

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

SHOALHAVEN STARCHES

**PROPOSED MODIFICATION TO
BOILERS No. 2, 4 & 6**

PROJECT APPROVAL MP 06_0228

**LOT 1 DP 838753, LOT B DP 334511
AND LOT B DP 376494
160 BOLONG ROAD, BOMADERRY**

Prepared for
Shoalhaven Starches Pty Ltd
June 2017



Prepared by:

COWMAN STODDART PTY LTD

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SHOALHAVEN STARCHES EXPANSION PROJECT

Ref. 16/110

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

**ENVIRONMENTAL ASSESSMENT
PREPARED BY**

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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
Lot No., DP/MPS, Vol/Fol etc. Lot 1 DP 838753, Lot B DP 376494, Lot B DP 334511
Project Development: Shoalhaven Starches Expansion Project (MP 06_0228)
Proposed Modification to Project: Proposed modifications to Boilers 2, 4 & 6

Environmental Assessment

An Environmental Assessment is attached

Certification

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

- It has been prepared in accordance with Section 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:

15th June 2017

CONTENTS

EXECUTIVE SUMMARY	(i)
1.0 INTRODUCTION	1
1.1 BACKGROUND TO PROJECT	1
2.0 THE SITE AND SURROUNDING LOCALITY	2
2.1 LOCAL AND REGIONAL CONTEXT	2
3.0 BACKGROUND.....	6
3.1 PRODUCTION PROCESSES.....	6
3.2 RECENT DEVELOPMENT AND APPROVAL HISTORY	7
3.2.1 Project Approval MP 06_0228	7
3.2.2 Approval History Following MP 06_0228	8
4.0 STATUTORY SITUATION.....	10
4.1 PART 3A OF THE EP&A ACT	10
4.2 SECTION 75W AND MODIFICATION PROPOSALS.....	11
4.3 LOCAL PLANNING PROVISIONS.....	12
4.4 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT	29
5.0 THE MODIFICATION PROPOSAL	30
5.1 THE ROLE OF THE BOILERS	30
5.2 THE PROPOSED MODIFICATION	30
5.3 PROCESS DESCRIPTION	31
5.4 ENERGY AND UTILITIES.....	33
6.0 CONSULTATION	34
7.0 RISK ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS.....	38
8.0 KEY ISSUES	46
8.1 PRELIMINARY HAZARD ANALYSIS	46
8.2 NOISE IMPACTS	47
8.2.1 Acoustic Criteria.....	47
8.2.2 Boiler Modifications - Operational Noise Emission.....	52
8.2.3 Construction Noise Emission	53
8.2.4 Recommended Noise Controls	54
8.3 AIR QUALITY (INCLUDING ODOUR IMPACTS)	55
8.3.1 Impact Assessment Criteria	56
8.3.2 Impact Assessment Predictions	58
8.4 FLOODING.....	61
8.5 VISUAL IMPACTS.....	62
8.6 TRAFFIC AND PARKING	71
8.6.1 Boilers Access	71
8.7 SITE CONTAMINATION	78
8.8 ACID SULPHATE SOILS	79
9.0 STATEMENT OF ADDITIONAL COMMITMENTS.....	81
9.1 PRELIMINARY HAZARD ANALYSIS	81
9.2 NOISE	81
9.3 VISUAL IMPACT	82
9.4 TRAFFIC	82
9.5 SITE CONTAMINATION	83
9.6 ACID SULPHATE SOILS	84
10.0 CONCLUSION.....	85

FIGURES

Figure 1	Site Locality Plan
Figure 2	Aerial Photograph of the Locality
Figure 3	Aerial Photograph of Site
Figure 4	Zoning provisions applying under Shoalhaven LEP 2014
Figure 5	Simplified Process Flow Diagram – Boilers 2, 4 and 6
Figure 6	Location of Closest Receptors to Subject Site as per EPL
Figure 7	Existing and Proposed Development
Figure 8	Vantage Points for Plates
Figure 9	Modification Additional Operational Trips
Figure 10	Modification Additional Construction Trips

ANNEXURES

Annexure 1	Requirements for EA issued by Secretary of the Department of Planning and other Government Agencies
Annexure 2	Plan Details of Proposed Modifications to Boiler No. 4
Annexure 3	Submission under Clause 4.6 of Shoalhaven LEP 2014 prepared by Cowman Stoddart Pty Ltd
Annexure 4	Preliminary Hazard Analysis prepared by Pinnacle Risk Management Pty Ltd
Annexure 5	Environmental Noise Impact Assessment prepared by Harwood Acoustics
Annexure 6	Air Quality Impact Assessment prepared by Stephenson Environmental Management
Annexure 7	Flood Compliance Report prepared by WMAwater Pty Ltd
Annexure 8	Traffic and Car Parking Assessment prepared by ARC Traffic & Transport
Annexure 9	Phase 1 Contamination & Acid Sulphate Soils Assessment prepared by Coffey Services Australia P/L

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.

Project Approval MP06_0228 was granted by the Minister for Planning on the 28th January 2009 for the Shoalhaven Starches Expansion Project. This approval also encapsulated previous approvals for the site into one overall approval for the site (at that time).

The Shoalhaven Starches Expansion Project is a 'transitional Part 3A Project' for the purposes of Schedule 6A of the Environmental Planning & Assessment Act.

The Shoalhaven Starches Expansion Project 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, this project required a series of plant upgrades and increase in throughput of raw materials, principally flour and grain.

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 their existing Boilers that provide steam for their operations. The modifications will include:

- The conversion of Boiler No. 2 from its current fuel source of woodchips back to coal (as it was originally designed) to increase steam production from this boiler to its design capacity.
- To convert Boiler No. 4 from gas back to coal fired, to provide an economically sustainable fuel source given the increasing costs associated with natural gas.
- To undertake modifications to Boiler No. 6 including the construction of a new baghouse and associated ducting to increase steam production from this boiler.

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 processed; 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 relevant Government agencies, including:

- The Department of Planning and Environment;
- Shoalhaven City Council;
- EPA;
- The Australian Department of Defence.

This Environmental Assessment has been prepared to address issues raised following this consultation.

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 design goals as outlined under the Environmental Protection Licence that applies to the site. Furthermore this Noise Assessment demonstrates noise emission during the construction phase of the development will meet noise management levels set by the EPA's relevant guidelines.
- Air Quality Impacts and including Odours – the EA is supported by an Air Quality Impact Assessment prepared by Stevenson Environmental Management Australia (SEMA). This assessment concludes that the emission parameters modelled and their impacts will be compliant with relevant assessment criteria.
- Preliminary Hazard Analysis (PHA) prepared by Pinnacle Risk Pty Ltd that assesses and compares the risks associated with the proposal and finds that such risks are acceptable when compared against the Department of Planning & Environment's risk criteria.
- Traffic and Car Parking Assessment prepared by ARC Traffic and Transport (ARC) that identifies that there are no access, traffic or parking impacts associated with the proposal – either during operation or construction – that would significantly impact on the efficiency and/or safety of the local traffic environment or existing on-site operations. The trip generation of the proposal during construction would be extremely minor, while once operational the proposal is not expected to generate any additional trips to the local road network. The access and parking network upon which this assessment is based is in turn based on the recommendations of the "Access and Parking Assessment" (PA) 2017 prepared by ARC and which according to ARC appropriately responds to all outstanding

issues as raised previously by the DP&E, Council and the RMS. These recommendations specifically include the finalisation of upgrades of key Bolong Road intersections and the appropriate provision, design and marking of car parking areas across the Starches Sites.

- Flood Assessment prepared by WMA Water that demonstrates the proposal will not result in any significant increase in the 1% AEP flood level.
- A Site Contamination and Acid Sulphate Soils Assessment prepared by Coffey Services. These assessments detail specific management measures to be undertaken during the construction of the works associated with this modification.

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 this modification application.

1.0 INTRODUCTION

1.1 BACKGROUND TO PROJECT

Project Approval MP06_0228 was granted by the Minister for Planning on the 28th January 2009 for the Shoalhaven Starches Expansion Project. This approval also encapsulated previous approvals for the site into one overall approval for the site (at that time).

The Shoalhaven Starches Expansion Project is a ‘transitional Part 3A Project’ for the purposes of Schedule 6A of the Environmental Planning & Assessment Act.

The Shoalhaven Starches Expansion Project 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, this project required a series of plant upgrades and increase in throughput of raw materials, principally flour and grain.

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 their existing boilers that provide steam for their operations. Cowman Stoddart Pty Ltd has prepared this Environmental Assessment on behalf of Shoalhaven Starches Pty Ltd.

The modifications will include:

- The conversion of Boiler No. 2 from its current fuel source of woodchips back to coal (as it was originally designed) to increase steam production from this boiler to its design capacity.
- To convert Boiler No. 4 from gas back to coal fired, to provide an economically sustainable fuel source for this boiler given the increasing costs associated with natural gas.
- To undertake modifications to Boiler No. 6 including the construction of a new baghouse and associated ducting to increase steam production from this boiler.

The justification for these modifications arises due to the increasing costs associated with natural gas compared to coal. Shoalhaven Starches anticipate that converting from natural gas to coal will result in a saving of \$9 million per annum in energy costs for the Company’s operations at the site.

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 processed; nor will it involve any changes in the amount of waste waters that will need to be treated and disposed.

Plan details of the proposal form **Annexure 2** to this EA.

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.

The works associated with this modification proposal are situated on the southern side of the factory site on Lots 1 DP 838753, Lot B DP 376494 and Lot B DP 334511 Bolong Road Bomaderry.

Figure 1 is a site locality plan.

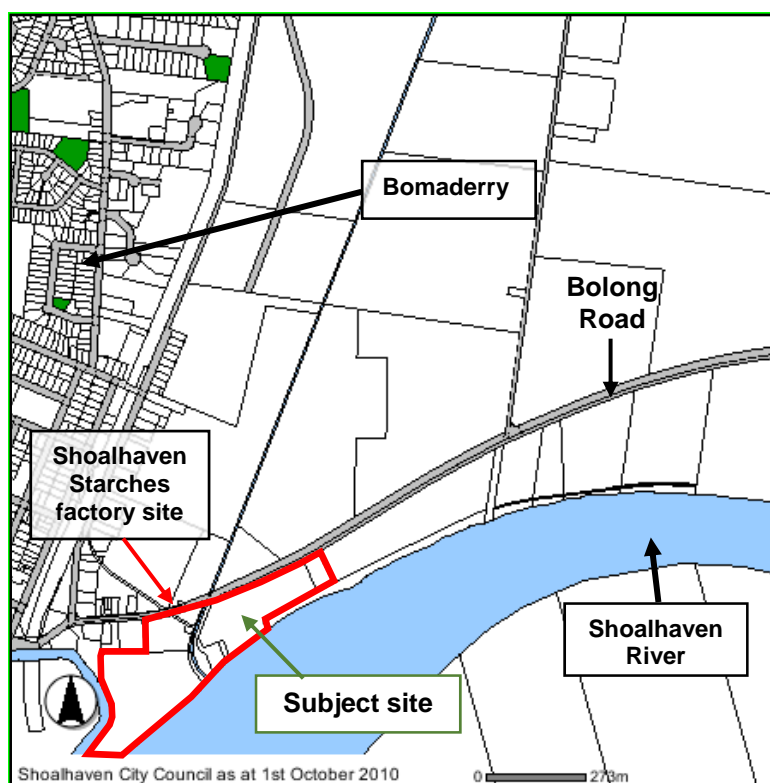


Figure 1: Site Locality Plan.

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.

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 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.

The Company also carries out irrigation activities on the Company's Environmental Farm located over 1000 hectares on the northern side of Bolong Road. This area is cleared grazing land and also contains spray irrigation lines and wet weather storage ponds. 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 grazing (dairy cattle).

Figures 2 and 3 are aerial photographs of the locality and the site respectively. Boilers No. 2, 4 and 6 form part of a boiler complex which contains seven (7) boilers. The boiler complex is situated within the southern part of the factory site between the flour mill and the DDG Dryers situated on the eastern banks of Abernethy's Creek.

To the east, west and north of the footprint of the proposed works is the Shoalhaven Starches factory site.

The property has direct road frontage to Bolong Road to the north.

The Shoalhaven River flows along the southern boundary of the factory site.

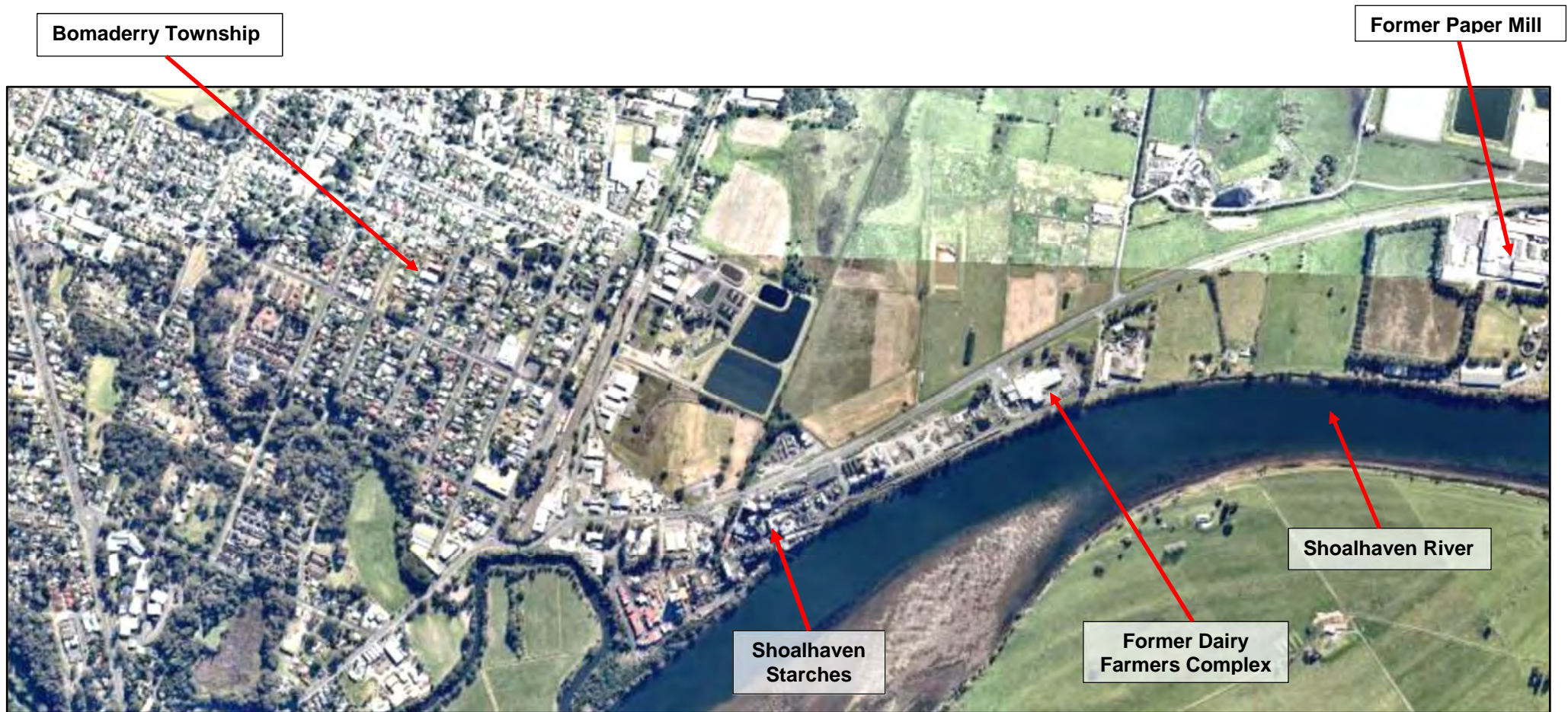


Figure 2: Aerial photograph of the locality.



Figure 3: Aerial photograph of 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 flour mills on site to enable the milling of part of the Company's flour requirements to be processed directly on the site. One flour mill has now been commissioned and the second flour mill is yet to be built. The remainder of the Company's flour requirements will continue to be 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 waste 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,

industrial and beverage 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. 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.

The boilers (including those associated with this modification application) are used to produce steam which is used for a multitude of purposes throughout the factory site wherever product or water is required to be heated.

3.2 RECENT DEVELOPMENT AND APPROVAL HISTORY

3.2.1 Project Approval MP 06_0228

On the 28th January 2009 the then Minister for Planning, issued Project Approval MP 06_0228 for the Shoalhaven Starches Expansion Project.

The primary objective of the Shoalhaven Starches Expansion Project 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.

In addition, as part of the Project Approval, Shoalhaven Starches will undertake comprehensive odour reduction measures for both the existing factory site and the works associated with the Expansion Project.

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 into the one approval so that there would be essentially one approval for the site.

3.2.2 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 26th October 2011). This Interim Packing Plant operates in conjunction with the Company's existing Packing Plant which is located within the existing factory site.

DA 11/1855 – Widening of Driveway

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

DA 13/1713 – Demolition of Dimethyl Ether Plant

On the 5th 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 15th July 2013.

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

On the 19th 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, to provide security of raw material storage and supply when there are closures of the Illawarra rail line serving the Shoalhaven Starches site. Shoalhaven City Council approved this development application on the 27th April 2017.

Other Approvals

There have been other approvals that have been issued by Shoalhaven City Council that associated with the 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 CO₂ 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 previous Part 3A to the Environmental Planning & Assessment Act 1979, and *State Environmental Planning Policy (Major Development)* in 2005, provided an assessment regime for state significant development.

Following the 2011 election, the NSW Government introduced a new regime for state significant development and had the effect of repealing Part 3A. These changes created an alternative assessment system which allows the NSW Government to assess and determine projects which are of State significance.

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 30th 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 28th 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.

Part 3A continues to apply to the Shoalhaven Starches Expansion Project. State Environmental Planning Policy (Major Projects) continues to support Part 3A of the Act.

4.2 SECTION 75W AND MODIFICATION PROPOSALS

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.

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

Shoalhaven Local Environmental Plan (SLEP) 2014

The site is zoned IN1 (General Industrial) zone under the provisions of SLEP 2014 (refer **Figure 4**). 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.*

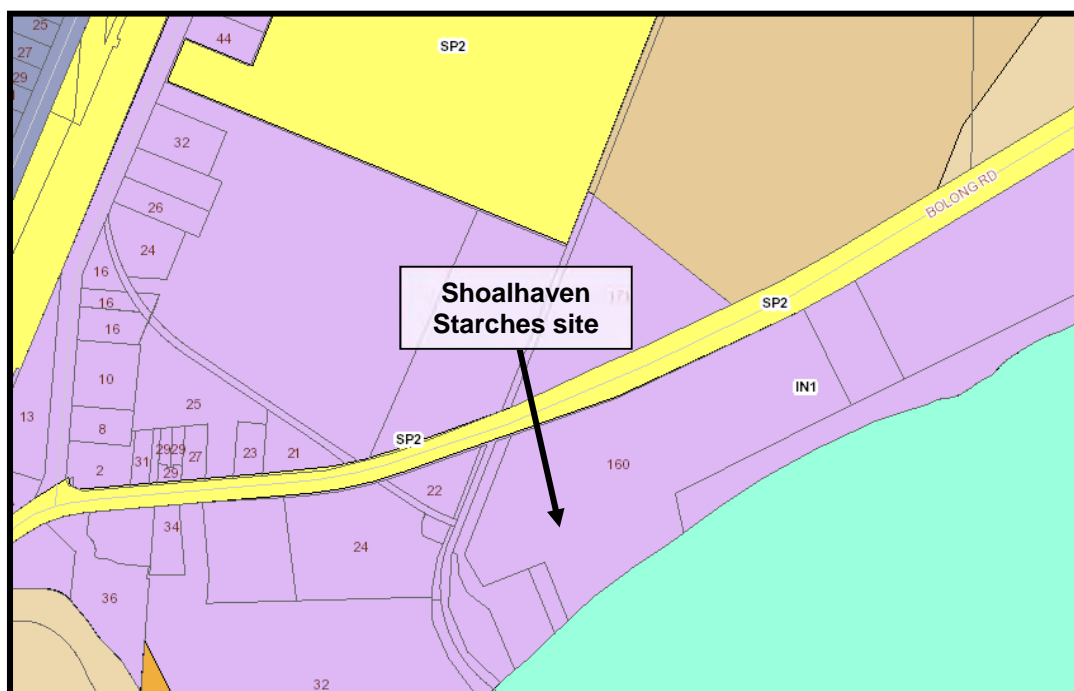


Figure 4: Zoning provisions applying under Shoalhaven LEP 2014.

It is our view that the proposal is consistent with these objectives as the proposal involves modifications to an existing industrial facility.

Industry is a permissible use within this zone. The proposal is permissible subject to Council's consent (see **Table 1** below).

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

Permitted without consent	Nil.
Permitted with consent	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
Prohibited	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 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 2** below:

Table 2
Shoalhaven LEP 2014 Provisions

SLEP 2014 Clause	Provisions	Comments
4.3 Height of Buildings	<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 will involve the erection of a range of structures with heights above ground level ranging from 15 m to 40.0 m.</p> <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 Annexure 3.</p>

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
4.6 <i>Exceptions to development standards</i>	<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 proposal will involve the erection of a range of structures with heights above ground level ranging from 15 m to 40 m that will exceeds the 11 metre maximum as specified in (2A) of Clause 4.3 Height of Buildings of the SLEP 2014.</p> <p>The proposed development will be erected within the surrounds of the Shoalhaven Starches factory site.</p> <p>As the proposed works will be built 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 SEE under Annexure 3.</p>

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
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><i>Note. When this Plan was made it did not include all of these zones.</i></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 2 (continued)

SLEP 2014 Clause	Provisions	Comments
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>(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>The subject land is located within the coastal zone.</p> <p>The proposal is not considered to adversely affect the coastal zone as:</p> <ul style="list-style-type: none"> • The proposal does not affect or impinge on public access to or along the coastal foreshore. <p>The proposed development is situated within an existing industrial development and is considered to be suitable development given its type, location and design. The development is also consistent with the zoning objectives for the land.</p> <ul style="list-style-type: none"> • The development will not lead to overshadowing of foreshore areas. The site is situated on the northern side of the Shoalhaven River. • The scenic qualities of the area will not diminish. Visual impact is further addressed in Section 8.5 of this EA. • The proposal will not lead to adverse impacts on threatened fauna and flora.

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
5.5 continued	<p>(a) existing public access to and along the coastal foreshore for pedestrians (including persons with a disability) with a view to:</p> <p>(i) maintaining existing public access and, where possible, improving that access, and</p> <p>(ii) identifying opportunities for new public access, and</p> <p>(b) the suitability of the proposed development, its relationship with the surrounding area and its impact on the natural scenic quality, taking into account:</p> <p>(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</p> <p>(ii) the location, and</p> <p>(iii) the bulk, scale, size and overall built form design of any building or work involved, and</p> <p>(c) the impact of the proposed development on the amenity of the coastal foreshore including:</p> <p>(i) any significant overshadowing of the coastal foreshore, and</p> <p>(ii) any loss of views from a public place to the coastal foreshore, and</p> <p>(d) how the visual amenity and scenic qualities of the coast, including coastal headlands, can be protected, and</p> <p>(e) how biodiversity and ecosystems, including:</p> <p>(i) native coastal vegetation and existing wildlife corridors, and</p> <p>(ii) rock platforms, and</p> <p>(iii) water quality of coastal waterbodies, and</p> <p>(iv) native fauna and native flora, and their habitats, can be conserved, and</p> <p>(f) the cumulative impacts of the proposed development and other development on the coastal catchment.</p> <p>(3) 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:</p>	

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
5.5 continued	<p>(a) 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</p> <p>(b) 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</p> <p>(c) 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</p> <p>(d) the proposed development will not:</p> <p style="margin-left: 40px;">(i) be significantly affected by coastal hazards, or</p> <p style="margin-left: 40px;">(ii) have a significant impact on coastal hazards, or</p> <p style="margin-left: 40px;">(iii) increase the risk of coastal hazards in relation to any other land.</p>	
5.10 Heritage Conservation	<p>(1) The objectives of this clause are:</p> <p style="margin-left: 40px;">(a) to conserve the environmental heritage of Shoalhaven; and</p> <p style="margin-left: 40px;">(b) to conserve the heritage significance of heritage items and heritage conservation areas including associated fabric, settings and views; and</p> <p style="margin-left: 40px;">(c) to conserve archaeological sites; and</p> <p style="margin-left: 40px;">(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.</p> <p>(2) Development consent is required for any of the following:</p> <p style="margin-left: 40px;">(a) 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):</p> <p style="margin-left: 80px;">(i) a heritage item,</p> <p style="margin-left: 80px;">(ii) an Aboriginal object</p> <p style="margin-left: 80px;">(iii) a building, work, relic or tree within a heritage conservation area,</p>	There are no heritage items within the subject land. And the subject site is not located within a heritage conservation area.

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
5.10 continued	<p>(b) <i>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,</i></p> <p>(c) <i>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,</i></p> <p>(d) <i>disturbing or excavating an Aboriginal place of heritage significance,</i></p> <p>(e) <i>erecting a building on land:</i></p> <p style="padding-left: 20px;">(i) <i>on which a heritage item is located or that is within a heritage conservation area;</i></p> <p style="padding-left: 20px;">(ii) <i>on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,</i></p> <p>(f) <i>subdividing land:</i></p> <p style="padding-left: 20px;">(i) <i>on which a heritage item is located or that is within a heritage conservation area, or</i></p> <p style="padding-left: 20px;">(ii) <i>on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.</i></p>	
7.1 Acid sulfate soils	<p>(1) <i>The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.</i></p> <p>(2) <i>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.</i></p>	<p>Coffey Services have undertaken an assessment of acid sulphate soils with respect to this modification proposal (Annexure 9). This issue is further addressed in Section 8.8 of this EA.</p>

Table 2 (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.	
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 2 (continued)

SLEP 2014 Clause	Provisions	Comments
7.1 continued	<p>(5) 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):</p> <ul style="list-style-type: none"> (a) 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, (b) 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). (c) minor work, being work that costs less than \$20,000 (other than drainage work). <p>(6) Despite subclause (2), development consent is not required under this clause to carry out any works if:</p> <ul style="list-style-type: none"> (a) the works involve the disturbance of less than 1 tonne of soil, and (b) the works are not likely to lower the watertable. 	
7.3 Flood Planning	<p>(1) The objectives of this clause are as follows:</p> <ul style="list-style-type: none"> (a) to minimise the flood risk to life and property associated with the use of land, (b) 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, (c) to avoid significant adverse impacts on flood behaviour and the environment. <p>(2) This clause applies to:</p> <ul style="list-style-type: none"> (a) land identified as "Flood Planning Area" on the Flood Planning Area Map, and (b) other land at or below the flood planning level. <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> <ul style="list-style-type: none"> (a) is compatible with the flood hazard of the land, and 	<p>The Flood Planning Area Map that accompanies the SLEP 2014 identifies the subject land as being flood prone land.</p> <p>The application is supported by a flood assessment undertaken by WMAWater (Annexure 7). This issue is discussed further in Section 8.4 of this EA.</p>

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
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: flood planning level 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 2 (continued)

SLEP 2014 Clause	Provisions	Comments
7.4 continued	<p>(c) <i>is not likely to alter coastal processes and the impacts of coastal hazards to the detriment of the environment, and</i></p> <p>(d) <i>incorporates appropriate measures to manage risk to life from coastal risks, and</i></p> <p>(e) <i>is likely to avoid or minimise adverse effects from the impact of coastal processes and the exposure to coastal hazards, and</i></p> <p>(f) <i>provides for the relocation, modification or removal of the development to adapt to the impact of coastal processes and coastal hazards, and</i></p> <p>(g) <i>has regard to the impacts of sea level rise.</i></p> <p>(4) <i>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.</i></p> <p>(5) <i>In this clause:</i> coastal hazard <i>has the same meaning as in the Coastal Protection Act 1979.</i></p>	
7.5 Terrestrial Biodiversity	<p>(1) <i>The objective of this clause is to maintain terrestrial biodiversity, by:</i></p> <p>(a) <i>protecting native flora and fauna,</i></p> <p>(b) <i>protecting the ecological processes necessary for their continued existence, and</i></p> <p>(c) <i>encouraging the recovery of native flora and fauna, and their habitats.</i></p> <p>(2) <i>This clause applies to land:</i></p> <p>(a) <i>identified as “Biodiversity—habitat corridor” or “Biodiversity—significant vegetation” on the Terrestrial Biodiversity Map, and</i></p> <p>(b) <i>situated within 40m of the bank (measured horizontally from the top of the bank) of a natural waterbody.</i></p> <p>(3) <i>Before determining a development application for development on land to which this clause applies, the consent authority must consider:</i></p> <p>(a) <i>whether the development is likely to have:</i></p>	<p>The <i>Terrestrial Biodiversity Map</i> that accompanies the SLEP 2014 does <u>not</u> identify the subject land as including areas of <i>Biodiversity - habitat corridor</i> and/or <i>Biodiversity - significant vegetation</i>.</p> <p>Given the nature of the site 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>

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
7.5 continued	<p>(i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and</p> <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>bank means the limit of the bed of a natural waterbody.</p> <p>bed, 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>	
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>	The Riparian Lands and Watercourses Map that accompanies the SLEP 2014 identify a class 1 watercourse, (Shoalhaven River) adjacent to the subject site.

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
7.6 continued	<p>(d) <i>ecological processes within watercourses and riparian areas.</i></p> <p>(2) <i>This clause applies to all of the following:</i></p> <p>(a) <i>land identified as “Riparian Land” on the Riparian Lands and Watercourses Map,</i></p> <p>(b) <i>land identified as “Watercourse Category 1”, “Watercourse Category 2” or “Watercourse Category 3” on that map,</i></p> <p>(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></p> <p>(3) <i>Before determining a development application for development on land to which this clause applies, the consent authority must consider:</i></p> <p>(a) <i>whether or not the development is likely to have any adverse impact on the following:</i></p> <p>(i) <i>the water quality and flows within the watercourse,</i></p> <p>(ii) <i>aquatic and riparian species, habitats and ecosystems of the watercourse,</i></p> <p>(iii) <i>the stability of the bed and banks of the watercourse,</i></p> <p>(iv) <i>the free passage of fish and other aquatic organisms within or along the watercourse,</i></p> <p>(v) <i>any future rehabilitation of the watercourse and its riparian areas, and</i></p> <p>(b) <i>whether or not the development is likely to increase water extraction from the watercourse, and</i></p> <p>(c) <i>any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.</i></p> <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> <p>(a) <i>the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or</i></p> <p>(b) <i>if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or</i></p>	<p>The site is industrial land with no existing vegetation and is beyond the influence of normal fluvial geomorphic processes. The works will have no impact on water quality.</p> <p>As such the development will not have any adverse effect on water quality, flows within the watercourse, aquatic and riparian species or habitats and ecosystems of the watercourse.</p> <p>The works associated with this modification are not located within close proximity of either the Shoalhaven River or Abernethy's Creek being located over 40 metres to the Shoalhaven River and 60 metres of Abernethy's Creek and situated either on top or adjacent existing structures.</p>

Table 2 (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>bank means the limit of the bed of a watercourse.</p> <p>bed, 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>	The proposed works do not involve land with a slope in excess of 20% or areas identified as sensitive land. Under these circumstances the provisions of this clause will not apply to this proposal.

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
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 <i>Scenic Protection Area Mapping</i> 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>
7.9 HMAS Albatross airspace operations	<p>(1) <i>The objectives of this clause are as follows:</i></p> <p style="padding-left: 20px;">(a) <i>to provide for the effective and on-going operation of the HMAS Albatross Military Airfield by ensuring that such operation is not compromised by proposed development that penetrates the Limitation or Operations Surface for that airport,</i></p> <p style="padding-left: 20px;">(b) <i>to protect the community from undue risk from that operation.</i></p> <p>(2) <i>If a development application is received and the consent authority is satisfied that the proposed development will penetrate the Limitation or Operations Surface, the consent authority must not grant development consent unless it has consulted with the relevant Commonwealth body about the application.</i></p> <p>(3) <i>The consent authority may grant development consent for the development if the relevant Commonwealth body advises that:</i></p>	<p>The Department of Defence (DoD) were consulted with respect to this proposal (see Annexure 1). The DoD do not raise any objections with this proposal.</p>

Table 2 (continued)

SLEP 2014 Clause	Provisions	Comments
7.9 continued	<p>(a) the development will penetrate the Limitation or Operations Surface but it has no objection to its construction, or</p> <p>(b) the development will not penetrate the Limitation or Operations Surface.</p> <p>(4) The consent authority must not grant development consent for the development if the relevant Commonwealth body advises that the development will penetrate the Limitation or Operations Surface and should not be carried out.</p> <p>(5) In this clause:</p> <p>Limitation or Operations Surface means the Obstacle Limitation Surface or the Procedures for Air Navigation Services Operations Surface as shown on the Obstacle Limitation Surface Map or the Procedures for Air Navigation Services Operations Surface Map for the HMAS Albatross Military Airfield.</p> <p>relevant Commonwealth body means the body, under Commonwealth legislation, that is responsible for development approvals for development that penetrates the Limitation or Operations Surface for the HMAS Albatross Military Airfield.</p>	
7.15 Development in the vicinity of extractive industries and sewerage treatment plants	<p>(1) The objective of this clause is to protect the operational environment of certain industries operating on the land to which this clause applies.</p> <p>(2) This clause applies to land identified as "Extractive Industry" and "Sewage Treatment Plant" on the Buffers Map.</p> <p>(3) Development consent must not be granted to the carrying out of development on land to which this clause applies unless the consent authority has:</p> <p>(a) made an assessment of the impact of noise, odour and other emissions from any industry carried out on that land, and</p> <p>(b) 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</p> <p>(c) considered any opportunities to relocate the development outside that land, and</p> <p>(d) has considered whether the development would adversely affect the operational environment of that industry.</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 (Annexure 6) and a Noise Impact Assessment (Annexure 5) that make recommendations for the development.</p>

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.

If approved, the proposed modification will necessitate the terms/provisions of this licence to be also reviewed.

5.0 THE MODIFICATION PROPOSAL

5.1 THE ROLE OF THE BOILERS

Steam is used at the Shoalhaven Starches factory for a multitude of purposes wherever product or water is required to be heated.

Steam is currently generated at Shoalhaven Starches by two coal-fired boilers (numbers 5 and 6), one woodchip boiler (No. 2) and four gas fired boilers (numbers 1, 3, 4 and 7). The combustion gases from these boilers are discharged via six stacks. Boilers 5 and 6 having a common stack. Exhaust from boiler 2 is treated in multi-cyclone and from boilers 5 and 6 exhaust is treated in a baghouse prior to discharge to atmosphere. All boilers operate 24 hours, seven days per week.

Boiler No. 4 was originally a coal-fired boiler however was converted in 2012 to gas fired. Boiler No. 2 was converted to woodchip in 2014.

5.2 THE PROPOSED MODIFICATION

The Modification Proposal seeks to carry out the following modifications to Boilers No. 2, 4 and 6 as follows:

- Modifications to Boiler No. 2. This boiler was originally a coal-fired boiler but was converted to enable the use of woodchips instead of coal and presently generates approximately 7 tonnes of steam per hour. It is now proposed to convert this boiler back to coal fired. This will require the construction of a new baghouse adjacent to the Boiler No. 2 building and the construction of a new emissions stack which will have a height above ground level of 40 metres. These modifications will increase production of steam from this boiler back to its design capacity of 14 tonnes per hour (consistent with what it originally produced before it was converted to burn woodchips).
- Modifications to Boiler No. 4. Shoalhaven Starches intend to convert Boiler No. 4 from gas back to coal-fired. The proposed conversion will require the construction of a baghouse on top of the boiler building. The baghouse will have a height of 8.3 metres, increasing the overall height of the boiler house to 35.0 m above ground level. The proposal will also include repairs and extension to an existing stack, increasing the height of the stack by 9 metres to an overall height above ground level of 40 m.
- Modifications to Boiler No. 6. This boiler is already a coal-fired boiler. It is proposed however to construct a new additional baghouse and associated ducting adjacent to

this boiler. These works will have a maximum height above ground level of 18.2 metres. The purpose of this work will be to increase steam production capacity from this boiler by 7 tonnes per hour.

Any increase in production of steam as a result of these modifications will be balanced by a corresponding reduction in steam generated by boilers on the site that use natural gas.

These modifications are being implemented due to substantial increases in natural gas prices that are currently being experienced nationwide. Shoalhaven Starches are therefore seeking to reduce their reliance on natural gas for their energy requirement. It is anticipated that the modifications to all these boilers (Nos. 2, 4 and 6) will result in savings in relation to energy costs of \$9 million per annum for the company.

5.3 PROCESS DESCRIPTION

Trucks deliver coal to the existing coal stockpile on the Shoalhaven Starches factory Site. The coal is currently used in Boilers 5 and 6 whereas previously it was also used in Boilers Nos. 2 and 4. For this project, coal will be reused in Boilers 2 and 4. Therefore, all of the existing coal handling equipment is to be reused.

All the coal-fired boilers are designed for limited attended operation in compliance with the requirements of AS2593, however, are operated as attended boilers.

Black coal is used at the Shoalhaven Starches site. The coal size is 10 to 25 mm and contains approximately 15% ash. It is reclaimed from the coal stockpile using a front end loader. The front end loader feeds the coal into an existing hopper and denseveyor (pneumatic transfer system). Compressed air is used to transfer the coal to the boiler.

Each of the four coal-fired boilers (2, 4, 5 and 6) has an existing feed hopper which is level controlled. The coal is gravity fed onto a grate for burning in each boiler. A door at the coal inlet to each boiler can be closed (manually) to stop the coal and hence the source of heat, eg. in the event of an emergency.

On boilers 2 and 4 the coal passes under a guillotine that maintains the desired bed depth. After about 1 m of travel, the coal is ignited by the heat from the existing coal that is burning. The heat from the burning coal raises the required steam. There are no changes to the water and steam equipment, controls and protection.

The boiler will be ignited during start-up by two gas burners.

The fly ash from Boiler No. 2 will pass through a multi-cyclone, economiser and air heater before passing through two new baghouse filters via a balanced flow arrangement. These are to be constructed adjacent to the boilers. They will contain 5 m long socks that will

collect the fly ash. The socks will be reverse pulsed with air to remove the fly ash (which falls to the bottom of the baghouse). This fly ash, along with the fly ash collected by the multi-cyclones, economiser and air heater, will be combined with water and the bottom ash from the boilers and conveyed to an ash bin to be emptied and removed from site by truck.

Combustion gas waste heat is used by the economiser to preheat feed water to the steam drum while the air heater uses the waste heat to preheat the combustion air thus improving the energy efficiency of the boiler.

Combustion gas will exit the new baghouse filter and vent to atmosphere via a new 40 m high exhaust stack.

The existing coal bin is fitted with a baghouse to aspirate the bin from the pneumatic conveying and to prevent the build-up of coal dust and hence the risk of a dust explosion. The baghouse vents directly to atmosphere.

The modifications to Boiler No. 4 are very similar to Boiler No. 2. The flowrate of coal to Boiler No. 4 will be approximately 9.6 tonnes per hour (the original design basis).

The fly ash from Boiler No. 4 however will pass through the *existing* multi-cyclone, then a new economiser and air heater before passing through two new baghouse filters via a balanced flow arrangement. These are to be constructed above the boilers. They will contain 5 m long socks that will collect the fly ash. The socks will be reverse pulsed with air to remove the fly ash (which falls to the bottom of the baghouse). This fly ash, along with the fly ash collected by the multi-cyclones, economiser and air heater, will be conveyed by screw conveyors to a new pug mill (produces a paste by forcibly combining fly ash with water) and then combined with the bottom ash from the boilers on the existing ash conveyor and conveyed to the existing ash bin to be removed from site by truck.

Combustion gas will exit the new baghouse filter and vent to atmosphere via the modified stack, ie. the height will be increased by 9 m to 40 m.

For Boiler No. 6, it is only proposed to construct a new additional baghouse filter and associated ducting adjacent to this boiler. These works will have a maximum height above ground level of 18.2 metres. The purpose of this work will be to increase steam capacity from this boiler by 7 tonnes per hour.

A simplified process flow diagram is shown in **Figure 5** below.

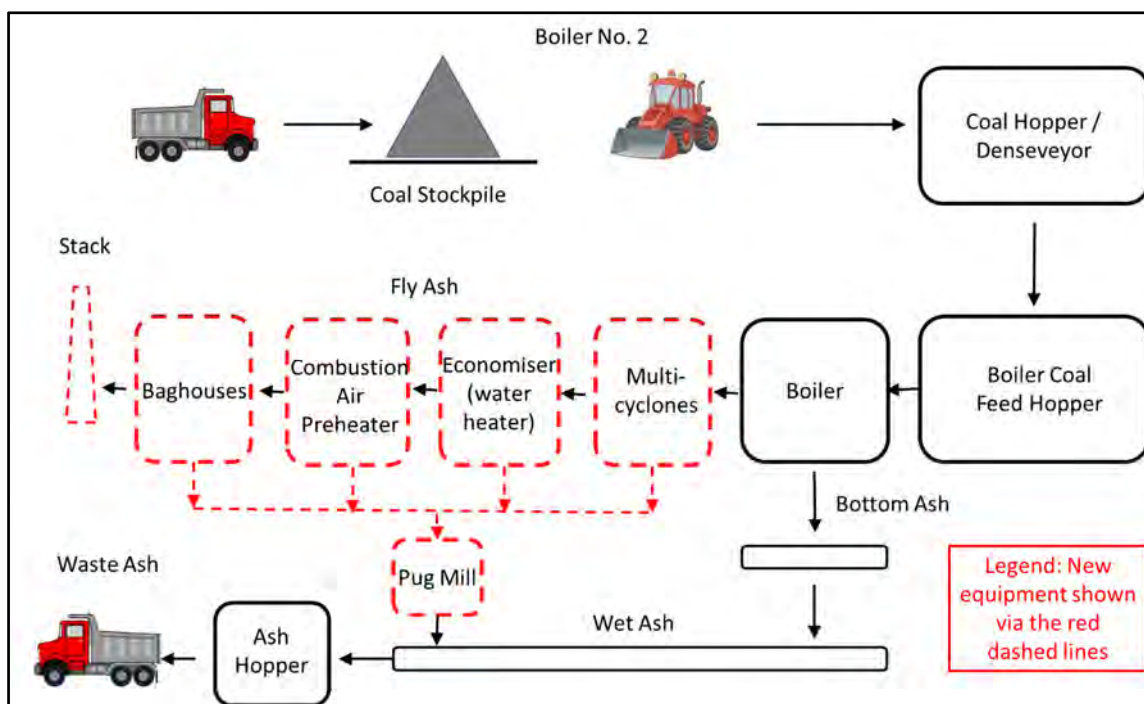


Figure 5: Simplified Process Flow Diagram – Boilers 2, 4 and 6.

Plan details of the proposal form **Annexure 2** to this EA.

5.4 ENERGY AND UTILITIES

Energy

The existing plant has the capacity to produce 200 t/h of process steam. The boilers are currently fuelled by coal, natural gas, biogas and woodchip. The current operations however produce about 175 t/h.

The site currently uses approximately 36 MVA of electricity.

The Company also currently utilises 190 Terajoules of Natural Gas.

The total requirements for the plant resulting from the proposed Modification to the boilers associated with this application is estimated at additional 0.3 MVA of power.

Water Consumption

In terms of water consumption, the existing operations (and including Mod. 8 alternations to the existing flour mill, and as a result of the proposed Flour Mill B Mod.) are as follows:

- Council Treated – 1, 035, 031 KL p.a;
- Council Raw – 1, 309, 641 KL p.a;
- Recycled RO – 2, 203, 036 KL p.a.

According to Shoalhaven Starches there will not be any significant changes to either water consumption or wastewater generation as a result of this modification.

6.0 CONSULTATION

During the preparation of this EA consultation has been undertaken with:

- Department of Planning and Environment;
- EPA
- Department of Primary Industry (DPI) - Water
- Australian Department of Defence
- Shoalhaven City Council;

Shoalhaven Starches have consulted with staff from the Department of Planning & Environment with respect to this proposal. The Secretary of the Department of Planning has issued requirements for this EA in emails dated 14th February and 1st May 2017. These requirements form **Annexure 1** to this EA.

Written consultation has been undertaken separately with the Shoalhaven City Council, the EPA and the Australian Department of Defence.

Responses from, the Australian Department of Defence, Shoalhaven City Council and EPA are also included in **Annexure 1** to this EA.

Department of Planning & Environment

The following is a summary of the matters raised by the Department in their email dated 14th February which related to an initial modification proposal that related to Boiler 4 only to be addressed in this EA (refer **Table 3**).

Table 3
Department of Planning & Environment SEARs

<i>DoPE Issue</i>	<i>Comments</i>
• Air quality including odour	Refer Section 8.3 of EA.
• Noise	Refer Section 8.2 of EA.
• Traffic	Refer Section 8.6 of EA.
• Preliminary hazard analysis	Refer Section 8.1 of EA.
• Visual impact	Refer Section 8.5 of EA.

The original modification proposal was modified to also include modifications to Boilers 2 and 6. In response to these modification the Department amended their original requirements to include the following matters:

DoPE Issue	Comments
• Acid Sulphate Soils	Refer Section 8.8 of EA.
• Contamination	Refer Section 8.7 of EA.
• Flooding	Refer Section 8.4 of EA.

EPA

In an email dated 9th March 2017 the EPA raised the following issue as a matter that would need to be addressed as part of this modification proposal:

“... I understand from Deana that she has provide you with the EAR’s for this proposed modification, which includes the need for a comprehensive air quality impact assessment (which your scoping submission also identified). This air quality impact assessment will need to be undertaken in accordance with the requirements of the EPA’s Approved Methods for the Modelling and Assessment for Air Pollutants in NSW (2016) (the Approved Methods).

With the air quality impact assessment, an important point to note is that the proposed changes to boiler 4 (gas fired to coal fired) will result in a change to its class under the Protection of the Environment Operations (Clean Air) Regulation 2010 (the Clean Air Regulation) to Group 6. As such, the air quality impact assessment will need benchmark the modified boiler against best practice process design and emission control.

This information will then be used by the EPA during the planning assessment stage to inform what the proposed new air emission pollutant limits for boiler 4 will be. In this respect it is important to point out that the prescribed Group 6 standards are the minimum performance requirements and the provisions of both the Clean Air Regulation and the Approved Methods provide that the EPA establish emission limits that are consistent with the proper and efficient operation of the boiler. As such, this could potentially result in limits that are lower than the minimum limits prescribed in the Clean Air Regulation for boiler 4.”

The email included the relevant text from the Approved Methods which sets out how the EPA determines limits for environment protection licences.

In a further email dated 27th April 2017 in response to the further modification to this proposal the EPA indicated that the above issue raised previously by the EPA would remain relevant.

Comment

The EA is supported by an Air Quality Impact Assessment prepared by SEMA (**Annexure 6**). This issue is further addressed in Section 8.3 of this EA.

Shoalhaven City Council

The following matters have been raised by Shoalhaven City Council as matters that should be addressed in the EA (refer **Table 4**):

Table 4
Issues Raised by Shoalhaven City Council

SCC Issue	Comments
<p>Council's Traffic Unit recommends the Traffic Impact Assessment (TIA) also include (however some of these – highlighted in red – may be able to be conditioned):</p> <ul style="list-style-type: none"> • an assessment of all traffic, bicycle and pedestrian movements along Bolong Road; • an assessment of all vehicle movements to and from the boiler access, including movements between the boiler access and other access points; • details of traffic management and movements during construction; • detailed plans showing the intersection location and layout in relation to both sides of Bolong Road, and in relation to the other site access points; • vehicle turning paths via swept path analysis; and • plans showing any proposed changes required to the driveway, including signs and lines. <p>There a number of unresolved conditions of consent that require attention. Whilst these outstanding conditions may not necessarily directly relate to this latest proposed modification to Project Approval MP06_0228, Council's Traffic Unit would like to see these conditions acknowledged and addressed in any TIA prepared in support of this latest modification.</p>	<p>Traffic issues are discussed in Section 8.6.</p>
<p>Environmental Health Comments/Requirements:</p> <p>Considering the proposal involves the conversion of a boiler from being gas fired to coal fired, this would most likely have implications for Shoalhaven Starches pollution license, especially in regard to any likely air emission impacts.</p>	<p>The EA is supported by an Air Quality Impact Assessment prepared by SEMA (Annexure 6). Air quality issues are discussed in Section 8.3.</p>
<p>Flooding Comments/Requirements:</p> <p>It will need to be demonstrated how the proposal will achieve the relevant objectives and acceptable solutions of Chapter G9, Shoalhaven Development Control Plan 2014 (SDCP 2014).</p> <p>Particular attention is required for the bag house additions where this needs to be watertight up to the 2050 flood planning level. The structures will need to withstand forces of floodwater during a 1% AEP and cannot become a floating debris during such an event. In addition, the flood evacuation plan needs to be updated taking the extensions into account.</p>	<p>The EA is supported by a Flood Compliance Report prepared by WMAwater (Annexure 7). Flooding issues are discussed further in Section 8.4 of this EA.</p>

Table 4 (continued)

SCC Issue	Comments
Building Comments/Requirements: It is assumed that the application will be referred to NSW Fire & Rescue for comment given the hazardous nature of the site.	The EA is supported by a PHA prepared by Pinnacle Risk Management Pty Ltd (Annexure 4). This issue is further discussed in Section 8.1 of the EA.
Other matters of particular note, as a result of the change from gas to coal, will be increased traffic impact (i.e. whether the coal will be delivered via the road etc.), storage of coal onsite (i.e. environmental impacts) and the impacts of the proposal on air emissions.	Traffic issues are discussed in Section 8.6. Coal storage areas will remain unchanged by this proposal. Air quality issues are discussed in Section 8.3.

Australian Department of Defence

In correspondence dated 30th January 2017 the Australian Department of Defence outlined the need for the Department to maintain accurate information about tall structures, and specifically in relation to structures that involve:

- 30 metres or more above ground level within 30 kilometres of an aerodrome; or
- 45 metres or more above ground level elsewhere.

The proposal involves structures that meet the above criteria. Under these circumstances the Department requests that the Applicant provide Airservices Australia with “as constructed” details of the proposed structures.

In addition Defence request that should LED obstruction lighting be provided that the frequency range of the LED light emitted fall within the wavelengths of 655 to 930 nanometres, thus being visible to person using night vision devices.

Comments

Shoalhaven Starches notes the above comments. This issue is also discussed in Section 4.3 of 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>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
Air Quality (including Odour) Assessment	<p>One of the primary issues that was addressed in the original EA for the Shoalhaven Starches Expansion Project concerned the need for a comprehensive odour assessment and reduction as part of the project.</p> <p>Stephenson Environmental Management (SEMA) have been engaged by Shoalhaven Starches to undertake an Air Quality Impact Assessment (AQIA) with respect to this Modification Proposal. A copy of SEMA's assessment is included as Annexure 6 to this EA.</p>	No additional management or mitigation measures are proposed by the AQIA prepared by SEMA.	Air quality including odour impacts have been identified by the SEARs and are further addressed in Section 8.3 of this EA.
Wastewater Treatment	<p>Water Discharges</p> <p>The Shoalhaven Starches Factory and Environmental Farm are licensed premises under the Protection of the Environment Operations Act. Wastewater discharges from the site are licensed by the DEC (EPL 883).</p> <p>The plant has a licensed outfall into the Shoalhaven River. The outfall point is a 50 cm diameter metal pipe discharging at the end of an existing jetty. It also has a cooling water discharge comprising a 50 cm diameter pipe which discharges onto a gabion spillway.</p> <p>Under the terms of the Company's EPL water waste streams associated with the plant include:</p> <ul style="list-style-type: none"> • river water passed through the boiler condensers and the primary side of the heat exchangers; • boiler water treatment plant regeneration waters; and • pH adjusted glucose plant ion exchange unit regeneration waters. 	No additional management or mitigation measures proposed.	Not a key issue.

Table 5 (continued)

<i>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
	<p>All these must be discharged from the cooling water discharges.</p> <p>The limiting conditions in relation to these discharges include:</p> <ul style="list-style-type: none"> • The volume of water discharged from the cooling water discharges must not exceed 100,000 kilolitres per day. • The waste waters discharged at both points shall not exceed a temperature of 32°C. <p>This Modification Proposal will not involve any changes to these discharges waters.</p>		
Site Stormwater Management	<p><i>Existing Site Stormwater Management System</i></p> <p>Shoalhaven Starches existing site stormwater management system is divided into three zones. The zones are:</p> <ul style="list-style-type: none"> • eastern portion of the site – all site stormwater is collected and pumped to the WWTP. During heavy rainfall events stormwater is passed through a first flush pit to remove gross solids and pollutants prior to discharge to the Shoalhaven River; • central portion of the site – all site stormwater is collected in pits and drainage channels and conveyed to the Environmental Farm WWTP. No stormwater from this zone is discharged to the Shoalhaven River; and • the Western portion of the site – all stormwater is collected and passed through a first flush system prior to discharge to the Shoalhaven River. 	No additional management or mitigation measures proposed.	Not a key issue.

Table 5 (continued)

Issue	Relative Change in Environmental Impact	Additional Management or Mitigation Measures Required	Significance of Issue with this Modification Proposal
Effluent Irrigation and Storage	<p>The total flour processed on the site as a result of this proposal will not exceed the previously approved amount of 20,000 tpw. Consequently wastewater volumes will remain unchanged.</p> <p>The treatment and management of wastewater from the site is therefore not envisaged to be a key issue that will need consideration as part of the Environmental Assessment.</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.
Site Contamination and, Acid Sulphate Soils	<p><i>Site Contamination</i></p> <p>The EA is supported by a Phase 1 Site Contamination Assessment prepared by Coffey's (Annexure 9).</p> <p>Coffey's consider the potential for widespread contamination of the site to be low. Some chemical additives have been stored in the western part of the boiler house used for dosing boiler water. Some components of these can be hazardous. As the site is paved, widespread subsurface contamination is not likely in the case of incidental spillage according to Coffey's.</p>	<p>Due to the history of industrial activities and indirect shallow investigations Coffey's recommend that precautions be taken with any subsurface penetrations, in particular if any are required in the vicinity of the chemical storage bund. Soils should be handled with caution as per requirements of handling the substances that are within the chemical bund as a precaution. If any evidence of contamination is identified during construction stages (eg. soil discolouration, chemical odour, unusual odour, waste, asbestos containing material, staining, etc.), then work should cease and a suitably qualified environmental practitioner should be engaged to assess the potential for risk to human health or environment and provide advice on property management. Soil assessment would also be required for any excess construction soil generated requiring off-site disposal or reuse.</p>	<p>These issues has been identified by the SEARs.</p> <p>Site contamination is addressed in Section 8.7 of this EA.</p>

Table 5 (continued)

<i>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
	<p><i>Acid Sulphate Soils</i></p> <p>The EA is supported by an Acid Sulphate Soils Assessment also prepared by Coffey's (Annexure 9).</p> <p>Previous reports have identified the potential for the presence of acid sulphate soils to be located in the vicinity of the proposed upgrade areas. Acid sulphate soils could be encountered within alluvial soils underlying the fill materials.</p>	<p>Coffey's recommend that should the proposed development involve the excavation of soils from depths greater than 3 m at the site and/or dewatering that could result in a drop in the water table than an Acid Sulphate Soil Management Plan (ASSMP) should be developed and actioned.</p>	<p>Acid Sulphate Soils is addressed in Section 8.8 of this EA.</p>
Noise	<p>Shoalhaven Starches are licensed under the POEO 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 Pty Ltd. A copy of this assessment is included in Annexure 5 to this EA. Noise Impacts are further addressed in Section 8.2 of this EA.</p> <p>Harwood Acoustics conclude in summary that noise emission from 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 providing noise control recommendations proposed by Harwood Acoustics are implemented.</p>	<p>The Noise Impact Assessment prepared by Harwood Acoustics makes recommendations in relation to the fan noise levels and Baghouse Pneumatic Pulse Cleaner, and this is discussed in Section 8.2.4 of the EA.</p>	<p>This issue has been identified by the SEARs.</p> <p>Noise impacts are further addressed in Section 8.2 of this EA.</p>

Table 5 (continued)

<i>Issue</i>	<i>Relative Change in Environmental Impact</i>	<i>Additional Management or Mitigation Measures Required</i>	<i>Significance of Issue with this Modification Proposal</i>
Transport & Traffic	The SEARs for this project have identified that a traffic assessment is required to be undertaken in relation to this proposed modification. The EA is supported by a traffic impact assessment prepared by Anton Reisch Consulting (ARC) (Annexure 8).	The Traffic Assessment prepared by ARC does not make any specific recommendations in relation to this modification proposal.	Traffic issues are further addressed in Section 8.6 of this EA.
Hazards	<p>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.</p> <p>Pinnacle Risk Management have been engaged to undertake a PHA in relation to this project.</p> <p>The risks associated with the proposed modifications have been assessed by Pinnacle and have been found to be acceptable when compared against the DoP risk criteria.</p> <p>Pinnacle also conclude that societal risk, area cumulative risk and environmental risk are also acceptable.</p>	Pinnacle recommend that all existing coal handling equipment for the boilers is to be functionally tested to ensure it is fit-for-purpose prior to reuse. This includes the safety instrumented controls, eg. alarms, trips and interlocks as well as any mechanical protective systems.	<p>This issue has been identified by DGRs as Key Issue.</p> <p>A PHA has been prepared for the Modification Proposal by Pinnacle Risk Pty Ltd and forms Annexure 4 to this EA.</p>
Flooding			Not a key issue.
Waste Management	<p>The proposed modification to the Ethanol Distillery will not alter the way waste is managed on the site.</p> <p>Ash from the modified boilers, will continue to be used on the Environmental Farm for road maintenance and construction.</p>	No additional management or mitigation measures proposed	Not a key issue.

Table 5 (continued)

Issue	Relative Change in Environmental Impact	Additional Management or Mitigation Measures Required	Significance of Issue with this Modification Proposal
Visual Impact	The works associated with this modification, will be situated within the vicinity of existing industrial development of a similar scale to that which is proposed. Furthermore the appearance, scale and height of the development will be similar to existing structures located on the site.	No additional management or mitigation measures proposed	This is a key Issue identified by this EA. The visual impacts associated with this proposal are addressed in Section 8.5 of this EA.
Flora and Fauna	The proposed works associated with this modification will all be located within the factory site which is devoid of vegetation. The original Flora and Fauna Assessment carried out by Kevin Mills & Associates for the Expansion Project did not identify any specific ecological constraints with this part of the site. The proposal involves works to three of the existing boilers and will not require any additional vegetation to be disturbed. No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed.	Not a key issue.
Heritage and Archaeological Issues	The proposed works associated with this modification will be located within the factory site which 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 works to the existing boilers will have no additional impact in terms of indigenous or non-indigenous heritage. No change in environmental impacts from that originally identified in EA.	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 (and including that identified by the DGRs for this project) are:

- Preliminary hazard analysis;
- Noise impacts;
- Air quality (including odour) impacts;
- Visual impact;
- Traffic;
- Site contamination;
- Acid sulphate soils.

8.0 KEY ISSUES

8.1 PRELIMINARY HAZARD ANALYSIS

This Modification Application is supported by a Preliminary Hazard Analysis prepared by Pinnacle Risk Management Pty Ltd ("Pinnacle"). A copy of this PHA forms **Annexure 4** to this EA. This section of the EA is based upon the findings of this assessment.

The risks associated with the proposed modifications to Boilers 2, 4 and 6 have been assessed by Pinnacle Risk Management and compared against the DoP risk criteria.

The results are as follows and show compliance with all risk criteria.

<i>Description</i>	<i>Risk Criteria</i>	<i>Risk Acceptable?</i>
Fatality risk to sensitive uses, including hospitals, schools, aged care	0.5 x 10 ⁻⁶ per year	Yes
Fatality risk to residential and hotels	1 x 10 ⁻⁶ per year	Yes
Fatality risk to commercial areas, including offices, retail centres, warehouses	5 x 10 ⁻⁶ per year	Yes
Fatality risk to sporting complexes and active open spaces	10 x 10 ⁻⁶ per year	Yes
Fatality risk to be contained within the boundary of an industrial site	50 x 10 ⁻⁶ per year	Yes
Injury risk – incident heat flux radiation at residential areas should not exceed 4.7 kW/m ² at frequencies of more than 50 chances in a million per year or incident explosion overpressure at residential areas should not exceed 7 kPa at frequencies of more than 50 chances in a million per year	50 x 10 ⁻⁶ per year	Yes
Toxic exposure - Toxic concentrations in residential areas which would be seriously injurious to sensitive members of the community following a relatively short period of exposure	10 x 10 ⁻⁶ per year	Yes
Toxic exposure - Toxic concentrations in residential areas which should cause irritation to eyes or throat, coughing or other acute physiological responses in sensitive members of the community	50 x 10 ⁻⁶ per year	Yes
Propagation due to Fire and Explosion – exceed radiant heat levels of 23 kW/m ² or explosion overpressures of 14 kPa in adjacent industrial facilities	50 x 10 ⁻⁶ per year	Yes

Pinnacle conclude that societal risk, area cumulative risk and environmental risk are acceptable.

The primary reasons for the low risk levels from the modifications according to Pinnacle are that significant levels of impact from potential hazardous events are contained on-site.

Pinnacle makes the following recommendation in relation to this modification proposal.

1. *All existing coal handling equipment for the boilers is to be functionally tested to ensure it is fit-for-purpose prior to reuse. This includes the safety instrumented controls, e.g. alarms, trips and interlocks, as well as any mechanical protective systems.*

8.2 NOISE IMPACTS

The area surrounding Shoalhaven Starches is a mix of commercial, industrial and residential premises with vacant land, owned by the Manildra Group, to the north.

The nearest residential locations to the complex are as follows:

- Location 1 – Nobblers Lane, Terara approximately 1450 metres to the south east
- Location 2 – Riverview Road, Nowra approximately 960 metres to the south west;
- Location 3 – Meroo Street, Bomaderry approximately 600 metres to the north west;
- Location 4 – Coomea Street, Bomaderry approximately 690 metres to the north west;

The above locations are listed in the order shown in the Environmental Protection Licence for the site.

This Modification Application is supported by a Noise Impact Assessment prepared by Harwood Acoustics. A copy of the Noise Impact Assessment prepared by Harwood Acoustics forms **Annexure 5** to this EA. This section of the EA is based upon the findings of this assessment.

8.2.1 Acoustic Criteria

NSW 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 (see Appendix 2);*
- 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 Environment 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.

Existing Project Approval

In response to a request for information relating to noise emission from the proposed modification, the NSW Department of Planning and Environment requires an assessment of the potential for noise impact.

Environment Protection Licence 883

Shoalhaven Starches operates under Environment Protection Licence 883 issued by the NSW Office of Environment and Heritage.

Section L5 'Noise Limits' of this 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.

The Shoalhaven Starches complex, neighbouring properties and nearby residential locations are shown on the attached site plan in **Figure 6**.



Figure 6: Location of closest receptors to subject site as per EPL (Harwood Acoustics).

Shoalhaven Starches Noise Management Plan

The Project Approval for the Shoalhaven Starches Expansion Project required the preparation of a Noise Management Plan to address and manage noise emissions 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 associated with the expansion project. 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 several months although significant noise producing aspects, such as piling, if required, will last a total of approximately two weeks. Consideration is given to the potential for noise impact from construction activities on residential receptors in Section 8.2.3 of this EA.

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

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

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_{eq} Noise Management Levels from Construction Activities

Receptor Location	Noise Management Level	How to Apply
Location 1 (Terara)	43 dBA (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"> Where the predicted or measured L_{Aeq} (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. 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.
Location 2 (Nowra)	50 dBA (40 + 10)	
Locations 3 & 4 (Bomaderry)	48 dBA (38 + 10)	
	Highly noise affected 75 dB(A)	<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"> 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"> 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) if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Project Specific Noise Criteria

When all the above factors are considered, Harwood Acoustics indicate the most stringent noise criteria for the proposed modification to the boilers are as follows:

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

- 28 dBA (L10, 15 minute) at locations in Terara on the south side of the Shoalhaven River;
- 28 dBA (L10, 15 minute) at locations in Nowra on the south side of the Shoalhaven River;
- 32 dBA (L10, 15 minute) at locations in Meroo Street, Bomaderry;
- 30 dBA (L10, 15 minute) at other locations in Bomaderry.

Construction Phase Noise Management Levels

- 43 dBA (Leq, 15 minute) at locations in Terara;
- 48 dBA (Leq, 15 minute) at locations in Bomaderry; and
- 50 BA (Leq, 15 minute) at locations in Nowra.

The residential 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 Boiler Modifications - Operational Noise Emission

Mechanical Plant and Equipment Source Noise Levels

The main sources of noise associated with the modification of the three boilers are the baghouses, fans, and small conveyor motors.

Coal is delivered to the coal storage area by truck and loaded into the existing coal-fired boilers using a front end loader. Noise sources associated with the delivery and movement of coal form part of existing operations in this location. 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. According to Harwood Acoustics, there will be no significant increase in these activities as a result of this modification application and as such are not considered further in this assessment.

Harwood Acoustics have conducted several noise surveys at the Shoalhaven Starches' complex including noise measurements of similar plant and equipment. In addition, the manufacturers of the fans and baghouses have supplied sound data for various items of plant to be installed.

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

Table 8
L₁₀ Sound Power Levels – Boilers 2, 4 and 6

Description	L_{10, 15 minute} Sound Power Level (dBA)
ID fan Boilers 2 and 4	94
ID fan Boiler 6	86
OFA Fan	83
SA Fan	83
Baghouse Pneumatic Pulse Cleaner	100
Small motors / screw feeds	87

Noise Level Predictions

Predicted Noise Levels

The predicted noise levels at each receptor are shown in **Table 9** below.

Table 9
Predicted Noise Levels at Receptor Locations – Boiler Upgrades

<i>Description</i>	<i>Predicted Noise Level $L_{10, 15 \text{ minute}}$ (dBA) at Receptor Location</i>			
	<i>Location 1</i>	<i>Location 2</i>	<i>Location 3</i>	<i>Location 4</i>
Boiler 2	19	23	27	21
Boiler 4	20	23	27	22
Boiler 6	< 10	< 10	< 10	< 10
Combined	23	26	30	24
Design Noise Goal ($L_{10, 15 \text{ minute}}$)	28	28	32	30
Complies	✓	✓	✓	✓

The above calculations and predictions consider distance loss to each receptor as well as the following:

- Barrier attenuation from existing site structures;
- Prescribed sound levels as per manufacturer's data are achieved for fans and baghouse pneumatic cleaning pulse; and
- Noise controls outlined in Section 8.2.3 are implemented and adhered to.

8.2.3 Construction Noise Emission

The construction process will involve removal of obsolete equipment, construction of the baghouses, repair of the stacks and installation of new equipment.

Table 10 below shows a schedule of sound power levels for typical construction equipment.

Table 10
Construction Equipment – L_{eq} Sound Power Levels

<i>Description</i>	<i>L_{eq} Sound Power Level (dBA)</i>
Mobile Crane (Diesel)	110
Grinder	105
Power Saw	101

Table 11 below shows the predicted level of potential noise emission from construction activities at each of the receptor locations.

Table 11
Predicted Noise Levels at Receptor Locations – Construction Phase

<i>Description</i>	<i>Predicted Noise Level $L_{eq, 15 \text{ minute}}$ (dBA) at Receptor Locations</i>			
	<i>Location 1</i>	<i>Location 2</i>	<i>Location 3</i>	<i>Location 4</i>
Construction Activity	< 20	40	22	21
Acceptable Noise Limit ($L_{eq, 15 \text{ minute}}$)	43	50	48	48
Complies	✓	✓	✓	✓

Based upon **Table 11** above Harwood Acoustics indicate that the construction noise management levels will be met at each receptor location during the construction phase.

8.2.4 Recommended Noise Controls

Predicted noise levels in Harwood Acoustics noise assessment are based on the sound levels for fans and the baghouse pneumatic cleaning pulses as supplied by the manufacturer's and as shown in **Table 12** below.

Table 12
Sound Pressure Levels – Fans and Equipment

<i>Description</i>	<i>Sound Pressure Level (dBA) when measured at 1 metre</i>
ID Fan Boilers 2 and 4 (two only)	86
ID fan Boiler 6 (one only)	78
OFA Fan (one only)	75
SA Fan (one only)	75
Baghouse Pneumatic Pulse Cleaner (per baghouse)	92

In the event that fan selections change or additional plant is required to be installed, a final assessment may be required once mechanical plant selections have been finalised.

We are confident that compliance with the project specific noise goals can be achieved for the modification without onerous mitigation measures and these may be implemented following installation if required.

The Noise Impact Assessment prepared by Harwood Acoustics concludes:

An assessment of the potential noise impact from the proposed modification of and upgrade to Boilers 2, 4 and 6 at Shoalhaven Starches on Bolong Road, Bomaderry, NSW has been undertaken.

Calculations show that the level of noise emission from the operation of modified boilers 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)

This Modification Application is supported by an Air Quality Impact Assessment (AQIA) prepared by Stephenson Environmental Management Australia (SEMA). A copy of SEMA's assessment forms **Annexure 6** to this EA. This section of the EA is based upon the findings of this assessment.

The objective of the AQIA prepared by SEMA was to determine the impact on ground level concentration (GLC) of odour; particles (TSP and PM₁₀); oxides of nitrogen (NO_x); and sulphur dioxide (SO₂) from the proposed modifications to the boilers to determine that they will be within relevant air quality standards. To achieve this objective, the AQIA referenced the approved Shoalhaven Starches Expansion Project and the proposed boiler modifications.

The AERMOD computer based dispersion model was used by SEMA to determine the maximum GLCs for this assessment in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (AMMAAP)*. AERMOD dispersion model is now the model of choice recommended by EPA NSW / OEH in AMMAAP because AUSPLUME is no longer supported. However, it is noted that AUSPLUME has been the regulatory dispersion model used in all previous air quality impact predictions for this Shoalhaven Starches site.

Odour, NO_x, SO₂ and TSP emission measurements have been conducted by SEMA on various occasions on each boiler and have been used to develop the emissions input files for the predictive dispersion modelling.

8.3.1 Impact Assessment Criteria

Odour Impact Assessment Criteria

The *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (AMMAAP) provides a GLC impact assessment criterion for a number of potential air emissions, and states that dispersion modelling undertaken should assess the modelling predictions against the GLCs to determine if the predicted impact from the emissions exceeds the criteria.

The Impact Assessment Criteria (IAC) for complex mixtures of odours have been designed to take into account the range of sensitivity to odours within the community and to provide additional protection for individuals with a heightened response to odours. This is achieved by using a statistical approach dependent upon population size. As the population density increases, the proportion of sensitive individuals is also likely to increase, indicating that more stringent criteria are necessary in these situations.

The GLC assessment criteria for the complex odour compound emissions considered in the modelling are shown in **Table 13**. The predicted odour impact due to the pollutant source must be reported in units consistent with the IAC as peak concentrations (ie. approximately one second average).

The odour criterion that has been selected by SEMA in their assessment, to determine the maximum odour GLC concentration from the proposed boiler modification, is the 2.0 odour units (ou) criterion for the 100th percentile of predicted odour concentrations, which indicates that 100% of all odour predictions would fall below this concentration. This criterion has been chosen as there are residential areas in the vicinity of the site, such that the population density of the area surrounding the facility as a whole is in excess of 2000 people.

Table 13
Impact Assessment Criteria for Complex Odorous Air Pollutants

<i>Population of Affected Community</i>	<i>Impact Assessment Criteria (ou)</i>
Urban (> 2000) and/or schools and hospitals	2.0
~ 500	3.0
~ 125	4.0
~30	5.0
~10	6.0
~ single rural residence (<= 2)	7.0

Adjustment for Peak-to-Mean Ratios

AMMAAP notes that the evaluation of odour impacts requires the estimation of short or peak concentrations on the time scale of less than one second. The dispersion modelling predictions are valid for one-hour ground level concentrations or longer. Therefore the dispersion model needs to be supplemented to accurately simulate atmospheric dispersion of odours and the instantaneous perception of odours by the human nose.

AMMAAP Table 6.1, reproduced in **Table 14** below, provides EPA recommended one-second to one-hour (P/M60) peak-to-mean ratios for estimating concentrations for different source types, stabilities and distances. It is important to note that these emission factors are for idealised situations for one source in flat terrain where the receptor is located along the centreline of the single plume and do not consider fluctuations away from the plume centre line, terrain influences or plume interactions from multiple sources.

AMMAAP further requires that the P/M60 ratio for wake-affected point sources be applied to the proposed boiler house modifications to determine the maximum permissible stack concentration. Therefore, maximum permissible stack source emission rate will need to be multiplied by 2.3 when checking for compliance with the ambient odour GLC criterion.

Table 14

Peak-to-Mean Factors

(AMAAP Table 6.1: Factors for estimating peak concentrations in flat terrain
[Katestone Scientific 1995 and 1998])

Source type	Pasquill-Gifford stability class	Near-field P/M60*	Far-field P/M60*
Area	A, B, C, D	2.5	2.3
	E, F	2.3	1.9
Line	A–F	6	6
Surface wake-free point	A, B, C	12	4
	D, E, F	25	7
Tall wake-free point	A, B, C	17	3
	D, E, F	35	6
Wake-affected point	A–F	2.3	2.3
Volume	A–F	2.3	2.3

* Ratio of peak 1-second average concentrations to mean 1-hour average concentrations.

Particle Impact Assessment Criteria

Table 7.1 of the AMMAAP presents impact assessment criteria (IAC) for ground level impact of particulate matter which is outlined in **Table 15**.

Table 15
Impact Assessment Criteria for Particulate Matter

<i>Pollutant</i>	<i>Averaging Period</i>	<i>Impact Assessment Criteria ($\mu\text{g}/\text{m}^3$)</i>	<i>Source</i>
TSP	Annual	90	NHMRC (1996)
PM ₁₀	Annual	25	DoE (2016)
	24-hour	50	DoE (2016)

Sulfur Dioxide Assessment Criteria

Similarly, Table 7.1 of the AMMAAP presents impact assessment criteria for sulfur dioxide as outlined in **Table 16**.

Table 16
Impact Assessment Criteria for Sulfur Dioxide

<i>Pollutant</i>	<i>Averaging Period</i>	<i>Impact Assessment Criteria ($\mu\text{g}/\text{m}^3$)</i>	<i>Source</i>
Sulfur Dioxide	Annual	60	NEPC (1998)
	24-hour	228	NEPC (1998)
	1-hour	570	NEPC (1998)
	10-minutes	712	NHMRC (1996)

Nitrogen Oxides Assessment Criteria

The AMMAAP criterion for nitrogen oxide is outlined in **Table 17**.

Table 17
Impact Assessment Criteria for Nitrogen Oxides

<i>Pollutant</i>	<i>Averaging Period</i>	<i>Impact Assessment Criteria ($\mu\text{g}/\text{m}^3$)</i>	<i>Source</i>
Nitrogen Dioxide (NO ₂)	Annual	62	NEPC (1998)
	1-hour	246	NEPC (1998)

Key to Tables 15 to 17.

TSP = Total suspended particulate matter

NEPC = National Environment Protection Commission

NHMRC = National Health and Medical Research Council

$\mu\text{g}/\text{m}^3$ = micrograms per cubic metre

DoE = Department of Environment

8.3.2 Impact Assessment Predictions

The impact assessment predictions prepared by SEMA for the proposed boiler modifications are presented in **Table 18** which indicate that:

- The worst case predicted odour GLC impact from proposed boiler modifications is 0.67 ou (cumulative total) on the boundary of the site;
- The 24-hour average and annual average worst case predicted PM₁₀ GLCs are 0.72 and 0.11 µg/m³ respectively;
- The one-hour average and annual average worst case predicted NO₂ GLCs are 108 and 6.6 µg/m³ respectively;
- The one-hour, 24-hour average and annual average worst case predicted SO₂ GLCs are 306, 119 and 17.6 µg/m³ respectively;
- All of these predictions are for the total emission from the boilers, and not just the incremental increase in emission, and are thus conservative and cumulative;
- All predicted GLCs are compliant with the relevant IAC.

Cumulative Worst Case Predicted GLCs

Pollutant	Averaging Period	Maximum Predicted GLC		Impact Assessment Criteria
		Boiler No. 4 (stack height – 38.74 m)	Combined Boilers No. 2 & 4 (including Boiler No. 4 total impacts at stack height – 38.74 m)	
PM ₁₀ * (µg/m ³)	24 hours	0.38	0.72	50
	Annual	0.065	0.11	25
Odour ** (ou)	1 hour	0.67	0.67	2.0
NO _x (as NO ₂) * (µg/m ³)	1 hour	108	180	246
	Annual	6.6	11.4	62
SO ₂ * (µg/m ³)	1 hour	260	306	570
	24 hours	93.4	119	228
	Annual	16	17.6	60

- **Key:**
- * = Maximum Predicted Incremental Impact for PM₁₀, NO_x and SO₂
- ** = 99th Percentile Predicted Incremental Impact for Odour
- GLC = Ground Level Concentrations m = metres
- PM₁₀ = Particulate matter less than 10 microns NO_x - oxides of nitrogen
- NO₂ = nitrogen dioxide SO₂ = sulfur dioxide
- µg/m³ = micrograms per cubic metre ou = odour units

Proposed Modified Boiler Odour Impacts

Based on available data and measurement results, SEMA estimates that, with the existing level of odour control, the proposed boiler modifications will emit 8,200 ou.m³/s of odour into the atmosphere. However, the majority of this odour emission has previously been counted and included in the total odour emissions from the Shoalhaven Starches factory site as input data to the GHD overall site odour assessment model.

The Boiler No. 4 odour emission includes the DDG odour destruction component of the existing Boiler No. 4 odour control duty.

The Boiler No. 2 (originally coal-fired) was not considered a principal odour emission source in the GHD 2008 air quality assessment. The change in fuel type from woodchip back to coal according to SEMA is not expected to increase odour emissions as boiler combustion temperature and residence times will remain unchanged. Therefore odour modelling on Boiler No. 2 has not been included in this assessment.

GHD 2008 Predicted Odour Impacts

The GHD 2008 air quality assessment estimated the total odour emissions from the Shoalhaven Starches factory (not including the proposed boiler modifications) before the implementation of odour controls.

The 2008 total factory predicted odour impacts at the Shoalhaven Starches boundary were 100 ou with existing controls, 25 ou with Stage 1 controls, 10 ou with Stage 2 controls and 5 ou with Stage 3 controls.

The 2008 total factory predicted odour impacts at Bomaderry were 40 ou with existing controls, 6 ou with Stage 1 controls, 3 ou with Stage 2 controls and 2 ou with Stage 3 controls.

The AQIA prepared by SEMA concludes:

“This Air Quality Impact Assessment (AQIA) concludes that the cumulative impacts of the approved ethanol expansion project development and the proposed boiler modifications at the Shoalhaven Starches factory site at Bomaderry, New South Wales will be as follows:

- *All emission parameters modelled and their impacts at ground level as presented in Section 6 of this report were compliant with the relevant Impact Assessment Criteria.*
- *Particulate emissions from Boilers No. 2 and 4 will now be controlled by fabric filtration air pollution control devices (baghouses) and hence will be less than the current configuration of boilers.*
- *An additional baghouse is proposed to be installed on Boiler No.6 to further reduce the particulate emissions from the EPL ID No.35, which is the combined stack serving Boilers 5 and 6.*

- *The existing odour control efficiencies for Boiler No. 4 will be maintained with the fuel change from gas to coal because the combustion temperatures and residence time in the boiler remain unchanged.*
- *There will be no changes to existing odour emissions from Boiler No. 6 under the proposed modifications.*
- *Boiler No. 2 was a coal fired boiler in 2008, when the GHD odour emissions inventory was conducted and was not considered to be a source of odour, thus was not included in the inventory. Therefore odour emissions from Boiler No. 2 have not been included in this AQIA."*

8.4 FLOODING

The subject site is inundated during the 1% Annual Exceedance Probability (AEP) flood event by floodwaters from the Shoalhaven River. The Modification Application is supported by a Flood Compliance Report prepared by WMAwater ("WMA") (**Annexure 7**). This section of the EA is based upon the findings of this assessment.

The position of the proposed works on the subject site is surrounded by an extensive array of existing plant and buildings. Thus, according to WMA the flow path of floodwaters from the Shoalhaven River over the river bank and towards Bolong Road and through the plant is already significantly impeded.

The construction of any works on the floodplain will cause a loss of temporary floodplain storage and a loss of hydraulic conveyance. The resulting increase in flood levels depends upon the magnitude of these losses. Given that not all the proposed works are on the ground (ie. are above the 1% AEP flood level or even the PMF) and the floodplain storage area of the Shoalhaven River floodplain is of the order of 100 km² the loss of temporary floodplain storage due to the proposed works according to WMA is too small to be evaluated.

The loss of hydraulic conveyance depends on the extent of the restriction to a flow path caused by the works. Prior to construction of the Shoalhaven Starches plant 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 blocked the flow path through the site. This issue has been investigated in WMA's October 2000 report titled "*Further Development within the Manildra Starches Plant off Bolong Road, Bomaderry - Hydraulic Assessment*". In summary an agreement was reached at that time that any future development within the intensively built-up area, as indicated on the **Figure 7** below (taken from that report), would not require hydraulic modelling to quantify the hydraulic impacts and cumulative effects.

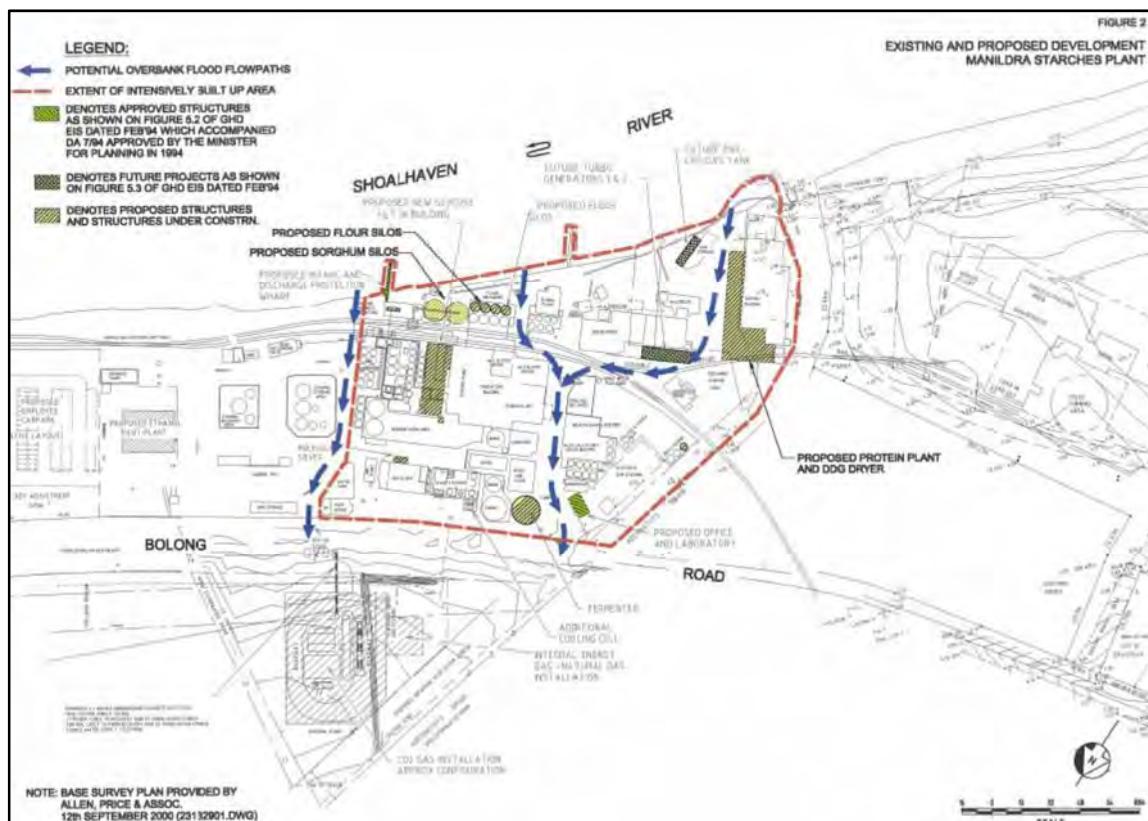


Figure 7: Existing and Proposed Development

Since publication of that report in 2000 a TUFLOW 2 dimensional hydraulic model has been established by Shoalhaven Starches in order to assess the hydraulic impact of any future works. This model is much more detailed than the CELLS model available in 2000, however the proposed development and surrounding existing plant is still considered too complex to be accurately assessed using the TUFLOW hydraulic model. One of the main issues is that large parts of the plant are on piers and there are a multitude of pipes which makes it impossible to accurately reflect each of these structures using the TUFLOW model.

In conclusion WMA consider that there would be no significant increase in the 1% AEP flood level as a result of the proposed works within the existing Shoalhaven Starches plant area.

8.5 VISUAL IMPACTS

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 Burraga (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 proposed modifications to the Boilers will involve the erection of structures with similar heights to existing facilities on the site. The proposed works will include:

- Boiler 2 – The construction of a new bag house adjacent to the boiler building which will have a height above ground level of 12 metres and the replacement of an existing stack with a new stack which will have a height above ground level of 40 m.
- Boiler 4 – The construction of a new bag house on top of the existing boiler building. This new structure will have a height above ground level of 35 m. It is also proposed to repair the existing stack for this boiler and increase its height to 40 m.
- Boiler 6 – Construction of a new baghouse at ground level and adjacent to the existing boiler building with a height above ground level of 15 metres.

The existing boiler house is a substantial building development and includes an existing stack with a height of 53 m. The proposed works associated with this modification reflect a character and scale that is consistent with the existing boilers and the site in general.

The visual impact of these works from the identified vantage points (refer **Figure 8**) is described as follows:

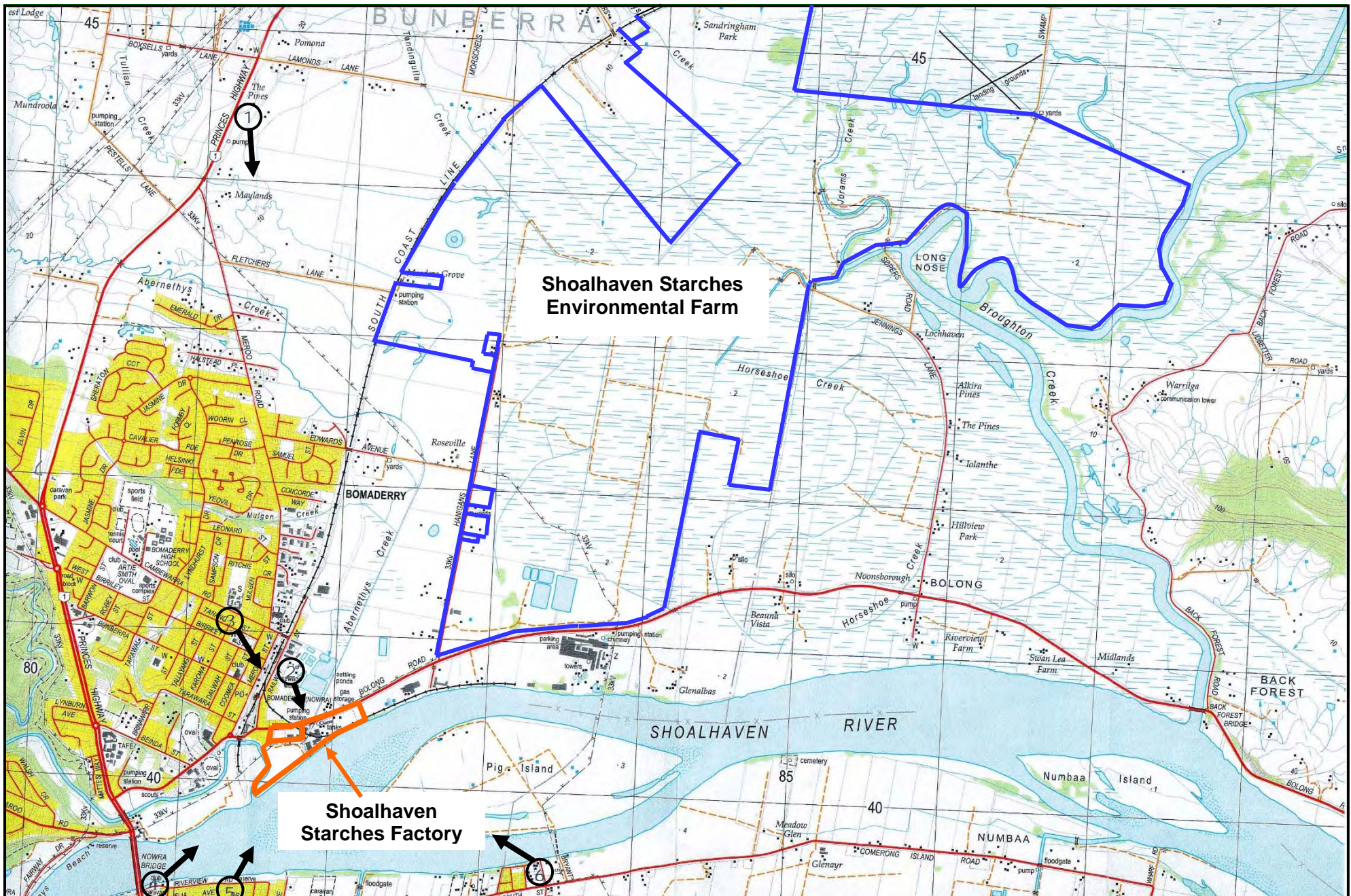


Figure 8: Vantage Points for Plates.

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, and the screening of the site attributed to terrain and vegetation it is considered the developments associated with this modification will not adversely impact on views from these vantage points.



Plate 1: View of Shoalhaven Starches Factory from Princes Highway (within vicinity of Boxsells Lane). Factory stack barely visible from this vantage point.

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 refer (**Plate 2**).

Works associated with this modification will mainly involve structures of a similar bulk and scale as existing structures within this part of the site. In this case the existing boiler house location is largely screened from view by existing development such as the Interim Packing Plant and the recently constructed Dryer No. 5 building.



Plate 2: View of Shoalhaven Starches factory site
(and boiler house location) from Bolong Road.

Note: Boiler house location is shielded from view by existing development such as in this case the Interim Packing Plant and recently constructed Dryer No. 5 building.

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**).

In light of the prevailing scale of existing development located to the north of the boiler house complex within the Shoalhaven Starches site the proposed modification works will be largely screened from view although the new stacks will be visible with the existing stack from this vantage point but will in context of existing similar types of structures.



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

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. The existing and proposed stacks associated with the boilers are and will protrude above the canopy of the vegetation along the river, as does the existing flour mill, the existing boiler house and starch plant. Although it is likely some of the proposed works will intrude into the existing skyline, it will not be out of context in terms of the existing factory development when viewed from this vantage point.

Riverview Road

The main vantage point from where the proposed works could be visible will be from residences along Riverview Road directly south of the site (refer **Plate 5**). 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. The proposed works are generally situated within context of the existing boiler and its stack. The proposed works will therefore not be out of context with existing development that will be visible from this vantage point.



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

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**.



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

The existing boiler stack is clearly visible from this vantage point. From this vantage point the proposed modifications to the boilers will be viewed as part of the existing factory complex, and will be viewed within this context.

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.

Overall it is considered that the proposed works will not create a significant adverse visual impact due, principally, due to the works comprising a scale and character consistent with existing development on the site. There are however measures which Shoalhaven Starches could undertake to minimise the visual impact of the proposal. Where appropriate and possible, the proposed flour mill 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 match existing development on the site.

8.6 TRAFFIC AND PARKING

This Modification Application is supported by a Traffic Impact Assessment prepared by ARC Traffic & Transport (ARC). In undertaking their assessment ARC has referenced their previous assessments that have been undertaken in relation to the Shoalhaven Starches site. This assessment has reviewed the potential construction and operational aspects of the proposal, and provides recommendations by which potential impacts can be minimised if not entirely ameliorated. A copy of ARC's report forms **Annexure 8** to this EA. This section of the EA is based upon and provides a summary of the main findings of this assessment.

8.6.1 Boilers Access

All access to the boiler house site (all of which lie within the main factory site) is via the intersection of Bolong Road and the Western Driveway (which provides for all movements to/from the east and west) and then via existing internal roads. All coal trucks would arrive and depart this intersection from the west, while all ash trucks will essentially loop between this intersection and the Environmental Farm via Hanigans Lane. These future coal and ash movements would be identical to existing coal and ash movements to/from the boiler house site.

During the construction period, up to 20 construction staff will be employed for a period of approximately 12 weeks in the final quarter of 2017. The Modification provides for these construction staff to utilise the Temporary Car Park via the Bolong Road and Temporary Car Park Driveway intersection (again providing for all movements to/from the east and west).

Operational Trip Generation and Distribution

ARC estimated that the modified boiler operations will require the supply of an average of some 1,050 tonnes of coal per week.

Based on existing (coal) truck capacities of an average 38 tonnes, ARC estimate that the Modification would generate an additional 28 coal trucks per week, or 54 coal truck trips per week; and in turn an estimated additional 6 coal trucks per day or 12 coal truck trips per day.

At most, ARC estimate this would result in an additional 2 truck trips in any weekday AM or PM peak hours (ie. potentially a single coal truck arriving, unloading and then departing in a peak hour). This estimate is based on the recent Farm TA analysis of coal truck movements using weighbridge data from the Western Driveway. This analysis indicated

that of the 785 coal delivery trucks reported in the weighbridge data 1st March 2016 to 30th June 2016:

- A total of only 53 coal trucks were generated in the broader weekday AM and PM peak periods (ie. between 7:00 am and 9:00 am, and between 4:00 pm and 6:00 pm) during the data period, or some 7% of all coal truck arrivals.
- A maximum of 2 coal trucks were generated to a single (day) AM peak hour (11th June 2016).
- A maximum of 3 coal trucks were generated to a single (day) PM peak hour (24th March 2016).

These coal truck trips would all be generated to/from the west of the Site, where routes to/from Princes Highway are available either directly via Bolong Road, or via Railway Street, Cambewarra Road and Meroo Road (for vehicles not subject to Restricted Access Vehicle restrictions).

ARC estimate that the modified boiler operations will require the removal of an average of some 157 tonnes of ash per week. Based on existing ash truck capacities of 17 tonnes ARC estimate that this Modification would generate an additional 10 ash trucks per week, or 20 ash truck trips per week; and in turn an estimated additional 2 coal trucks per day or 4 coal truck trips per day. At most, ARC estimate this would result in a single additional ash truck trip in any weekday AM or PM peak hour.

Finally, the conversion of Boiler 2 from woodchip to coal-fired operations will result in removal of all woodchip truck trip generation. At present, Boiler 2 woodchip operations require some 320 tonnes of woodchip per week. Based on existing woodchip truck capacities of 22.5 tonnes, ARC estimate that the Modification would generate 14 fewer woodchip trucks per week, or 28 fewer woodchip truck trips per week; and in turn approximately 3 fewer woodchip trucks per day, or 6 fewer woodchip truck trips per day.

According to ARC, woodchip trucks currently have an almost identical arrival profile to coal trucks as detailed above, with the majority of movements between 7:00 pm and 7:00 am; as such, it is estimated that the removal of woodchip trucks would result in the removal of a single woodchip truck trip in any weekday AM or PM peak hour.

Operational Trip Assignment

The assignment of additional Modification operational trips to the key local intersections is shown in **Figure 9** below.

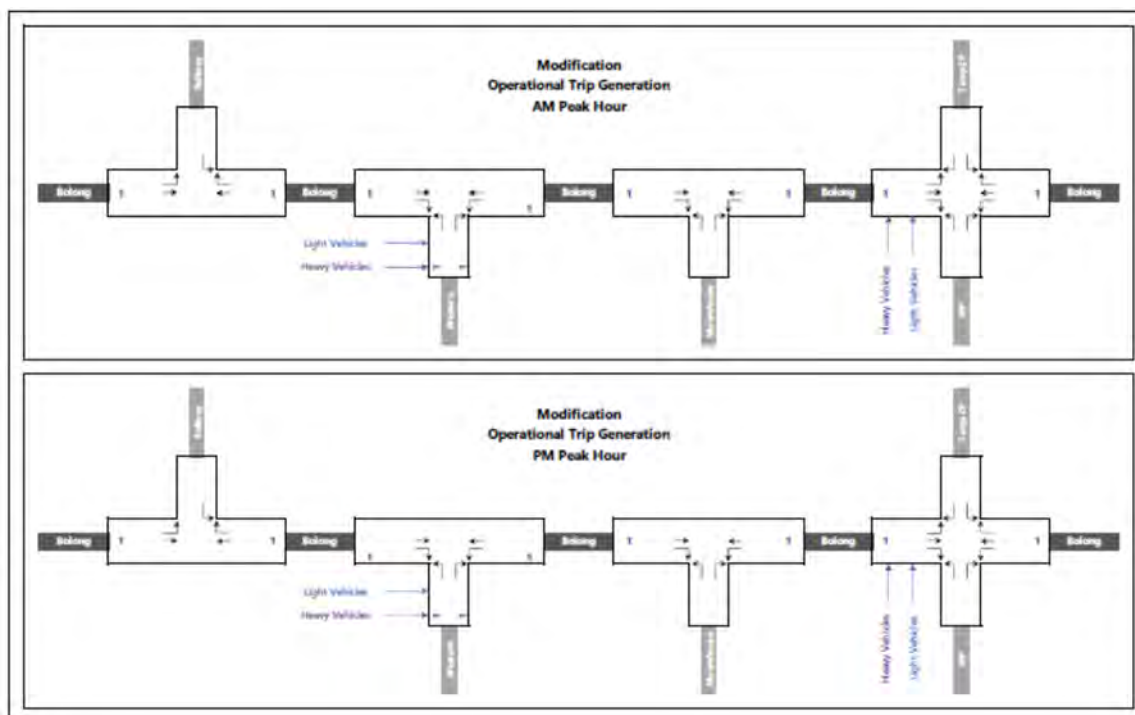


Figure 9: Modification Additional Operational Trips

Construction Trip Generation and Distribution

Construction Schedule and Requirements

According to ARC, the construction phase is estimated to occur over some 12 weeks, and require:

- Up to 20 construction staff on-site daily;
- Up to 5 construction material carrying trucks per day.

Construction Traffic Generation

The primary construction contractor has indicated that they intend to employ local sub-contractors for the majority of the construction works, many of whom have worked on the site during previous construction projects. Work undertaken by ARC provides clear evidence that construction staff – even when locally based – generate fewer trips through car sharing and the like, but to provide a worst-case assessment all construction staff are designated as drivers. As such, ARC has estimated that the construction staff could generate up to 9 vehicle trips in a peak hour.

Construction Trip Assignment

The assignment of additional Modification construction trips to the key local intersections is shown in **Figure 10** below.

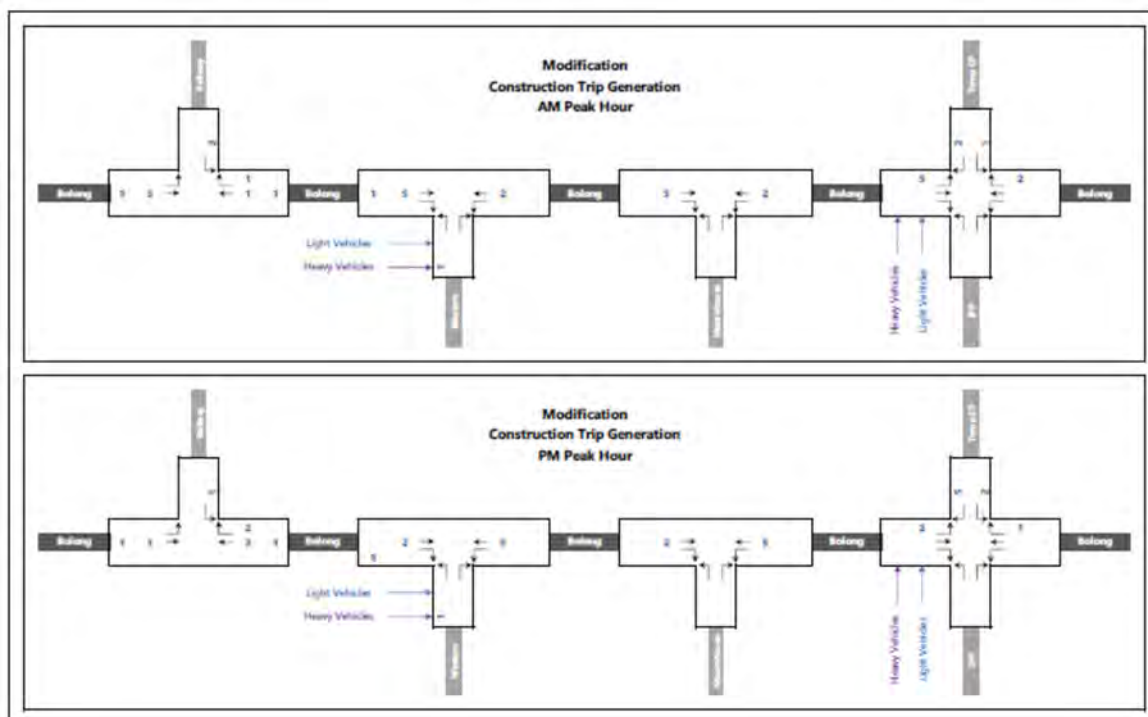


Figure 10: Modification Additional Construction Trips

Traffic Impacts

Operation Traffic Impacts

According to ARC, the operational trip generation associated with the Modification proposal will have little if any impact on the local road network simply as a factor of the very minimal trip generation of those operations. Even if traffic flows in Bolong Road increased annually from the existing peak levels (again noting that the RMS forecasts flows to be significantly reduced) the additional of 1 – 2 vehicle trips in a peak hour would have no impact on levels of service at any of the key intersections, nor in the broader road network.

Construction Traffic Impacts

Similarly, according to ARC, the construction phase will have little if any significant impact on the local road network simply as a factor of the minimal generation and short duration of the construction phase.

Notwithstanding, ARC has completed revised SIDRA analysis of this construction period, with the results provided below in **Table 19**.

Table 19
Modification Construction Period Intersection Operations

2017 Base Intersection Operations + Modification Construction Trips	Level of Service		Average delay(s)		Worst Approach Delay(s)		Degree of Saturation	
	AM	PM	AM	PM	AM	PM	AM	PM
Bolong Road & Railway Street	B	A	2.7	2.3	15.4	12.6	0.340	0.356
Bolong Road & Western Driveway	A	A	0.5	0.4	11.2	9.6	0.360	0.329
Bolong Road & Moorehouse Driveway	A	A	0.6	0.2	4.6	3.5	0.360	0.376
Bolong Road & IPP & TCP Driveway	B	B	0.6	0.6	15.9	18.1	0.362	0.372

With reference to **Table 19**, according to ARC, it is clear that all intersections will continue to operate at a high Level of Service through the peak Modification construction period (again noting that the base flows include other peak construction projects across the Starches Sites).

Perhaps the only issue to resolve relates to the additional (construction staff) use of the intersection of Bolong Road and IPP and Temporary Car Park. At present, Starch Dryer 5 (Mod. 7) approval provides for all movements at this intersection, and the Temporary Car Park through mid-2018 to accommodate construction staff working on the Modification 10 (Flour Mill B) construction, as this parking would be provided in direct proximity to the Flour Mill B construction site.

Council has raised issue with ARC in regard to the operation of the Temporary Car Park Driveway, and specifically its provision of all turning movements, its proximity to the Bolong Road median and barrier fence (to the immediate east) and alignment directly opposite the IPP Driveway. However, based on the current Starch Dryer 5 (Mod. 7) approval, observations by ARC, and a review of the short construction period traffic flows and intersection operations, it is ARC's opinion that the use of the Temporary Car Park by the construction staff during the 12 week construction schedule associated with this Modification would not compromise the existing (approved) access conditions.

Further to the above, the recent Access & Parking Assessment (2017) prepared and submitted by ARC to the Department does provide additional recommendations in regard to the Temporary Car Park, including the upgrade of the driveway at Bolong Road (to provide a formal concrete driveway as provided at the Moorehouse Car Park) and for the

marking of all parking spaces in accordance with Australian Standard 2890.1. Manildra has committed to these works further to an approval of the APA 2017 recommendations.

ARC conclude that the trip generation of the construction phase of the Modification would have no impact on the local traffic environment.

Parking

It is proposed that all construction staff parking be provided in the Temporary Car Park. It is important to note that during the construction phase (estimated within the final quarter of 2017) two other construction projects are expected to be underway (further to course to appropriate approvals), being the Flour Mill B (Mod. 10) and Ethanol Distillery Modification (Mod. 12) construction projects.

Importantly, Modification 12 construction staff will be provided with parking in the Dairy Farmers Car Park adjacent to the Modification 12 works site, reducing the demand within the Temporary Car Park (100 spaces) to Modification 10 (Flour Mill B) construction staff and a minor number of (Starches) operational staff redistributed from the Moorehouse Car Park during the Modification 10 construction. As such, ARC estimate that up to 60 of the 100 spaces within the Temporary Car Park would be used under peak construction conditions, leaving 40 spaces – or double the demand – for the construction staff associated with this Modification proposal.

Once operational, the Modification proposal would not require additional operational staff, and as such there would be no increase in operational staff parking demands.

Construction Management

According to ARC, during the construction phase of the Modification an appropriate set of management procedures will be required.

In relation to access, traffic and parking requirements during the construction phase, ARC recommends the following initiatives, which essentially mirror the Construction Traffic Management Plan (CTMP) prepared by ARC for the construction requirements of past SS Site projects, including most recently the Packing Plant:

- All parking for construction staff and construction trucks 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. As discussed above, it is proposed that all construction staff parking be provided for in the approved Temporary Car Park, which is readily accessible to the SS Site, noting the existing pedestrian paths on both sides of Bolong Road and the pedestrian refuge crossing in Bolong Road directly adjacent to the Temporary Car Park.

- 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 the Western Driveway and the Princes Highway via Bolong Road.
- 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 the DP&E and Council.

Conclusion

The Traffic Impact Assessment prepared by ARC concludes:

“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 potential impacts of construction and operational traffic - 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 Approval, nor as a result increases in SS Site vehicle or rail trips above those provided for in the SSEP Approval.*
- *During the construction phase, construction vehicle trips would be generated over only a short 12 week period and access would be exclusively via existing access points and internal roads which appropriately provide for the largest construction vehicles. The operation of local intersections during the construction periods would not be detrimentally impacted by the additional construction traffic, and construction staff parking can be provided for within the existing capacity of the Temporary Car Park.*
- *The provision of additional detail in regard to the management of construction traffic can be conditioned as part of a Modification Approval.*
- *During the operational phase, operational vehicle trips would again exclusively use existing access points and internal roads which appropriately provide access for the largest operational vehicles. The operation of local intersections during the operational phase would be essentially unchanged, with operations estimated to generate a maximum of only 1 – 2 additional truck trips in a peak hour. The Modification would not result in increases in operational staff, and as such there would be no increase in operations staff parking demand.*
- *The access and parking network upon which this assessment is based is in turn based on the recommendations of the APA 2017, which in the opinion of ARC appropriately responds to all outstanding issues as raised previously by the DP&E, Council and the RMS. These recommendations specifically include the finalisation of upgrades of key Bolong Road*

intersections and the appropriate provision, design and marking of car parking areas across the Starches Sites.

It is acknowledged that should the DP&E require further revisions to the recommendations of the APA 2017, revisions may be required to this Modification assessment.

8.7 SITE CONTAMINATION

The Modification Application is supported by a Phase 1 Contamination and Acid Sulphate Soils Assessment prepared by Coffey's (**Annexure 9**). Coffey's has carried out previous geotechnical and environmental reports in this general area. The most recent environmental report (Ref: ENAUWOLL04319AA-R01, dated 10 October 2016) was carried out for the planned Flour Mill B (Mod. 10). The scope of works included a site history review (including review of previous reports). This previous report is directly relevant to this site.

The general area had a history of industrial use. Between 1949 and late 1960s the area was occupied by a factory producing cheese, gluten and a drink product. From the late 1960s onward the site was occupied by Manildra and used for the production of wheat, starch, gluten and later ethanol.

Earlier site plans reviewed within a summarised 2008 Coffey's preliminary environmental site assessment (ref. ENVIWOLL00111AA-R02) indicate that the Boiler House has been in its current location since at least 1977.

Intrusive assessment works have been carried out since 2007 to the east of the boiler house including:

- 2007 - Proposed Starches Product Dryer (Mod. 7);
- 2008 - Proposed Shoalhaven Starches Ethanol Expansion (Project Approval);
- 2014 - Proposed New Silos (DA 14/2161).

These assessments identified fill material at depths between 0.5 m and 2.5 m, soil sampling has also been conducted analysing the material for potential contaminants. Selected samples were analysed for total recoverable hydrocarbons, benzene, toluene, ethyl-benzene, xylene, metals, pesticides, polycyclic aromatic hydrocarbons and polychlorinated biphenyls. No contamination was identified in any of the sampling locations above the adopted criteria for industrial land use at the time.

The most recent assessment (Coffey, 2016) to the east of the boiler did not directly identify contamination, but due to the history of industrial activities at the site and shallow

investigations, the report recommended that if evidence of contamination is identified during construction stages, a suitably qualified environmental practitioner should be engaged to assess the potential for risk to human health or environment and provide advice on proper management. Soil assessment would also be required for any excess construction spoil requiring offsite disposal or reuse.

In addition to a literature review, Coffey's also undertook a site walkover by a Coffey's environmental scientist on 24 April 2017 in company of an employee of Shoalhaven Starches familiar with the site.

Based upon the results of Coffey's investigations as described above, they consider the potential for widespread contamination of the site to be low. Some chemical additives have been stored in the western part of the boiler house used for dosing boiler water. Some components of these can be hazardous. As the site is paved, widespread subsurface contamination is not likely in the case of incidental spillage. These are also stored in a bunded storage area.

Due to the history of industrial activities and indirect shallow investigations Coffey's recommend that precautions be taken with any subsurface penetrations, in particular if any are required in the vicinity of the chemical storage bund. Soils should be handled with caution as in accordance with requirements of handling the substances that are within the chemical bund as a precaution. If any evidence of contamination is identified during construction stages (eg. soil discolouration, chemical odour, unusual odour, waste, asbestos containing material, staining etc), then work should cease and a suitably qualified environmental practitioner should be engaged to assess the potential for risk to human health or environment and provide advice on proper management. Soil assessment would also be required for any excess construction spoil generated requiring offsite disposal or reuse.

Where cut to fill balances suggest a net soil excess or if there are geotechnically unsuitable soils, Coffey's strongly recommend careful soil management during civil work so that disposal costs can be minimised. For example separation of like fill materials and segregation of fill from natural soils.

8.8 ACID SULPHATE SOILS

The Coffey's report referred to in Section 8.7 above (**Annexure 9**) also addressed the issue Acid Sulphate Soils.

A review of acid sulphate soil potential was also conducted as part of the previous investigations undertaken by Coffey's and which are discussed in Section 8.7 above.

These assessments identified the site was in an area of “low probability” of the occurrence of acid sulphate soils. Based upon previous sampling undertaken, Coffey’s concluded that acid sulphate soils could be encountered within alluvial soils underlying the fill materials at depths greater than 3 m. The assessment recommended that should the proposed development involve the excavation of soils from depths greater than 3 m at the site and/or dewatering that could result in a drop in the water table then an acid sulphate soil management plan (ASSMP) should be developed and actioned.

Previous reports undertaken by Coffey’s have also identified the potential for the presence of acid sulphate soils to be located in the vicinity of the works associated with this proposal. Acid sulphate soils could be encountered within alluvial soils underlying the fill materials. Coffey’s recommended that should the proposal involve the excavation of soils from depths greater than 3 m at the site and/or dewatering that could result in a drop in the water table then an Acid Sulphate Soil Management Plan (ASSMP) should be developed and actioned.

9.0 STATEMENT OF ADDITIONAL COMMITMENTS

Section 8.0 of the EA for the Shoalhaven Starches Expansion Project prepared by our firm 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 Shoalhaven Expansion Project 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 of the PHA prepared by Pinnacle Risk as follows: <ul style="list-style-type: none">• <i>All existing coal handling equipment for the boilers is to be functionally tested to ensure it is fit-for-purpose prior to reuse. This includes the safety instrumented controls, e.g. alarms, trips and interlocks, as well as any mechanical protective systems.</i>

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 new flour mill.

Table 21
Noise Mitigation Measures

<i>Measures and Design Considerations</i>
Shoalhaven Starches commits to implementing the recommendations of the Noise Impact Assessment prepared by Harwood Acoustics for this modification proposal as follows: Predicted noise levels in Harwood Acoustics noise assessment are based on the sound levels for fans and the baghouse pneumatic cleaning pulses as supplied by the manufacturer's and as shown below.

Table 21 (continued)

Measures and Design Considerations	
Sound Pressure Levels – Fans and Equipment	
<i>Description</i>	<i>Sound Pressure Level (dBA) when measured at 1 metre</i>
ID Fan Boilers 2 and 4 (two only)	86
ID fan Boiler 6 (one only)	78
OFA Fan (one only)	75
SA Fan (one only)	75
Baghouse Pneumatic Pulse Cleaner (per baghouse)	92
<p>In the event that fan selections change or additional plant is required to be installed, a final assessment may be required once mechanical plant selections have been finalised.</p> <p>We are confident that compliance with the project specific noise goals can be achieved for the modification without onerous mitigation measures and these may be implemented following installation if required.</p>	

9.3 VISUAL IMPACT

As outlined in Section 8.5 of this EA it is our view that the proposed works will not create a significant adverse visual impact due principally to the location of the proposed works within the vicinity of existing structures of a similar height, bulk and scale as those works which are proposed. Shoalhaven Starches however 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

Measures
<i>Shoalhaven Starches commits to where appropriate and possible, the proposed works associated with this modification 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 match existing development on the site.</i>

9.4 TRAFFIC

Shoalhaven Starches commit to the following additional measures as outlined in **Table 23** to assist in minimising traffic impacts arising from the proposed modification.

Table 23
Traffic Impacts

Measures
<p>Shoalhaven Starches commits to the following recommendations of the traffic impact assessment prepared by ARC: and which essentially mirror the Construction Traffic Management Plan (CTMP) prepared by ARC for the construction requirements of past Shoalhaven Starches projects, including most recently the Packing Plant:</p> <ul style="list-style-type: none"> • All parking for construction staff and construction trucks 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. It is proposed that all construction staff parking be provided for in the approved Temporary Car Park, which is readily accessible to the site, noting the existing pedestrian paths on both sides of Bolong Road and the pedestrian refuge crossing in Bolong Road directly adjacent to the Temporary Car Park. • 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 the Western Driveway and the Princes Highway via Bolong Road. <p>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 the DP&E and Council.</p>

9.5 SITE CONTAMINATION

Shoalhaven Starches commit to the following additional measures as outlined in **Table 24** to manage potential site contamination issues arising from the proposed modification.

Table 24
Site Contamination

Measures
<p>Shoalhaven Starches commits to the following recommendations of the site contamination assessments assessment prepared by Coffey's:</p> <ul style="list-style-type: none"> • Due to the history of industrial activities and indirect shallow investigations precautions shall be taken with any subsurface penetrations, in particular if any are required in the vicinity of the chemical storage bund. Soils should be handled with caution as in accordance with requirements of handling the substances that are within the chemical bund as a precaution. If any evidence of contamination is identified during construction stages (e.g. soil discolouration, chemical odour, unusual odour, waste, asbestos containing material, staining etc), then work should cease and a suitably qualified environmental practitioner should be engaged to assess the potential for risk to human health or environment and provide advice on proper management. Soil assessment would also be required for any excess construction spoil generated requiring offsite disposal or reuse. • Where cut to fill balances suggest a net soil excess or if there are geotechnically unsuitable soils, careful soil management during civil work so that disposal costs can be minimised. For example separation of like fill materials and segregation of fill from natural soils.

9.6 ACID SULPHATE SOILS

Shoalhaven Starches commit to the following additional measures as outlined in **Table 25** to assist in minimising traffic impacts arising from the proposed modification.

Table 25
Acid Sulphate Soils

<i>Measures</i>
<p>Shoalhaven Starches commits to the following recommendations of the acid sulphate soils assessment prepared by Coffey's:</p> <ul style="list-style-type: none"><i>Coffey's have identified the potential for the presence of acid sulphate soils to be located in the vicinity of the works associated with this proposal. Acid sulphate soils could be encountered within alluvial soils underlying the fill materials. Should the proposal involve the excavation of soils from depths greater than 3m at the site and/or dewatering that could result in a drop in the water table then an Acid Sulphate Soil Management Plan (ASSMP) should be developed and actioned.</i>

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 including Project Approval MP 07_0021 (the Flour Mill) 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 their existing Boilers that provide steam which is used for heating various aspects of their operations. Cowman Stoddart Pty Ltd has prepared this Environmental Assessment on behalf of Shoalhaven Starches Pty Ltd.

The modifications will include:

- The conversion of Boiler 2 from its current fuel source of woodchips back to coal as it was originally designed to increase steam production from this boiler.
- To convert Boiler No. 4 from gas to coal-fired. The objective of this modification application is to provide an economically sustainable fuel source for this boiler given the costs associated with using natural gas.
- To undertake modifications to Boiler No.6 including the construction of a new baghouse and associated ducting so as to increase steam production from this boiler.

The main reason for these modifications is due to increasing costs associated with natural gas compared to coal. Shoalhaven Starches anticipate that converting from natural gas to coal will result in a saving of \$ 9 million per annum in energy costs.

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 processed; 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 relevant Government agencies, including:

- The Department of Planning and Environment;
- Shoalhaven City Council;
- EPA;
- The Australian Department of Defence;

This Environmental Assessment has been prepared to address issues raised by these government agencies.

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. Furthermore noise emission during the construction phase of the development will meet noise management levels set by the EPA's relevant guidelines.
- Air Quality impacts including odours – the EA is supported by an Air Quality Impact Assessment prepared by SEMA. This assessment concludes that the emission parameters modelled and their impacts at ground level will be compliant with relevant criteria.
- Preliminary Hazard Analysis (PHA) prepared by Pinnacle Risk Pty Ltd that assesses and compares the risks associated with the proposal and finds that such risks are acceptable when compared against the Department of Planning & Environment's risk criteria.
- Traffic and Car Parking Assessment prepared by ARC Traffic and Transport that identifies that there are no access, traffic or parking impacts associated with the proposal – either during operation or construction – that would significantly impact on the efficiency and/or safety of the local traffic environment or existing on-site operations. The trip generation of the proposal during construction would be extremely minor, while once operational the proposal is not expected to generate any additional trips to the local road network.
- Flood Assessment prepared by WMAwater that demonstrates the proposal will not result in any significant increase in the 1% AEP flood level.
- A site Contamination and Acid Sulphate Soils Assessment prepared by Coffey Services. These assessments detail specific management measures to be undertaken during the construction of the works associated with this modification.

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 this modification application.

ANNEXURE 1

Requirements for EA

issued by

**Secretary of the Department of Planning and
Requirements of other Government Agencies**

ANNEXURE 2

Plan Details

Proposed Modification Works

ANNEXURE 3

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

prepared by

Cowman Stoddart Pty Ltd

ANNEXURE 4

Preliminary Hazard Analysis

prepared by

Pinnacle Risk Management

ANNEXURE 5

Environmental Noise Impact Assessment

prepared by

Harwood Acoustics Pty Ltd

ANNEXURE 6

Air Quality Impact Assessment

prepared by

Stephenson Environmental Management Australia

ANNEXURE 7

Flood Compliance Report

prepared by

WMAwater Pty Ltd

ANNEXURE 8

Traffic Impact Assessment

prepared by

ARC Traffic & Transport

ANNEXURE 9

**Phase 1 Contamination
and
Acid Sulphate Soils Assessment**

prepared by

Coffey Services Australia Pty Ltd