the SS Site infrastructure proposed under the Modification, with AP 3 providing internal access to all proposed construction locations; and by vehicle trips associated with the expanded operation of the Farm Site storage area proposed under the Modification.

This intersection will also be used by additional construction vehicle trips associated with the Moorehouse Site demolition and Starch Dryer construction approvals, trips which could potentially be generated at the same time as construction of the SS Site infrastructure proposed under the Modification is undertaken.



### *Bolong Road and Railway Street*

This intersection would be used by vehicle trips associated with the construction of the SS Site infrastructure proposed under the Modification, and by vehicle trips associated with the expanded operation of the Farm Site storage area proposed under the Modification. This intersection will also be used by additional construction vehicle trips associated with the Moorehouse Site demolition and Starch Dryer construction approvals, and (further to approval) Packing Plant construction trips; as stated, these trips could potentially be generated at the same time as construction of the SS Site infrastructure proposed under the Modification is undertaken.

### *Bolong Road and Hanigans Lane, Hanigans Lane and Farm Site*

These intersections would be used by all vehicles associated with the expanded operation of the Farm Site storage area proposed under the Modification. However, the Modification is expected to generate no vehicle trips to these intersections during weekday peak periods, but rather (only very minor flows) to non-peak periods only. Given the low turning movements at these intersections and increasingly reduced through flows in Bolong Road even during peak periods, there is no information to suggest that the Modification would impact the performance of these intersections.

### *Other SS Site and DF Site Access Points*

A number of other SS Site and DF Site access points are provided to Bolong Road, including the Central Access Point (AP 2); Eastern Access Point (AP 1); Car Park Access Point (AP 4); and the Dairy Farmers Access Point (DF 1). In addition, the DP&E has recently approved the use of (what has been termed) Packing Plant Site Access Point 1 (PP 1), which would provide access to a temporary car park (for staff relocated from the Moorehouse Site during the approved demolition and Starch Dryer construction works) and then be retrofitted to provide a left in ingress only access point to the future Packing Plant in accordance with the SSEP approval.

The construction of the SS Site infrastructure proposed under the Modification would generate few if any trips east of AP 3, while the additional trips generated by the expanded operation of the Farm Site storage area proposed under the Modification would be minimal; occur outside of weekday peak periods; and constitute additional Bolong Road through flows only. As such, it is the opinion of ARC that the Modification would have no significant impact on the operation of these other SS Site, DF Site and PP Site intersections, and specifically no impact on the efficiency/delay of turning movements at these other access intersections.

### ***Traffic Flows***

Further to the commission of traffic surveys over many years, and in consultation with Council, ARC has over time developed base peak period traffic flows for the key intersections along Bolong Road that reflect 120th Highest Hour (or 'recreational peak') conditions. In recent assessments consideration has also been given to the redistribution of trips from Bolong Road (the 'Sandtrack') to the upgraded Princes Highway, a redistribution that is currently well advanced further to the opening of the Gerringong Bypass section of the Princes Highway.

The potential also exists for construction to commence (further to an approval) on the SS Site infrastructure proposed under the Modification at the same time as construction is occurring on other approved and proposed works at the SS Site and PP Site respectively, and specifically at the same time as construction works at the Moorehouse Site (Starch Dryer) and at the Packing Plant (currently before the DP&E) are being undertaken.

The PP Modification TIA provides details of the future peak hour traffic flows in the local road network during the construction of the Packing Plant, and importantly a forecast scenario where Packing Plant construction works were occurring at the same time as the Starch Dryer construction works. Given that the potential exists that these construction projects could continue through the (likely initial) stages of the construction of the SS Site infrastructure proposed under the Modification, these flows have been adopted as base flows for the assessment of the proposed modification, and specifically for the assessment of the intersections of Bolong Road with Railway Street and with AP 3, the only intersections where there is any significant potential for traffic impacts associated with the proposed modification.

### ***Traffic Operations***

Section 2.4 of the PP Modification TIA reports SIDRA modelling of the future performance of the key intersections of Bolong Road with Railway Street and with AP 3 further to the introduction of construction trips associated with both the Starch Dryer and Packing Plant construction. Specifically, Table 2.4.1 of the PP Mod TIA reports that both intersection will operate well, with the intersection of Bolong Road and Railway Street reporting a Level of Service B and A in the AM and PM peak period respectively, and the intersection of Bolong Road & AP 3 reporting a Level of Service A in both peak periods. At both intersections during both peak periods, significant spare capacity is available.

### ***Rail Operations***

Shoalhaven Starches uses rail for the majority of transport operations, including incoming raw materials and outgoing product. This has very significant benefits in reducing vehicle trip generation, and specifically heavy vehicle trip generation; it is estimated that existing rail movements equate to the generation of some 100 heavy vehicle trips per day.

The Modification will not result in any increase in rail movements over those provided for under the SSEP approval.

#### **8.7.3 Traffic and Access Associated with the Proposal**

From an access, traffic and parking perspective, once operational the SS Site infrastructure proposed under the Modification would not result in any increase in production from the broader SS Site over that which has been the subject of past approvals, nor an increase in either vehicle traffic or rail trips over SSEP approved levels. The only potential for short term traffic impacts associated with the SS Site infrastructure proposed under the Modification would be during the construction period.

The proposed expanded use of the existing Farm Site storage area proposed under the Modification would result in the generation of additional trips to the local road network once operational. However, these trips would be minimal and not be generated during weekday peak periods (see below).

#### ***Construction Traffic and Access Characteristics***

The construction of all the SS Site infrastructure proposed under the Modification will be undertaken in a single construction period, noting that there are no construction requirements in regard to the expanded use of the Farm Site storage area.

It is estimated that the construction of the SS Site infrastructure components will occur over (a total of) approximately 6 months.

#### **Construction Access**

All access to the construction sites within the SS Site will be via AP 3 (arrival and departure trips); the majority of these trips – and all heavy vehicle trips – would be generated to/from Bolong Road west of AP 3. Within the SS Site, internal access roads provide immediate access to each of the individual construction sites, and are (already) designed to accommodate the maximum sized construction vehicles proposed for the construction works.

### Heavy Vehicle Trips

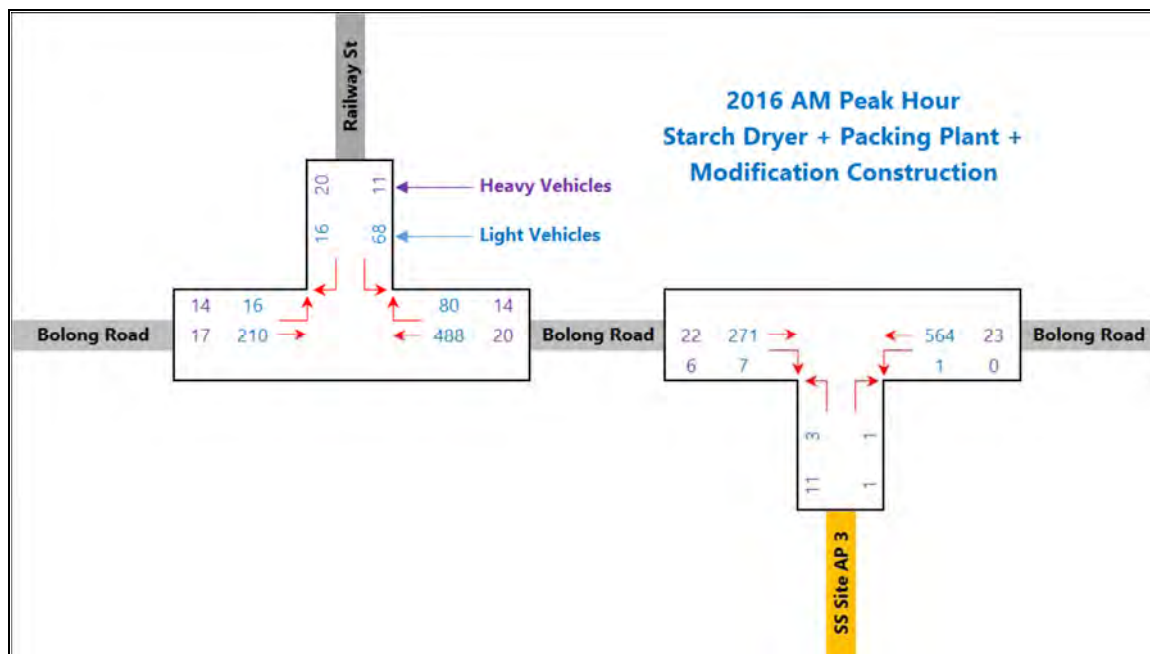
According to ARC, it is estimated that an average of 2 heavy vehicles – or 4 heavy vehicle trips – would be generated per day throughout the construction period. In the peak periods, it is estimated that no more than 2 heavy vehicle trips could be generated in a single hour, being 1 arrival trip and 1 departure trip.

### Construction Staff - Vehicle Trips

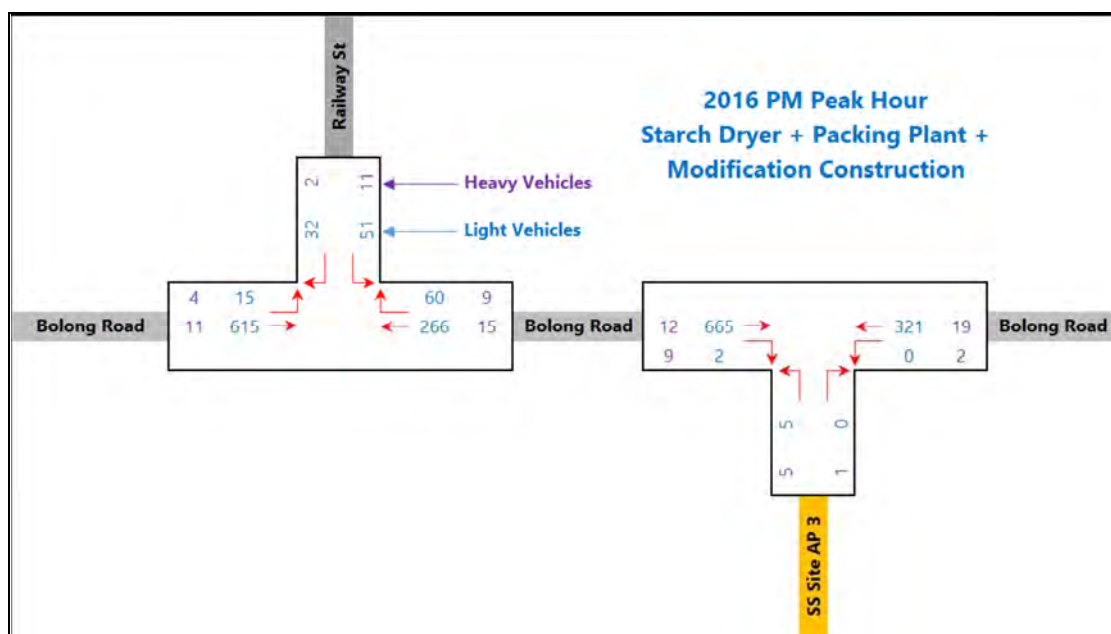
It is estimated that up to 20 construction staff could be on-site at any one time during the construction period. As with previous construction projects at the SS Site, specialist construction staff are expected to arrive in group transport (small shuttle buses and the like), though some construction staff will arrive in private vehicles. In total, it is estimated that construction staff could generate up to 4 vehicle trips per hour in the peak periods, which would primarily be arrival trips in the AM peak hour and primarily departure trips in the PM peak hour.

### Construction Stage – Traffic Flows

Total traffic flows at the key intersections during the construction of the SS Site infrastructure components of the proposed modification are shown in **Figure 11** (AM Peak Hour) and **Figure 12** (PM Peak Hour).



**Figure 11: AM Peak Hour Construction Trip Totals**  
(ARC Traffic and Transport)



**Figure 12: PM Peak Hour Construction Trip Totals**  
(ARC Traffic and Transport)

#### ***Farm Site Storage Area – Operational Traffic and Access Characteristics***

The only component of the proposed modification which would generate additional operational traffic would be the expanded use of the coal and woodchip storage area at the Farm Site. It is noted that while the proposed modification provides for this expanded use, it is forecast that additional trip generation (associated within this expanded use) would be unlikely for some years.

Notwithstanding, the proposed modification provides for the expanded use of the future Farm Site storage area specifically to provide a stockpile of materials for weekend boiler operations at the SS Site. At present, heavy vehicles deliver coal and woodchips directly to the SS Site (via AP 3) on weekdays only, with an on-site stockpile built up over the week sufficient to store enough coal and woodchip to meet demands over the weekend.

The proposed modification provides for a (future potential) scenario where this stockpile is instead provided on the Farm Site, allowing (potentially) the future use of the SS Site stockpile area for other purposes.

### Access

According to ARC, the expanded use of the Farm Site storage area proposed under the Modification would result in 1 – 2 heavy vehicles per weekday currently generated to the SS Site (to deliver to the SS Site stockpile) to instead be generated to the Farm Site via the intersections of Bolong Road and Hanigans Lane; and Hanigans Lane and Farm Site. On weekends, smaller heavy vehicles (or likely a single tip truck) would loop between AP 3 and the Farm Site, collecting materials from the Farm Site and delivering them to the SS Site via AP 3.

### Operational Trip Generation - Heavy Vehicle Trips

As suggested above, once expanded stockpiling occurs at the Farm Site, the delivery of materials to the Farm Site is expected to generate an average of 1 – 2 additional heavy vehicle loads per weekday day (or up to 4 heavy vehicle trips per weekday); it is noted again that these trips would replace trips currently generated directly to the SS Site via AP 3. On weekends, approximately 10 smaller (tip truck) heavy vehicle loads of materials would be required each day (Saturday and Sunday) at the SS Site, generating 20 heavy vehicle trips looping between the SS Site (AP 3) and the Farm Site. These trips would generally be spread across the day as demand requires.

### Operational Trip Generation - Staff Vehicle Trips

The expanded Farm Site operations would not generate any additional operational staff vehicle trips.

## **8.7.4 Impact Assessment**

According to ARC, the expanded operations of the Farm Site storage area proposed under the Modification would generate no additional vehicle trips to the key weekday peak periods, and only a very minor number of vehicle trips on weekends, perhaps 1 – 2 trips in any single (weekend) hour. As such, it is the opinion of ARC that the additional vehicle trips associated with the expanded operation of the Farm Site storage area would have no significant impact on the operation of local intersections, being generated to periods where access point/local road turning flows are very low, and where the key Bolong Road traffic flow is steadily being reduced further to the upgrade of the Princes Highway.

Further to the above and according to ARC, the only potential for any significant impact arising from the proposed modification will be during the construction of the SS Site infrastructure proposed under the modification.

ARC has assessed the key intersections of Bolong Road with Railway Street and AP 3 (referencing the future total flows reported above) using SIDRA, and have determined that both intersections will retain good operations, with Levels of Service unchanged from those reported in the PP Modification TIA (i.e. including both Starch Dryer and Packing Plant construction trips) and significant spare capacity retained.

It is the opinion of ARC that the proposed modification would have little if any impact on the local road network, given that the key SS Site infrastructure proposed under the modification will not result in an increase vehicle or rail trips above those levels provided for in the SSEP approval; and that the operational trip generation of the expanded Farm Site storage area proposed under the modification would be very minor, and generated outside of weekday peak periods.

#### **8.7.5 Construction Management**

Notwithstanding the findings above, it remains that the case that the construction of the SS Site infrastructure proposed under the modification will need to be governed by an appropriate set of management procedures. In relation to access, traffic and parking requirements during the construction works, ARC recommends the following initiatives, which essentially mirror the Construction Traffic Management Plan (CTMP) requirements of past SS Site projects:

- All parking for construction staff and construction heavy vehicles must be contained within an appropriately secure on-site environment so as not to impact or be impacted by existing SS Site operations; or on the off-site traffic environment.
- While it is not anticipated that Restricted Access Vehicles (RAVs) will be required as part of the construction task, it is nonetheless the case that any such vehicles would be required to utilise the existing approved RAV route between AP 3 and the Princes Highway via Bolong Road; access for such vehicles via the Cambewarra Road bridge is not acceptable.
- Construction work hours are generally between 6:00am/7:00am and 5:00pm/6:00pm Monday to Friday, with an earlier finish time on Saturdays and no work on Sundays. Construction hours are most often established to minimise amenity impacts on neighbouring residential areas, and will require finalisation further to consultation with Council.

### **8.7.6 Conclusion**

The Traffic Assessment carried out by ARC makes the following conclusions:

*Following a detailed and independent assessment of the access, traffic and parking characteristics of the proposed Modification, ARC has concluded that the Modification – and specifically the construction traffic associated with the SS Site infrastructure proposed under the Modification; and the operational traffic associated with the expanded use of the Farm Site storage area proposed under the Modification - would have no significant impacts on the local traffic environment. In summary: -*

- *The Modification will not result in production increases above those provided for in the SSEP, nor as a result increases in SS Site vehicle or rail trips above those provided for in the SSEP.*
- *Construction vehicle trips would be generated over a short period, and minimised through the provision of group transport for staff. Even coinciding with periods of construction at other Shoalhaven Starches sites, the construction works would have no significant impact on the operation of the local road network or on the performance of key intersections.*
- *The potential future generation of a small number of addition trips associated with the expanded use of the existing Farm Site storage area would similarly have no significant impact on the operation of the local road network or on the performance of key intersections, with trips generated outside of weekday peak periods during a time when through flows in Bolong Road are being significantly reduced further to the Princes Highway upgrades.*
- *All construction staff parking will be provided in appropriately designated and secure parking areas adjacent to the construction areas.*
- *An appropriate set of construction traffic management strategies will be put in place through the construction period.*



## 9.0 STATEMENT OF ADDITIONAL COMMITMENTS

Section 9.0 of the EA for this Modification Proposal 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 the proposed modifications and having regard to the findings of the EA.

The only additional commitments arising from this modification proposal include the following:

### 9.1 PRELIMINARY HAZARD ANALYSIS

**Table 20** outlines recommended additional management procedures and design considerations that Shoalhaven Starches commits to implementing and incorporating into practices that would prevent and / or minimise risk scenarios from occurring.

**Table 20**  
**Preliminary Hazard Analysis**

<i>Preliminary Hazard Analysis</i>
Shoalhaven Starches commits to implementing the recommendations made by Pinnacle Risk Management Pty Ltd which included: <ul style="list-style-type: none"><li>➤ <i>All dust explosion vents are to be either flameless or directed to a safe location to ensure propagation risks will be acceptable.</i></li><li>➤ <i>Review the need for installing temperature sensors in the bucket elevator for fire detection and/or the installation of deluge or fire suppression system (Inergen). Operator detection of issue required plus response, e.g. opening a valve to initiate the deluge.</i></li></ul>

### 9.2 NOISE

**Table 21** outlines the recommended additional noise mitigation measures and design considerations that Shoalhaven Starches commits to implementing and incorporating into the design, construction and operation of the proposed modifications.

**Table 21**  
**Noise Mitigation Measures**

<i>Measures and Design Considerations</i>
Shoalhaven Starches commits to implementing the recommendations made by Harwood Design in relation to noise impacts and which include: <p><i>According to Harwood Acoustics the noise design goals can be met for Stage 1 without the need for additional noise controls. This is providing that manufacturer's sound power levels for individual items of plant are achieved.</i></p> <p><i>Noise controls are likely to be required for the subsequent installation of an additional three dryers as considered in Stage 2.</i></p>

### **Measures and Design Considerations**

#### **STAGE 1**

*The initial dryer may be constructed in the open, without a building or acoustical screening based on the manufacturer's sound power levels provided.*

*Cooling towers may be installed adjacent to the dryer, as shown in Appendix A, without the need for additional noise controls.*

*This is providing that the maximum combined sound power level ( $L_w$ ) of the cooling towers does not exceed **90 dBA**.*

*This equates to, for example:-*

- *Two cooling towers with a sound power level of 87 dBA each; or*
- *Four cooling towers with a sound power level of 84 dBA each.*

*Once the final selection of plant is made and / or the DDG dryer and cooling towers installed, a final compliance assessment should be undertaken prior to commissioning of the plant to ensure the noise design goals are achieved.*

#### **STAGE 2**

*Stage 2 involves the installation of an additional three (3) DDG dryers and their associated cooling towers.*

*Based on the manufacturer's sound power levels provided in Table 8 of this report being achieved, a further reduction of a minimum **6 dB** will be required for each of the DDG dryers and the cooling towers including the dryer and cooling towers installed initially as part of Stage 1.*

*The required reduction may be achieved through a combination of the judicious selection of low noise plant and localised acoustical treatment.*

*A final assessment will be required prior to installation or commissioning of the additional three plant and equipment, to ensure the most appropriate and cost-effective noise controls are implemented if and where required.*

#### **CONSTRUCTION NOISE**

*The Project Approval prescribes allowable operation hours for construction activities in Clause 11 and Clause 13, which states:-*

*"During construction, the Proponent shall prepare and implement all reasonable and feasible measures to minimise the construction noise impacts of the project."*

*It can be seen from Table 8 that the construction noise management levels are likely to be met at each receptor location during general construction activity, with the exception of piling.*

*During piling (if required) there is potential for the noise management levels to be exceeded at Receptors L3 and L4, by up to 2 dB, on some occasions. This is not considered a significant exceedance during day time hours for short and sporadic duration.*

*However, a Construction Noise Management Plan may be provided in accordance with NSW EPA's Interim Construction Noise Guideline and to satisfy Condition 13 of the Project Approval.*

*Construction noise mitigation measures are included in the Construction Safety & Environmental Management Plan prepared the Shoalhaven Starched Project Manager.*

### 9.3 VISUAL IMPACT

As outlined in Section 8.5 of this EA it is our view that the proposed modifications will not create a significant adverse visual impact.

Shoalhaven Starches commit to the following additional measures as outlined in **Table 22** to assist in screening and further minimising visual impacts arising from the proposed works.

**Table 22**  
**Visual Impact**

<i>Measures</i>
<p>Shoalhaven Starches commits to where appropriate and possible, the proposed modifications to the DDGS Dryers 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.</p> <p>Consideration should be given to incorporating a cladding colour if possible which will match existing development on the site.</p> <p>Consideration will be given to supplementary planting to the immediate south of the coal and woodchip storage area at Hanigans Lane in order to enhance screening provided by the existing Norfolk Island Pines.</p> <p>Vegetative screening is to be provided to the north of the proposed storage area in order to minimise the visual impact of the proposal from the north along Hanigans Lane.</p>

### 9.4 RIVERBANK STABILITY

**Table 23** outlines recommended additional management procedures that Shoalhaven Starches commits to implementing and incorporating into practices to address riverbank stability issues.

**Table 23**  
**Riverbank Stability**

<i>Management Procedures</i>
<p>In relation to the river bank stability, Shoalhaven Starches commits to the following recommendations made by Coffey's:</p> <ul style="list-style-type: none"><li>➤ <i>In areas where vegetation has been established along the river and creeks, the trees should be maintained.</i></li><li>➤ <i>Drainage from the development should not be concentrated along the top of the creek or river banks that could contribute to erosion or failure of the banks.</i></li><li>➤ <i>No fill should be placed along the tops of the river or creek banks.</i></li><li>➤ <i>Shoalhaven Starches commits to seeking expert geotechnical advice should there be any observed significant changes to the ground surface conditions along the Shoalhaven River bank, the banks of Abernethy's Creek and the eastern bank of Bomaderry Creek.</i></li></ul>

## 9.5 TRAFFIC

As outlined in Section 8.6 of this EA it is the view of ARC that the proposed modification would have no significant impacts on the local or on-site road network.

Shoalhaven Starches however commit to the following additional measures as outlined in **Table 24** to assist in screening and further minimising traffic impacts arising from the proposed construction works.

**Table 24**  
**Traffic Impacts**

<i><b>Management Procedures</b></i>
<p>Shoalhaven Starches commits to the recommendations of the traffic impact statement prepared by ARC and which include:</p> <ul style="list-style-type: none"><li>➤ <i>All construction staff parking will be provided in appropriately designated and secure parking areas adjacent to the construction areas.</i></li><li>➤ <i>An appropriate set of construction traffic management strategies will be put in place through the construction period.</i></li></ul>

## **10.0 CONCLUSION**

In 2009 the Minister for Planning issued Project Approval for an application made by Shoalhaven Starches to increase its ethanol production capacity at its existing ethanol plant located at the Shoalhaven Starches Plant at Bomaderry. This Project Approval enables Shoalhaven Starches to increase its ethanol production in a staged manner at its Bomaderry Plant from the current approved 126 million litres per year to 300 million litres per year.

The Project Approval also consolidated all previous approvals into the one Project Approval. Following the Minister's determination Shoalhaven Starches have been implementing and commissioning works in accordance with this approval.

To accomplish the increase in ethanol production, the project required a series of plant upgrades and increase in throughput of raw materials, principally flour and grain. The Project included upgrades to the Stillage Recovery Plant, including 6 additional DDGS Dryers to be installed within the western part of the site.

Demand for ethanol however has not met that which was anticipated following the introduction of the NSW Governments ethanol mandate.

It is now proposed to undertake modifications to reduce the number of approved DDGS Dryers from 6 to 4. The reduction in Dryer "footprint" on the site will release land for other development purposes. The proposed modification will also include:

- slight modification to the footprint and siting of the DDGS Dryer Building;
- a mill feed silo and structure to feed the DDGS Dryers;
- relocation of cooling towers within the site;
- the provision of an additional two Biofilters;
- construction of a forklift maintenance building;
- provision of a container preparation area;
- provision of a container storage area; and
- regularisation of two existing coal and woodchip storage areas.

The modified proposal will not result in any increase in production from the site over that which has been the subject of past approvals. The proposal will not involve any change in the amount of raw products that will be utilised; nor will it involve any changes in the amount of waste waters that will need to be treated and disposed.

The application is made pursuant to Section 75W of the Environmental Planning & Assessment Act 1979.

The preparation of this Environmental Assessment has been undertaken following consultation with the Department of Planning & Environment. This Environmental Assessment has been prepared to address issues detailed in requirements supplied by the Department.

Following a comparison of the modified proposal to that originally approved having regard to the key issues originally identified associated with this Project, this Environmental Assessment concludes that the proposal is suitable for the site and this locality and consistent with the objects of the Environmental Planning & Assessment Act.

The Minister's approval of this proposed modification to Project Approval MP 06\_0228 is sought.

## **ANNEXURE 1**

**Plans of Proposed Modifications  
to approved DDGS Dryers**

## **ANNEXURE 2**

**Requirements  
of the  
Department of Planning & Environment**



## **ANNEXURE 3**

**Submission under Clause 4.6  
of Shoalhaven LEP 2014**

**prepared by**

**Cowman Stoddart Pty Ltd**

## **ANNEXURE 4**

**Flood Impact Assessment**

**prepared by**

**WMAwater Pty Ltd**

## **ANNEXURE 5**

**Air Quality and Odour Impact Assessment**

**prepared by**

**GHD Pty Ltd**

## **ANNEXURE 6**

**Environmental Noise Impact Assessment**

**prepared by**

**Harwood Acoustics**

## **ANNEXURE 7**

### **Preliminary Hazard Analysis**

**prepared by**

**Pinnacle Risk Management**

## **ANNEXURE 8**

**Geotechnical Assessment  
(Riverbank Stability)**

**prepared by**

**Coffey Geotechnics**

## **ANNEXURE 9**

**Traffic Impact Assessment**

**prepared by**

**ARC Traffic and Transport**