Modification Application – Environmental Assessment Report

Cotton Trash Solution

DA 161314 – Designated and Integrated Development

PREPARED FOR: RIVCOTT (THE APPLICANT)

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Acronyms and Abbreviations

Abbreviation	Definition
Applicant	RIVCOTT PTY LTD
CIV	Capital Investment Value
Council	Murrumbidgee Council
DA	Development Application
Department	Department of Planning and Environment (DPIE)
Development	The development as described in this EA, previous modifications and development consents and accompanying information and any amendments made.
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
FTE	full-time equivalent
Ha	hectare
LEP	Local Environmental Plan
LGA	Local Government Area
Regulation	*Environmental Planning and Assessment Regulation 2021*
TfNSW	Transport for NSW (Roads and Maritime Services)

Contents

1 Introduction

1.1 Background

RivCott is a company owned by local cotton farmers who collectively operate the cotton gin at 50 Conargo Road, Carrathool in the Murrumbidgee Local Government Area (LGA). The cotton gin operates under an existing development consent granted by Murrumbidgee Council (DA 161314) and an Environment Protection Licence (EPL) No. 20717. The development consent and the EPL permit the processing of up to 150,000 tonnes of raw cotton per year. The Cotton Gin has been in operation for 10 years.

Cotton Ginning Process

The Riverina and surrounding area including Lachlan Valley is fast becoming one of the largest cotton producing regions in the southern hemisphere. Around 82,000 hectares of cotton are planted each year in the region. To decrease the cost for farmers to transport their cotton, a number of cotton gins have been developed in the region including the RivCott gin.

Cotton ginning process commences at the farmers paddock where cotton fibre is harvested using purpose-built cotton harvesters which separate the fibre from the remainder of the cotton plant to create bales. Within the bales are cotton lint, seeds as well as sticks, stems, burrs and other foreign matter.

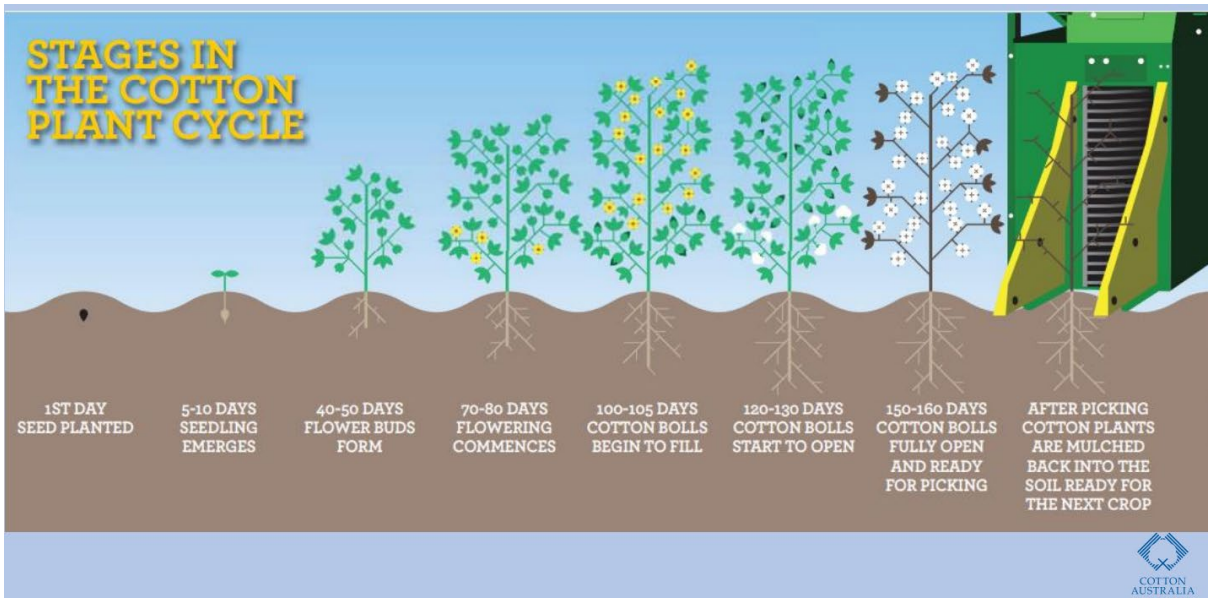

Figure 1: Cotton Growing Stages (source: Cotton Australia).

The bales are stored in the paddock covered in plastic until the farmer schedules transportation and ginning with the cotton gin.

The main goal of ginning is to separate the seed and lint from the cotton fibre. The first stage of the ginning process involves the measuring of the moisture content of the cotton which will determine the amount of heat that will be applied to the fibre. Cotton is capable of absorbing

over 25 times its weight in water. The drying process is integral to producing useable lint for the manufacture of clothes and other products. Presently, RivCott utilises propane as a heat source to dry the cotton. Around 12 litres of propane is required to dry each bale converted to 83 kWh. Cotton must be ginned with a moisture level of 5%.

The cotton fibre then makes its way through conditioners to remove cotton trash and foreign material before being sent to the gin stand where the seeds are removed. The cotton seed is sent to oil processing facilities to create cotton seed oil. The cotton lint is then sent to the bale press to create bales under high pressure for transportation to third party manufacturers which carry out the processes of carding, combing, spinning, dying and weaving to make clothes or other products.

At the end of the ginning process, 42% of each bale consists of lint, 49% is cotton seed and 9% is cotton trash which is mainly composed of cotton burrs (also known as cotton carpels or hulls), motes (cotton fibres attached with immature or broken seeds), sticks, leaf parts, and fine woody particles.

RivCott previously had an ongoing arrangement with Wormtech, a composing facility to the south of the site at 50 Conargo Road, Carrathool legally described as Lot 3 DP1265397. The facility has recently commenced composting of food organics and garden organics waste (FOGO) collected from LGA's in the region and therefore cannot accept the cotton trash without exceeding their yearly processing limits. Wormtech ceased accepting the cotton trash in 2020 and since then RivCott has either stockpiled the cotton trash onsite, used it as a soil amendment on their land holdings under the EPA Gin Trash Exemption 2016 or provided it to farmers to utilise under this exemption. None of these practices represent a sustainable solution for the waste stream and therefore RivCott has sought more long-term solutions. The constant transportation of propane to the site is also not sustainable and its replacement with gin trash would decease the greenhouse gases (GHG) emissions associated with the facility. The proposal would also decrease the GHG emissions from the cotton ginning process as the storage and breakdown of the cotton gin trash in an outdoor paddock creates a substantial amount of methane which would not occur.

1.2 Site Description

The subject site comprises around 104.51 (ha) of RU1 – Primary Production zoned land located at 50 Conargo Road in the Griffith LGA (see **Figure 1**) and is legally described as Lot 2 DP1265397

The subject site is bound by Conargo Road to the east and Sturt Highway to the north. The subject site presently contains the RivCott Cotton Gin which operates under DA 161314 and an Environment Protection Licence (EPL) No. 20717.

The site has a single formalised driveway from Canargo Road which connects to the Sturt Highway to the north via a channelised intersection designed for road trains.

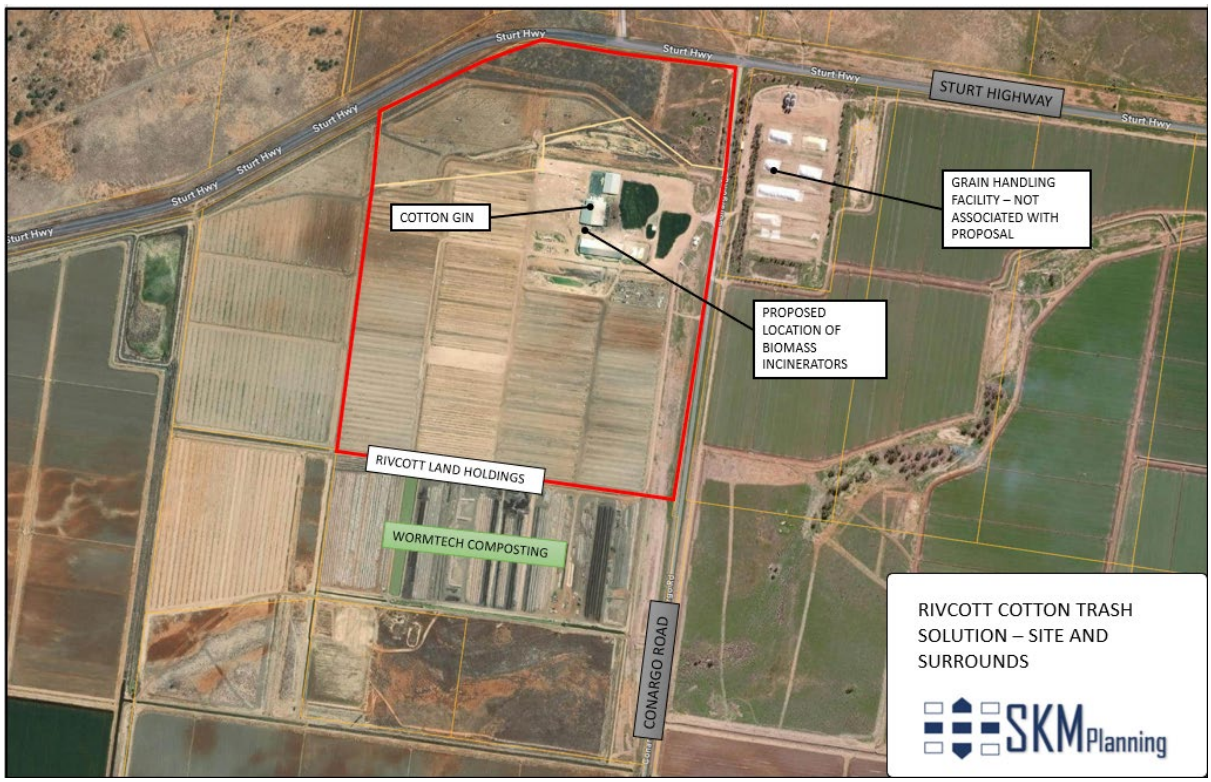

Figure 2: Location of the Site

The site contains the following improvements:

- Main cotton gin building
- Bail shed
- Cotton seed shed
- Workshop
- LPG gas tanks
- Weighbridge and office
- Car park
- Fire tanks, booster and pumps
- Landscaping areas
- Cotton bale storage areas
- Cotton trash storage areas
- Stormwater detention and conveyance system (the site operates as a closed system for water and is totally bunded.
- Nosie barrier to the south and north of the cotton gin

- Truck parking and waiting areas
- Bulk diesel tank

1.3 Surrounding Land Uses

The site is located in a remote location in the Murrumbidgee Local Government Area on Conargo Road which connects to the Sturt Highway at an existing channelised intersection around 450 m from the site. Conargo Road is a bitumen sealed two lane road. The nearest residential receiver is located 1.8 km to the north-west of the site. The predominant land use in the locality is broadacre and irrigated crop agriculture. Wormtech has a composting operation also on Conargo Road to the south of the site. The facility also operates under a Council development consent and an EPL and is permitted to receive around 90,000 tonnes per year of waste.

1.4 DA 1611314 – Summary and Background

DA 161314 was approved by the Western Joint Regional Planning Panel on 12 August 2014. The approval permitted 150,000 tonnes of lint cotton to be processed at the site per year. The development consent required the mitigation measures listed in the Noise Assessment prepared by Reverb Consultants which included the installation of an acoustic mound 2500 mm above ground level to the north of the cotton gin. The mound was installed prior to the use of the cotton gin.

1.5 DA 1611314 MOD 1

MOD 1 was approved on 18 February 2015 and included consolidation of sheds, relocation of fire water supply tanks, new roadways around the gin, relocation of oil shed and bulk diesel tanks and alteration of the internal layout of the gin building.

1.6 DA 1611314 MOD 2

MOD 2 was approved on 18 March 2015 and largely dealt with correcting errors which were found in the development consent.

1.7 Environmental Protection Licence

EPL 20717 was issued by the EPA on 15 December 2015 and has been varied on two occasions. The EPL contains a processing limit of 150,000 tonnes of raw cotton per year. The EPL contains limits for discharge to air for Total Suspended Particles (TSP). A total of 37 monitoring locations are listed in the EPL.

The EPL also contains noise limits requiring the operations of the premises to not exceed an Leq (15 minute) noise emission criterion of 35dB(A).

The EPL also states under O4.1 that “there must be no incineration or burning of any waste at the premises.

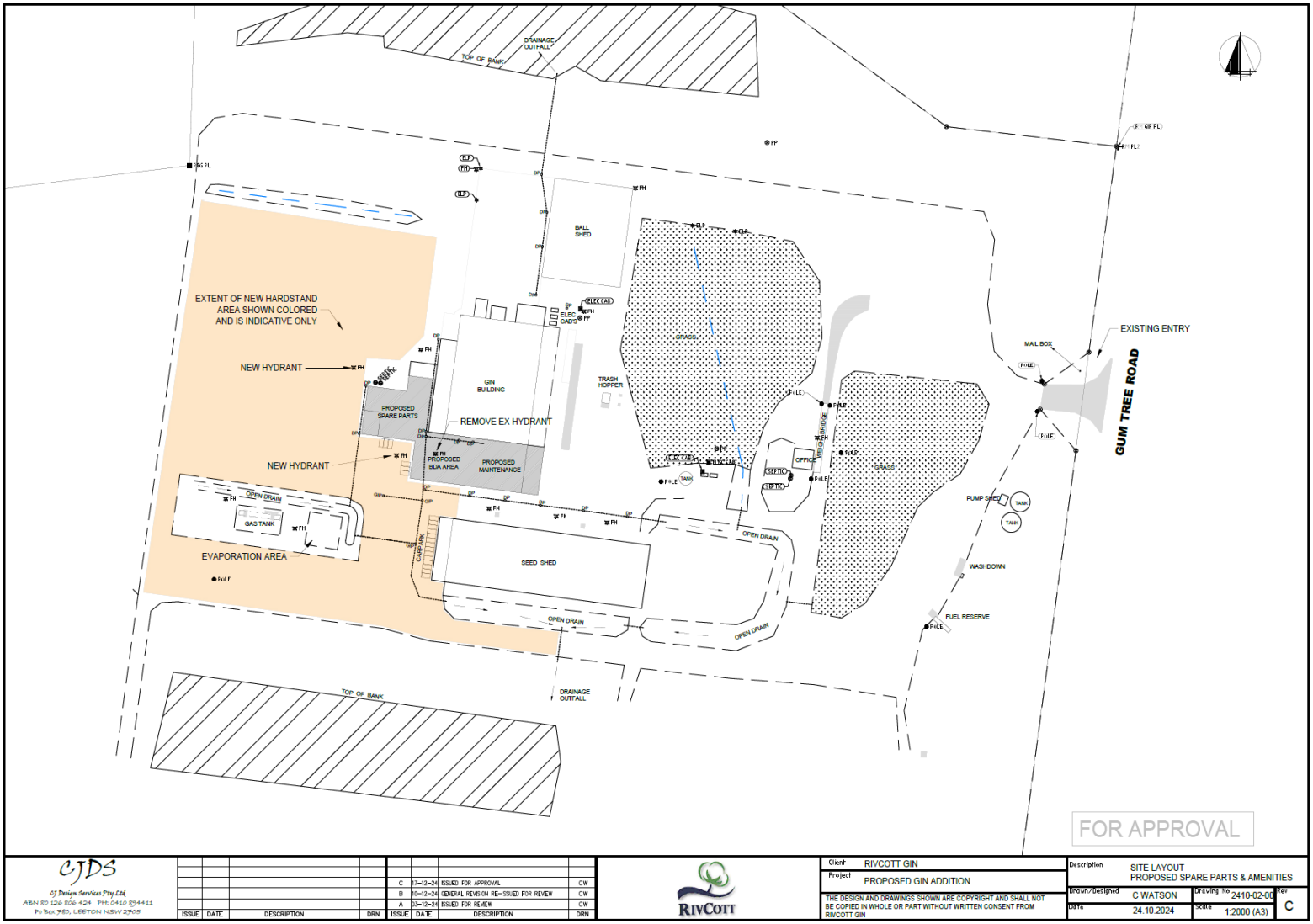

Figure 3: Site Layout

2 Overview of Biomass Incineration

2.1 Gin Trash Problem

As discussed above, gin trash represents 9% of every cotton bale processed through the site. The RivCott EPL permits the processing of 150,000 tpy of cotton which equates to 13,500 tpy of cotton trash or around 4.5 tonnes per hour.

Figure 4: Cotton Trash Example

RivCott previously sent their cotton trash to the Wormtech composting facility. However, the facility began taking in food organic and garden organic (FOGO) waste and deceased poultry birds which does not leave any capacity to accept the cotton trash. Based on the existing approval being 150,000 tonnes of incoming cotton fibre, the gin produces 13,500 tonnes of cotton trash. The cotton trash is presently stored on site and used as a soil amendment. Storing the cotton trash in the paddocks. This is not considered to be a sustainable practice at the RivCott landholding for a number of reasons, including:

- The storing and decomposition of the cotton trash in paddocks creates greenhouse gas emissions.
- The cotton trash is considered a fuel load which could ignite in the paddock while being stored.

The cotton trash uses up space which could be used for the storage of cotton bales. The EPA have issued an Order and Exemption for cotton gin trash which permits the land application of cotton gin trash within the confines of the controls in the Order. The use of the Order and Exemption to remove the cotton trash from the site is not feasible as farmers in the area have required the use of it as a soil amendment and do not wish to pay the transportation costs to haul it to their paddocks.

RivCott has been searching for an alternative and sustainable method for the reuse of the cotton trash which could alleviate the above noted issues. The solution presented itself to RivCott through research and international best practices.

2.2 Composition of Cotton Gin Trash

Huang et al. (2015)[i] studied the physicochemical properties of cotton ginning waste that collected from four different ginning industries in USA. According to this study cotton ginning waste contains small leaf fraction, clean lint, hulls, stick/stems, grass, seed, motes, small leaf, pin trash and other (0.5%–5.3%). The studied showed that the fractional composition of cotton ginning waste varied amongst gins as well as the ginning seasons. However, this study was completed on dryland farms which have less consistent trash make up. Riverian cotton growing conditions are uniform. All farms are irrigated (no dryland), planted and harvested under the same environmental impacts (sun, rain, temperature, time of planning and harvesting) and all growers follow the same practises (herbicide and pesticide) and use the same few Australian varieties, so the consistency is very, very similar between growers

Chemical composition of this cotton ginning waste consists of ash (10%–22%), ethanol extractives (7.5%–11.5%), acid-insoluble material (19.2%–25%), arabinose (1.1%–3.9%), xylose (3.4%–10.5%), mannose (0.6%–2.0%), galactose (1.2%–2.9%) and glucose (25%–33%). The total fraction of carbohydrate ranges 32%–44% of dry mass of cotton ginning wastes. Out of this glucan and xylan constituted 80%–90% of the total carbohydrates.

2.3 Cotton Gin Solution

The Rivcott Gin presently utilises LPG to dry the cotton prior to ginning. Around 12 litres of LPG is required per bale which equates to 300 MJ of heat. The gin presently processes around 300,000 bales of cotton each year which requires 3.6 million litres of LPG. Each LPG tanker has a capacity of 40,000 litres and therefore around 90 truck movements are required each year to bring in LPG. The cost of LPG per litre in Australia as of 2 December 2024 was 1.17 AUD/L. Based on this cost ratio, RivCott must spend over $4 million per year to dry the cotton.

Cotton trash has substantial heat value equating to 16.6 MJ/kg. 46 kg of gin trash is produced per bale of cotton which equates to 764 MJ/bale of heat value which surpasses the heat requirement to dry the lint produced from each bale. Evidence of the power output of the cotton gin trash is provided in the report prepared by Bluefield Renewable Energy Pty Ltd which tested the cotton gin trash in Singapore using pyrolysis (see **Appendix 6**).

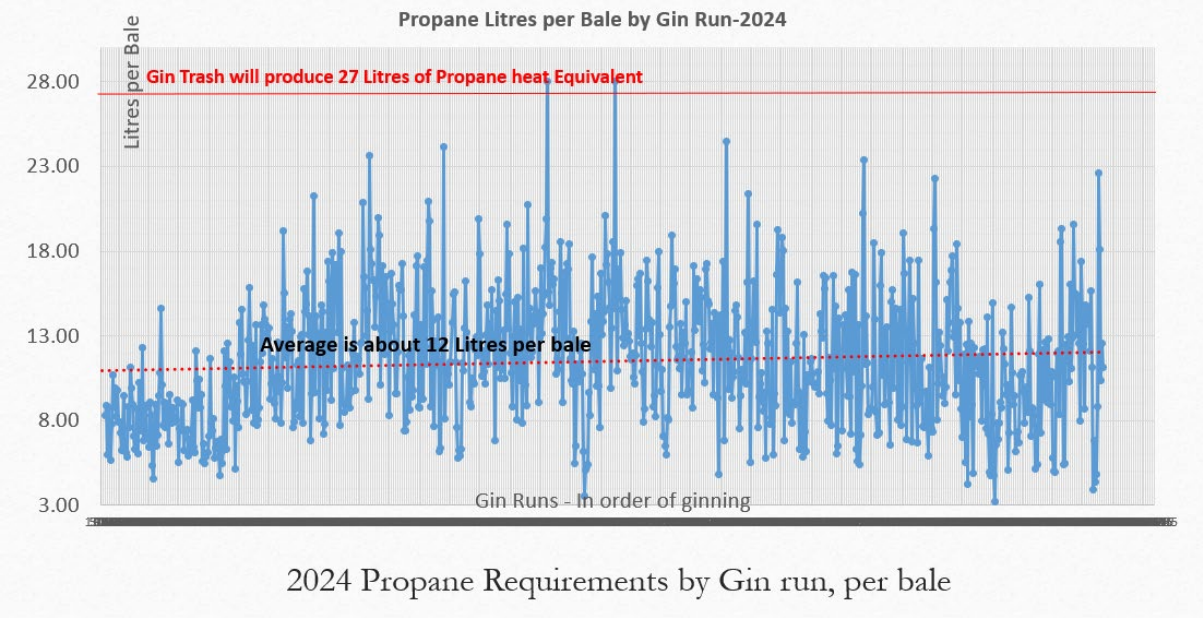

Figure 5: Propane vs Gin Trash Use.

Cotton gin trash therefore offers an optimal heat source to be used in the ginning process to eliminate the need to use LPG. Internationally, cotton gins in Greece incinerate gin trash to preplace propane in the drying process. The incinerators used in Greece have only one chamber and are able to comply with EU EPA Standards.

RivCott is proposing to utilise three incinerators sourced from Canada referred to as Triple Green Biomass Incinerators (TGBI) which are used for drying agricultural products and as a heat source of communities. The manufacturers have provided a study prepared by Dillon Consulting which provides an emissions testing report for the incinerators burning wood waste – See **Appendix 8**.

The TGBI's have been sized to cater for the

2.4 Consultation

During the preparation of the modification application, the Applicant carried out consultation with the EPA, NSW Department of Planning and Environment and Council through meetings and correspondence. The following is a summary of the results of the consultation:

- The modification application must provide sufficient background, information and legislative analysis regarding the proposed planning pathway and ensuring the proposal is substantially the same as the development approved (Council).
- An Air Quality Impact Assessment must be provided (EPA).
- A variation to the EPL would be required (EPA).
- The required Resource Recovery Exemption to use cotton trash in an energy from waste incinerator would be facilitated through the varied EPL (EPA).

- Full Details of the existing process carried out must be provided (EPA).
- Traffic report not required as there would be no increase in traffic to the site (Council).
    - The incinerators would be located in an enclosed building under negative pressure and would not noticeably increase noise outputs from the site.

RivCott has also discussed the proposal with neighbouring operations and no concerns were raised.

A review of Council's Development Control Plan was also carried out to determine the expected notification and consultation requirements for the proposed modification. It appears that Council would notify and advertise the modification application in the same manner as the original DA.

Figure 6: Triple Green Biomass Incinerator

3 Proposed Building Extensions

3.1 Incinerators and Enclosure

The proposed modification includes the installation of three Triple Green Biomass Incinerators (TGBI) which have been purchased from Canada. The incinerators would be installed in a new purpose-built extension attached to the southern wall of the existing gin building. The incinerators will require two new rooms:

- The incinerator room which will house the three TGBI's – referred to as 'BDA area' on the plans. The BDA area would contain a sliding door and PA door on the southern elevation. The BDA area would be connected to the gin building area by a PA door on the existing southern elevation of the building. The three incinerators would connect the cotton trash room (walking floor area) via enclosed conveyors which feed the incinerators to ensure a consistent and optimal fire.
- The walking floor area would contain the cotton trash which is directed from the gin via a pipe / blower and spreader auger system which places the trash on the walking track (see **Figure 7**). The walking floor area would have an open side on the southern elevations but contain a bund wall to ensure the trash stays within the area. The walking floor area would be connected to the existing gin building via a 5m x 5m skidding door.

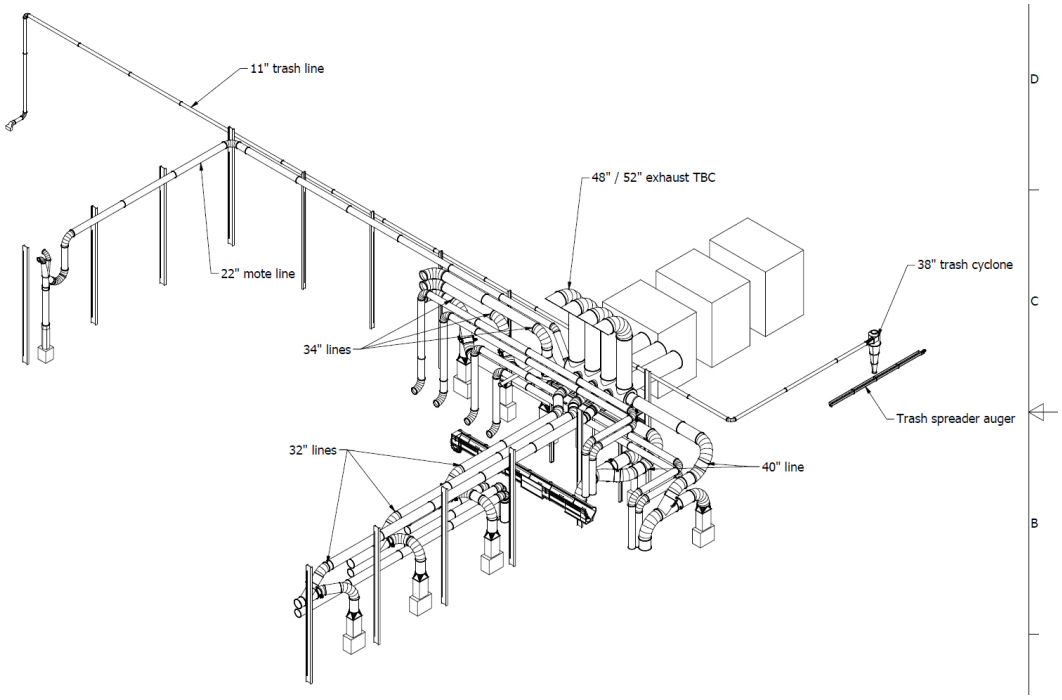

Figure 7: Proposed Cotton Trash Pipes and Exhausts

When the incinerators are in use all doors would remain closed. The exhausts of the incinerators discharge to the cotton ginning building to dry the cotton. The incinerator room and walking floor area would have a height of 10.7 m and a floor area of around 748 m^2.

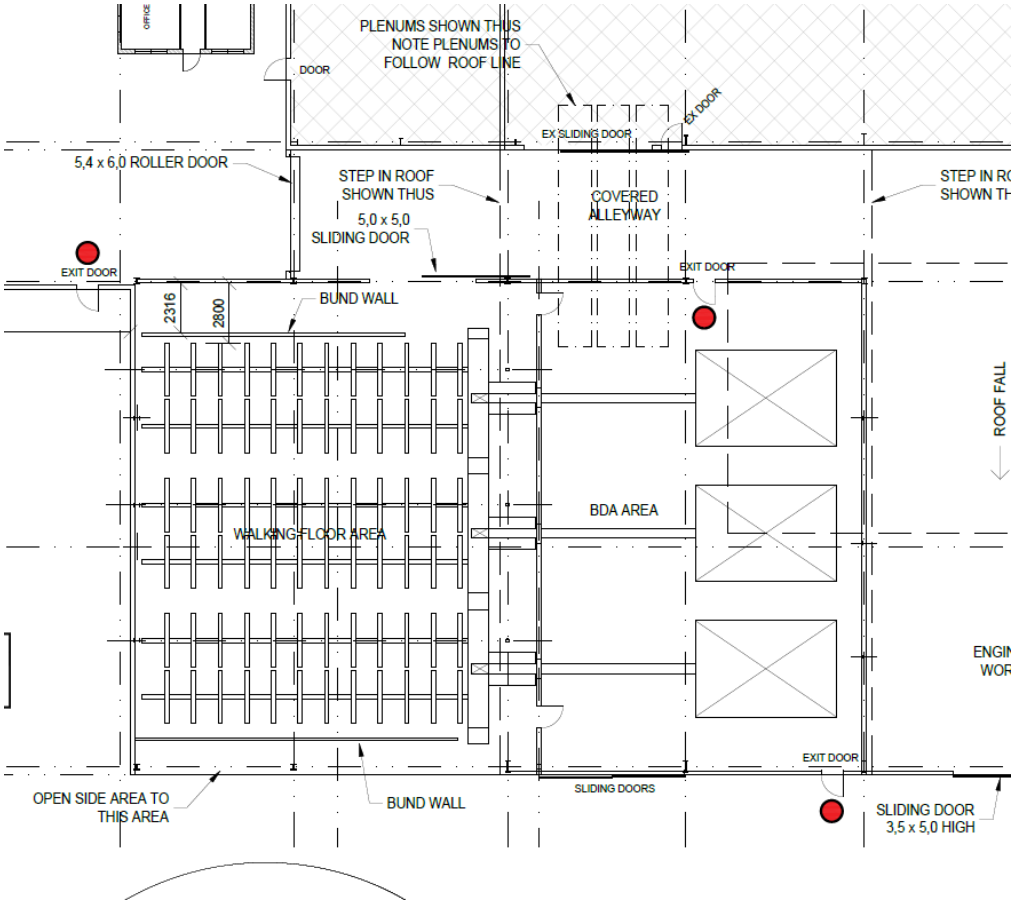

Figure 8: Walking Floor Area and Incinerator Room

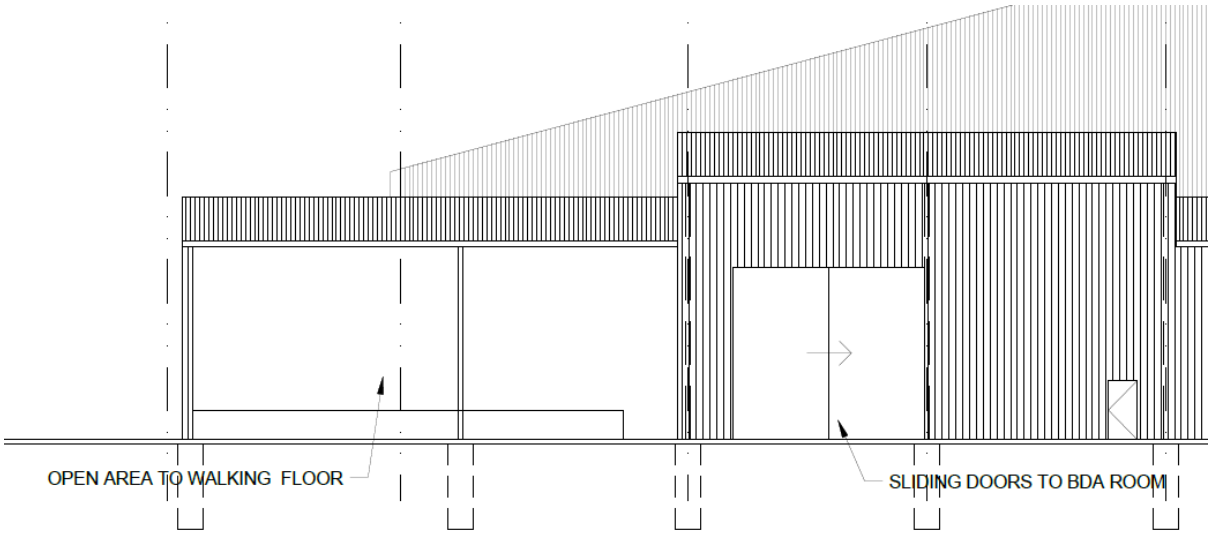

Figure 9: Incinerator Room and Walking Floor Area Elevation

3.2 Spare Parts and New Staff Amenities

The proposed modification includes the extension of the existing gin building to the west to include a new spare parts warehouse area and a new sliding door on the western elevation

to an awning (140m^2) which would be used as a delivery area. The spare parts area would have a height of 8.435 m and an area of around 1156m^2.

Within the spare parts enclosure, a new staff amenities building is proposed which would contain:

- Two offices
- A PPE room
- An open dining area with four tables, refrigerators and benches.
- A male amenities room including three ambulant toilets, a urinal, a shower and two hand basin.
- A female amenities room including three ambulant toilets, a shower and three hand basin.
    - An accessible toilet has not been provided and we would be seeking an exemption from the certifier due to the nature of the work in the cotton gin precluded individuals with disabilities from working within the gin.

The amenities structure would be built as a stand alone structure with an area of 178 m^2 with a height of 3m totally within the spare parts warehouse area.

3.3 Maintenance Extension

The proposed modification includes an extension to the east of the proposed incinerator room which will house a mechanic workshop, engineering workshop, bale bag storage room and an awning extension attached to the existing gin blower awning. The awning would have an area of 292m^2. The maintenance extension would have an area of around 560m^2 with a height of 8m.

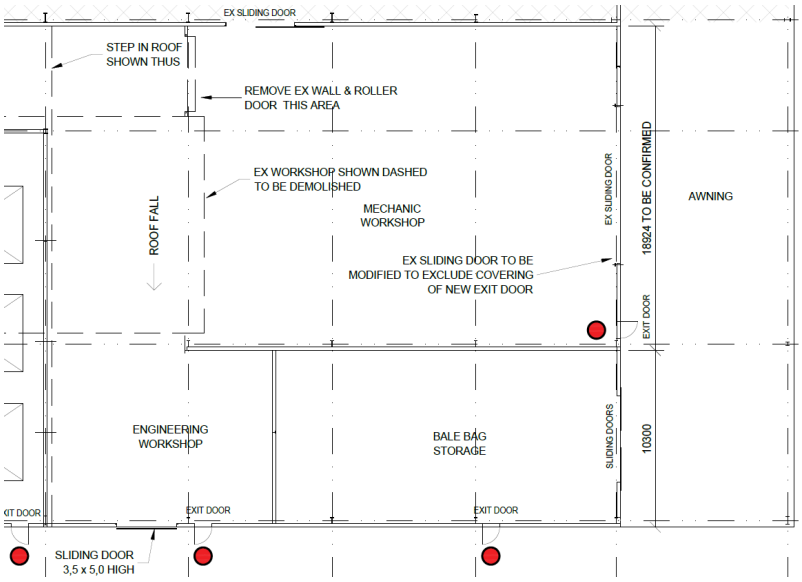

Figure 10: Maintenance Extension Area

3.4 Other Infrastructure

The proposal includes the following additional infrastructure or works:

- Extension to all weather hardstand area to the west of the existing gin building.
- Removal of an existing hydrant and replacement with two hydrants within the existing ring main to provide coverage for the new extensions.
- New carpark area with an additional 20 parking spaces located in three areas.
- Connection of the new roof area to downpipes discharging to existing
- Installation of a new septic system

4 Legislative context

4.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

Section 4.55

Development consents can be modified under section 4.55(2) of the EP&A Act as long as the development as modified would remain 'substantially the same' as originally approved:

(1A) Modifications involving minimal environmental impact A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if—

(a) it is satisfied that the proposed modification is of minimal environmental impact, and

(b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and

(c) it has notified the application in accordance with—

(i) the regulations, if the regulations so require, or

(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and

(d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.

Subsections (1), (2) and (5) do not apply to such a modification.

Commentary:

Substantially the Same

The NSW Land and Environment Court (LEC), in various decisions has established a framework for determining whether a proposal is considered 'substantially the same' as the original development, including the following, with commentary:

- *"substantially" means "essentially or materially" of "having the same essence". Moto Projects (No 2) Pty Ltd v North Sydney C [1999] NSWLEC.*

The proposed modification relates to the RivCott site, which has a designated development approval for the processing of cotton. The proposal relates to the by-product of the cotton gin process. Previously, RivCott sent the trash to a composting facility to the south of the site. The Wormtech composting facility will not accept the cotton trash as it is not financially viable for

them to do so without charging Rivcott a substantial tipping fee. The use of the by-product on site to create the heat required for the ginning processing is considered materially the same as the proposal as originally approved at a time when RivCott did not have a sustainable solution for the trash.

- *If the development as modified, involves an "additional and distinct land use", it is not substantially the same development. Vacik Pty Ltd v Penrith City Council [1992] NSWLEC 8*

The proposed modification would not alter the existing dominant land use of the site being a rural industry. The incinerators would be wholly ancillary to the Gin and would not produce energy for any other sites or processes and would not feed back electricity into the grid. Although an energy from waste incinerator could operate on its own elsewhere, this is not the case for the development.

- *A development as modified would not necessarily be substantially the same development solely because it was for precisely the same use as that for which consent was originally granted.*

The modification is considered to retain the dominant land use associated with site and the original DA being rural industry, however, this is not the only reason the proposal is considered substantially the same development. Modifications of existing rural industrial operations are necessary to maintain contemporary plant and react to changing demands in products, technological innovations, the needs of the industry and in reaction to increased electricity and gas costs. As NSW moves to reduce waste disposal and increase resource recovery, existing rural industries must evolve to decrease waste creation and offsite disposal and reuse.

In this instance, the proposed modification would not materially alter the existing site, increase processing capacity or change the use as perceived by the general public. The site would continue to operate as a cotton gin and the proposed modification would merely allow the dominant use of the site to operate more efficiently and sustainably.

- *To determine whether something is "substantially the same" requires a comparative task between the whole development as originally approved and the development proposed to be modified. In order for the proposal to be "substantially the same", the comparative task must:*
    - *result in a finding that the modified development is "essentially of materially" the same.*
    - *appreciated the qualitative and quantitative differences in their proper context. Moto Projects (No 2) Pty Ltd v North Sydney C [1999] NSWLEC.*
    - *in addition to the physical difference, consider the environmental impacts of proposed modification application to approved developments. Tipalea Watson Pty Ltd v Ku-Ring-Gai Council [2003] NSWLEC.*

As per the commentary above, the modification application is considered to be essentially or materially the same as the originally approved development. The proposed modification would not increase the capacity of the facility or alter the approved processes on the site.

In conclusion, the Applicant considers the proposal to be substantially the same development as originally approved and Council should have confidence that Section 4.55 (1A) is the most appropriate planning pathway to determine the proposal.

4.2 Environmental Planning and Assessment Regulation 2000 (the Regulations)

Schedule 3 of the Regulations details the types of development which are considered designated development. The dominant purpose of the site being the ginning of cotton is considered a form of 'Agricultural produce processing facility':

Agricultural produce processing facilities

(1) Development for the purposes of an agricultural processing facility is designated development if the facility—

> *(a) involves crushing, juicing, grinding, **ginning**, milling, separating, washing, sorting, coating, rolling, pressing, steaming, flaking, combing, homogenising and pasteurising more than 30,000 tonnes of agricultural produce per year, or*
>
> *(b) releases effluent, sludge or other waste—*
>
> > *(i) in or within 100 metres of a natural waterbody or wetland, or*
> >
> > *(ii) in an area of high watertable, highly permeable soils or acid sulfate, sodic or saline soils.*

(2) In this section—

agricultural processing facility means a building or place at which agricultural produce is processed.

agricultural produce includes dairy products, seeds, fruit, vegetables or other plant material.

The site processes 150,000 tonnes per year of cotton and the original application was submitted and approved as a designated development application which included the preparation of an Environmental Impact Statement.

The proposed modification application includes the installation of an 'Energy recovery

Energy recovery facilities

(1) Development for the purposes of an energy recovery facility is designated development if the facility—

> *(a) processes more than 200 tonnes per year of waste, other than hazardous waste, liquid waste, restricted solid waste or special waste, or*

(b) has on site at any time more than 200 kilograms of hazardous waste, liquid waste, restricted solid waste or special waste.

(2) Subsection (1) does not apply to—

(a) the processing of contaminated soil, or

(b) container reconditioning, or

(c) the recovery of gases classified in Class 2 under the ADG Code.

(3) For the purposes of this section, 1 litre of waste is taken to weigh 1 kilogram.

(4) In this section—

energy recovery facility means a building or place that—

(a) receives waste from on site or off site, and

(b) recovers energy from waste.

hazardous waste, liquid waste, restricted solid waste and special waste have the same meaning as in the Protection of the Environment Operations Act 1997, Schedule 1.

However, the proposed incinerators would create heat to be used in the ginning process and as discussed above, the modification proposal and the energy recovery facility would e wholly ancillary and subservient to the main use of the site being for the ginning of cotton. To this end, it is our interpretation that section 48 of Schedule 3 would apply to the modification:

48 Alterations or additions to existing or approved development

(1) Development involving alterations or additions to development, whether existing or approved, is not designated development if, in the consent authority's opinion, the alterations or additions do not significantly increase the environmental impacts of the existing or approved development.

(2) In forming its opinion, a consent authority must consider the following—

(a) the impact of the existing development, including the following—

(i) previous environmental management performance, including compliance with the conditions of any consents, licences, leases or authorisations by a public authority and compliance with any relevant codes of practice,

(ii) rehabilitation or restoration of any disturbed land,

(iii) the number and nature of all past changes and their cumulative effects,

(b) the likely impact of the proposed alterations or additions, including the following—

(i) the scale, character or nature of the proposal in relation to the development,

(ii) the existing vegetation, air, noise and water quality, scenic character and special features of the land on which the development is, or will be, carried out and the surrounding locality,

(iii) the degree to which the potential environmental impacts can be predicted with adequate certainty,

(iv) the capacity of the receiving environment to accommodate changes in environmental impacts,

(c) proposals to mitigate the environmental impacts and manage residual risk,

(d) proposals to facilitate compliance with relevant standards, codes of practice or guidelines published by the Department or other public authorities.

Commentary:

Murrumbidgee Council as the consent authority can be satisfied that the proposed alterations or additions would not significantly increase the environmental impacts of the development for the following reasons:

- An Air Quality Impact Assessment has been prepared by Soundin Consulting which found that the cumulative impacts of the site operating at full capacity including the use of three incinerators under worst case scenario meteorological conditions would not result in exceedances of any of the air quality criteria in the EPA's Approved Methods for the Modelling and Assessment of Air Pollutants (Approved Methods) (see **Appendix 3**).
- Previous air emissions testing for the site operating at full capacity during ginning season showed that the predictions in the original Air Quality Impact Assessment for the site prepared by Pacific Environment Limited (see **Appendix 9**).
- Noise associated with the use of the incinerators would be mitigated by the proposed incinerator room which would insulate the noise created by the incineration process.
- There are very few sensitive receives in the locality who could be impacted by the potential cumulative impacts of the cotton gin including the use of the incinerators.

It is requested that Council accept the modification application in consideration of the above noted section of the Regulations and the findings of this report.

Requirements to Modify a Development Consent.

Clause 115 of Regulations requires an application to modify a development consent under clause 4.55 of the EP&A Act to contain the requirements as stipulated in **Table 7**.

Table 1: Relevant clauses of the Regulations and section of the EA where addressed

Relevant clause	Requirement	Section addressed
1(a)	the name and address of the applicant;	Section 1.1
(b)	a description of the development to be carried out under the consent (as previously modified);	Section 2.1
(c)	the address, and formal particulars of title, of the land on which the development is to be carried out;	Section 1.2
(d)	a description of the proposed modification to the development consent;	Section 2.1
(e)	a statement that indicates that the modification is intended to have some effect, as specified in the statement;	Section 3.1
(f)	a description of the expected impacts of the modification;	Section 4
(g)	an undertaking to the effect that the development (as to be modified) will remain substantially the same as the development that was originally approved;	Section 3.1
(h)	if the applicant is not the owner of the land, a statement signed by the owner of the land to the effect that the owner consents to making of the application (except where the application for the consent the subject of the modification was made, or could have been made, without the consent of the owner);	Application Form
(i)	a statement as to whether the application is being made to the Court (under Section 4.55) or to the consent authority under section 4.56), and, if the consent authority so requires, must be in the form approved by that authority.	N/A

4.3 Protection of the Environment Operations (Clean Air) Regulation 2022 (Clean Air Regs)

The Clean Air Regs contains provisions to regulate emissions form wood heaters, fires, motor vehicles, industry and petrol and other liquid fuel. Section 17 deals with the use of incinerators as proposed:

17 Authorised burning—incinerators and flares

(1) Burning matter is authorised for the purposes of this Division if the burning is carried out —

(a) in an incinerator subject to an environment protection licence and the burning is authorised by the licence, or

(b) in an incinerator—

(i) equipped with a **primary and secondary furnace**, and

(ii) designed, maintained and operated in a way that ensures the maintenance of appropriate temperatures for the complete combustion of anything that the incinerator is designed to burn and prevents the escape of sparks or other burning material, and

(iii) equipped with suitable equipment that is designed, maintained and operated for the purposes of controlling air impurities in the exhaust gas once the incineration process has been completed, and

(iv) not installed in a residential building comprising home units, flats or apartments.

The proposed incinerator which has been constructed and shipped to Australia by Triple Green Products in Manitoba, Canada has a primary and secondary chamber in the single furnace:

- The first air injection coming up through the chain bed has controllable dampers to adjust it to just the right amount of air to stimulate the incineration but NOT blow the ash up into the exhaust.
- The second air injection is introduced in the top of the chamber and promoted the incineration of ALL combustible gasses plus vaporizes any ash in the 1,100 C exhaust.

RivCott sent cotton gin trash from the 2023 season to Bluefield Renewable Energy (BRE) Pty Ltd in Singapore to carry out trials and analysis with the original aim to use the cotton trash waste using pyrolysis to convert it to energy and biochar. Part of this analysis included the

measurement of flue gas from the burning of gin trash gases. The results of the flue gas emitting from BRE's system during cotton trash burning are provided in **Table 2**.

Table 2: Summary of Test Results carried out on 04/06/2024

Test Parameters	NEPM Allowable Emissions Limits (mg/Nm^3)	Cotton Emission Results (mg/Nm^3)
Particulates	50	23.1
Carbon monoxide	250	21
Oxides of Nitrogen	500	289
Sulphur Dioxide	1700	296
Hydrogen Chloride	10	<0.2

As shown in the above table and in the BRE report at **Appendix 6** the findings indicate that the levels of pollutants released into the atmosphere from BRE's system are within the acceptable limits specified by the EPA.

5 Impact Assessment

5.1 Overview

This section provides an assessment of the potential impact arising from the proposed modification.

Consideration of the following potential impacts is provided in this section:

- Air Quality
- Compliance with EPA's Eligible Waste Fuels Guidelines

5.2 Air Quality

This EA includes a comprehensive assessment of the potential air quality impacts of the development. An AQIA has been prepared by SoundIn Consultants. This Assessment is attached at **Appendix 3**.

Existing Environment

Several isolated rural dwellings comprise the nearest and most potentially affected sensitive receptors near the Site, which have been identified for assessment purposes. These receptors are identified in **Table 3** and shown in **Figure 11**. Several dwellings in the area are associated with RivCott (see **Figure 11**) and are not considered sensitive receptors for this assessment.

Table 3: Sensitive Receptors

Receptor ID	MGA55 Coordinates		Distance to site boundary (km)
	Easting (m)	Northing (m)	
R1	351,008	6,186,437	3.3
R2	352,799	6,185,618	1.3
R3	358,100	6,185,980	3.4
R4	357,299	6,184,758	2.4
R5	352,544	6,180,275	2.8

Long term meteorological data for the area surrounding the site is available from the Bureau of Meteorology (BoM) Automatic Weather Station (AWS) at Griffith Airport. The Griffith Airport AWS is located approximately 65 kilometres north-east of the Site and records observations of several meteorological parameters including temperature, humidity, and rainfall.

Long-term climate statistics are presented in Table 4-2. Temperature data recorded at the Griffith Airport AWS indicates that January is the hottest month of the year, with a mean daily maximum temperature of 33.3°C. July is the coolest month with a mean daily minimum temperature of 3.4°C. October is the wettest month with an average rainfall of 40 mm falling over 5 days. There are, on average, 49 rain days per year, delivering 411 mm of rain.

Table 4: Climate Data – Griffith Airport.

Obs.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
9am mean temperature and humidity													
Temp(°C)	23.0	21.7	18.5	15.3	10.6	7.9	6.9	9.0	12.3	16.8	18.8	21.3	15.2
Hum(%)	49	58	60	66	78	87	88	79	70	56	56	49	66
3pm mean temperature and humidity													
Temp(°C)	30.6	30.2	27.0	22.8	18.2	14.3	13.3	15.5	18.9	22.8	26.0	28.6	22.4
Hum(%)	28	34	37	41	53	63	62	54	47	37	35	31	43
Daily minimum and maximum temperatures													
Min(°C)	17.4	17.5	14.4	10.3	6.7	4.3	3.4	3.8	5.8	9.2	12.8	15.3	10.1
Max(°C)	33.3	32.4	29.0	24.1	19.2	15.5	14.8	16.7	20.3	24.3	28.2	31.1	24.1
Rainfall													
Rain(mm)	36.8	28.0	35.4	29.6	36.1	35.1	32.4	34.9	32.7	39.9	36.6	32.9	410.6
Rain Days	3.3	2.6	2.9	3.3	4.2	4.9	5.5	5.5	4.6	4.6	3.7	3.5	48.6

The AQIA in **Appendix 3** provides the windrows for the Hay Airport meteorological stations which clearly indicates that on an annual basis, northerly and south westerly winds appear dominant. The south westerly winds are a feature of summer, spring and autumn. It is noted that south easterly winds rarely feature in any season. Wind speed and wind direction during 2021 are considered representative of the five-year period and were therefore adopted for assessment purposes.

Air Quality Criteria

The NSW EPA's Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (Approved Methods) (NSW EPA, 2022) sets out applicable impact assessment criteria for a number of air pollutants.

Air quality criteria are benchmarks set to protect the general health and amenity of the community in relation to air quality. The AQIA uses the Approved Methods and best practices to identify pollutants of interest concluding that particulate matter is the primary air pollutant associated with the Proposal and is the focus of this assessment.

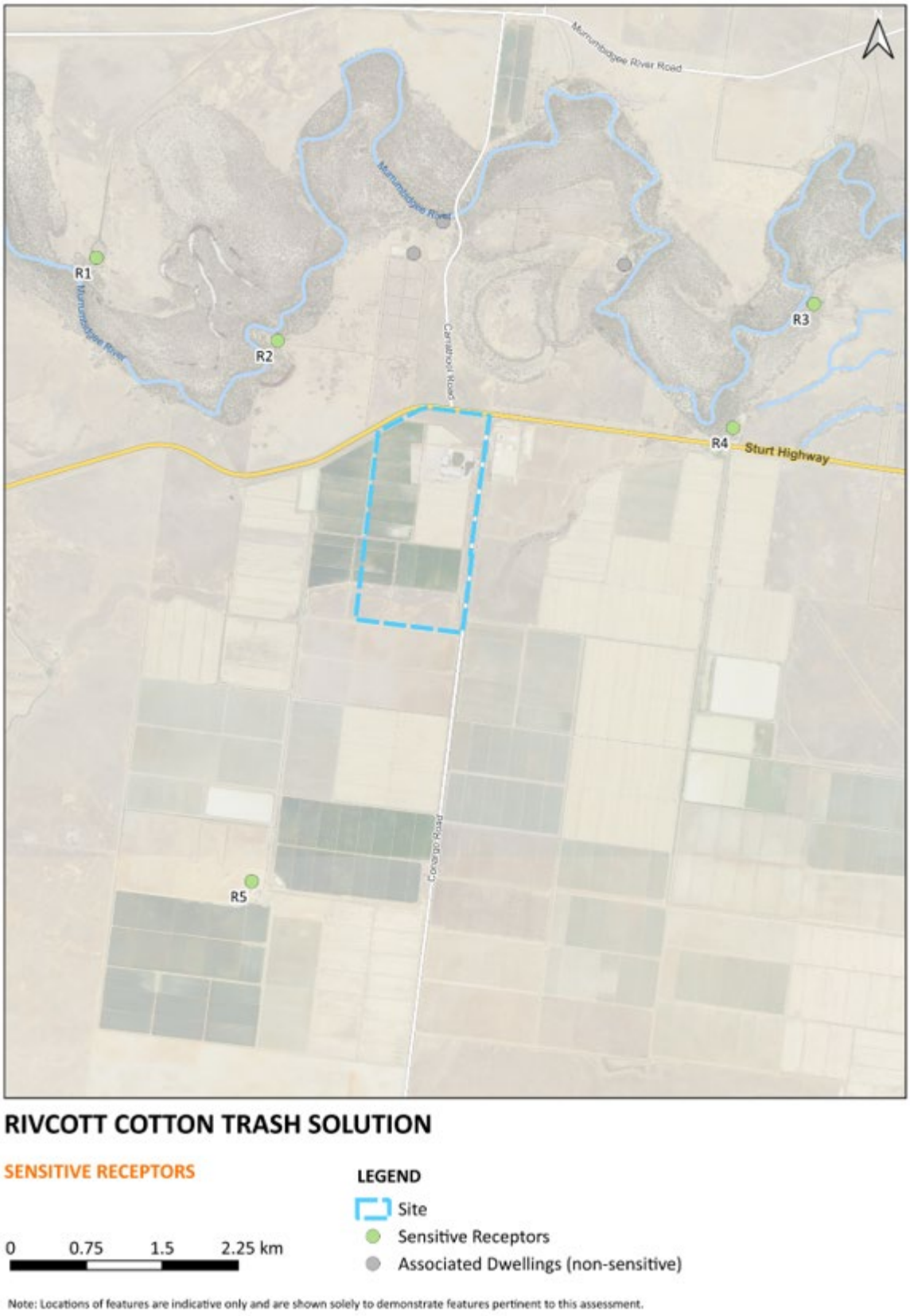

Figure 11: Receptor Location

Dispersion Modelling

The AQIA utilised AERMOD – the US EPA regulatory Gaussian plume air dispersion model. AERMOD is a steady state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts. It includes treatment of both surface and elevated sources, and both simple and complex terrain.

In terms of NOx transformation, the AQIA assumed that 100% of the NOX emitted from the stacks (i.e. the cyclones) is transformed to NO^2. This is a very conservative assumption, which is supported by the Approved Methods, and would lead to the NO^2 impacts associated with the Proposal being overestimated by approximately 5-10 times.

Emission Estimates

The AQIA formulated emissions estimates for the existing operation of the cotton gin from the AQIA from the original EIS prepared by Pacific Environmental and the results of the emissions testing by Aecom in 2016.

The original emissions inventory was based on a maximum gin capacity of 50 bales per hour. The maximum capacity of the gin is now 100 bales per hour. Accordingly, particulate emissions associated with ginning and haulage have been increased. In combination with the increased capacity of the gin, the AQIA increased air flow rates through some of the cyclones.

The TGBI emissions from the combustion / incineration of cotton trash have been estimated from manufacturer's data, supplemented by emission factors from the NPI (see **Appendix 8**).

During operations, the 3 TGBI would consume a total of 3,750 kg of gin trash per hour. The exhaust streams from the TGBI would be mixed with ambient air to produce approximately 84.5 cubic metres of heated air per second to be used in the ginning process. This heated air, which would contain the combustion products (i.e. air pollutants), would be sent to various stages of the ginning process in the proportions presented in *Table 5-1* of the AQIA at **Appendix 3**.

Assessment of Impacts

The AQIA provides the results of the comprehensive and conservative modelling in Section 6 of the report. The results of the model shows that the proposal including the worst case scenario ginning operations including the use of the three incinerators would be expected to achieve compliance with the relevant air quality criteria for TSP, $PM_{2.5}$ and PM_{10}. The AQIA concluded that the air quality impacts associated with the operation of the Proposal would comply with the relevant impact assessment criteria. Predicted stack concentrations in the cyclones comply with the existing limits in EPL #20717 and the Clean Air Regulation.

5.3 Compliance with EPA's Eligible Waste Fuels Guidelines (EWFG)

An important consideration in the approval of an incinerator to be used for heat production through the incineration of agriculture biomass is the EPA's EFWG's.

Definitions of eligible waste fuels

1. Biomass from agriculture

Definition

Weeds, plant or crop residues that are free of any physical contaminants, produced directly from agricultural practices; for example, non-putrescible natural organic fibrous materials and organic residues from harvest activities. These residues may include fibres, roots, stalks, stubble, leaves, seed pods, nut shells and some waste from agricultural processing such as cotton and cane trash.

Additional information

The EPA notes that this material may contain pesticide or herbicide residues. The risks presented by these residues will be assessed as part of the resource recovery order and exemption application. This definition excludes:

- *waste material from processing dairy products or beverages*
- *waste from the production of food, and*
- *dead animals,*

Commentary:

The definition of biomass from agriculture specifically mentions that cotton trash should be considered an eligible fuel source.

Part 2 Additional Criteria for Eligible Waste Fuels

This section of the EWFG's outlines the criteria that proponents should consider before applying for a licence variation to permit the use of a waste material as an eligible waste duel source in Section 3 of the NSW Energy from Waste Policy Statement.

Waste Hierarchy

The proposed use of cotton trash as a waste fuel to produce heat for the cotton ginning process is consistent with the waste hierarchy for the following reasons:

- It would be impossible for RivCott to avoid or reduce the cotton gin trash waste stream. Cotton gin trash is an unavoidable by-product of the modern ginning process which utilises machinery to harvest cotton instead of hand picking.
- The reuse of the waste stream as a soil amendment is possible but requires increased transportation costs and there needs to be farmers willing to accept the trash under the Gin Trash Exemption. RivCott's experience is that farmers are hesitant to accept the trash due to the high transportation costs and the mechanical requirements to work the trash into the soils which adds to the cost of reuse.

- The recycling of the waste stream is not possible.
- The proposal permits RivCott to realise and recover the embodied energy from the cotton gin trash which is considered a suitable reuse of the waste stream within the waste hierarchy.

Chemical and Physical Homogeneity of the Waste

Cotton gin trash is a by-product of the ginning process and is made up of organic matter which is harvested from farms who transport their cotton to the gin. The cotton gin takes cotton from farms within 250 km of the site from various farmers who operate irrigated farming operations under very similar conditions including environmental, meteorological and in the application of fertilisers and pesticides during production based on the advice of Cotton Australia and local agronomists. The composition of the harvested cotton is extremely similar across bales including the resultant make up of the cotton trash which includes such by-products as small leaf fraction, clean lint, hulls, stick/stems, grass, seed, motes, small leaf, pin trash and other (0.5%–5.3%). In terms of the potential presence of other chemicals due to spraying the cotton with pesticides, RivCott commissioned the testing of representative samples of cotton trash for its potential use as cattle feed. The results are provided in the table below which illustrates that the pesticide residues were in ranges which were below the relevant Australian and United States standards for cattle feed. The AQIA at **Appendix 3** found that the incineration of the cotton trash using the proposed incinerators would also achieve compliance with the relevant air EPA air quality criteria and standards.

Table 5: Prevalence of Pesticides in Cotton Trash

Pesticide	N	Residue range (mg/kg)	Highest residue expected in livestock, no clean feed period
2,4-D	26	1.47	TF = 0.0045 (kidney) Anticipated residues if fed at 100% diet are 0.0045×1.47 = 0.007 mg/kg, well below the Australian, Codex and USA MRLs of 2, 5 and 4 mg/kg for edible offal.
6-chloronicotinic acid (imidacloprid)	26	0.14	TF 0.01 (liver) Anticipated residues if fed at 100% diet are 0.01×0.14 = 0.0014 mg/kg, below the Australian, Codex and USA MRLs of 0.2, 0.3 and 0.3 mg/kg for liver or edible offal.
Acetamiprid	26	0.89	TF = 0.045 (liver) Anticipated residues if fed at 100% diet are 0.045×0.89 = 0.04 mg/kg, below the

			Australian, Codex and USA MRLs of *0.05, 1 and 0.7 mg/kg for liver or edible offal.
Bifenthrin	26	4.09	TF = 0.3 (fat) Anticipated residues if fed at 100% diet are 0.3×4.09 = 1.23 mg/kg, below the Australian and Codex MRLs of 2 and 3 but above the US tolerance of 1 mg/kg for fat. Also, the levels found in trash are lower than the existing Australian MRLs for other feed items; bean forage and fodder (5-20 mg/kg) and for almond hulls (5 mg/kg)
Chlorantraniliprole	26	0.06	TF = 0.003 (fat) Anticipated residues if fed at 100% diet are 0.003×0.06 = 0.0002 mg/kg, well below the Australian, Codex and USA MRLs of 0.02, 0.2 and 0.1 mg/kg for fat.
Diafenthiuron	26	1.65	In a sheep feeding study at 20 ppm for 56 days; maximum residues in omental fat were 0.11 mg/kg and in renal fat were 0.12 mg/kg (TF = 0.006) . After 14 days withdrawal, residues were <0.02 mg/kg in omental and subcutaneous but were 0.05 mg/kg in renal fat. Anticipated residues in fat are 0.006×1.65 = 0.05 mg/kg. The half-life for residue decline was 7-14 days. The tissue LOQ is 0.02 mg/kg, so residues after 60 days will be lower than the Australian MRL and not likely to be detected in tissues.
Dimethoate	26	0.25	A metabolism study with lactating goats dosed orally with dimethoate at a rate equivalent to feeding at 30 ppm in the diet suggests that residues are not expected in animal tissues
Diuron	26	1.09	TF=0.04 (liver, measured using common moiety method) Anticipated residues if fed at 100% diet are 0.04×1.09 = 0.044 mg/kg. There are no

			MRLs internationally, but the tissue LOQ was 0.05 mg/kg and is unlikely to be monitored using such a specialised method. Also, the highest level in trash is well below the Australian Primary feed commodities MRL of 50 mg/kg.
Fipronil	26	0.1	TF = 0.09 (fat) Anticipated residues if fed at 100% diet are 0.09×0.1 = 0.009 mg/kg, well below the Australian, Codex and USA MRLs of 0.1, 0.5 (proposed to be revoked) and 0.4 mg/kg for fat.
Fluroxypyr	26	0.31	There are animal feed MRLs of 100 ppm for forage of cereal grains and other grass-like plants and for straw and fodder (dry) and hay of cereal grains and other grass-like plants. In livestock, fluroxypyr residues declined rapidly upon cessation of dosing at 1000 ppm for 28 days such that after 6 days residues in all tissues are less than the LOQ. In a goat metabolism study with dosing at the equivalent of 90 ppm in the feed, residues were highest in kidney at 0.986 mg/kg, TF = 0.011 (kidney). Anticipated residues if fed at 100% diet are 0.011×0.31 = 0.003 mg/kg Detectable residues are unlikely.
Haloxyfop	26	0.35	TF = 0.2 (kidney) Anticipated residues if fed at 100% diet are 0.2×0.35 = 0.07 mg/kg, well below the Australian and Codex MRLs of 0.5 and 2 mg/kg for offal. There is no US MRL for haloxyfop. The highest level in trash is well below the Australian MRL for pasture (3 mg/kg) as well as a range of forage and fodder crops (5-10 mg/kg).

Imidacloprid	26	0.23	TF = 0.01 (liver) Anticipated residues if fed at 100% diet are 0.01×0.23 = 0.002 mg/kg, well below the Australian, Codex and USA MRLs of 0.2, 0.3 and 0.3 mg/kg for edible offal.
MCPA	26	0.11	TF = 0.005 (kidney) Anticipated residues if fed at 100% diet are 0.005×0.11 = 0.0005 mg/kg, well below the Australian, Codex and USA MRLs of *0.05, 3 and 0.1 mg/kg for edible offal.
Metolachlor	26	0.018	TF = 0.007 (kidney) Anticipated residues if fed at 100% diet are 0.007×0.018 = 0.00013 mg/kg, well below the LOQ for this compound (0.01 mg/kg).
Omethoate	26	0.051	A metabolism study with lactating goats dosed orally with dimethoate at a rate equivalent to feeding at 30 ppm in the diet suggests that residues are not expected in animal tissues
Pendimethalin	26	0.03	The 2106 JMPR reported a feeding study with lactating cows fed at the equivalent of 99 ppm in the feed to 28 days. No residues were found in milk or tissues (LOQ 0.05 mg/kg). No residues are expected.
Tebuconazole	26	0.07	TF = 0.0008 (liver) Anticipated residues if fed at 100% diet are 0.0008×0.07 = 0.00006 mg/kg, well below the Australian, Codex and USA MRLs of 0.5, 0.2 and 0.2 mg/kg for edible offal.

Compliance with Emissions Limits

Following the commissioning of the cotton gin and during the ginning season when the facility was operating at its capacity, Aecom carried out Emissions Monitoring of the cyclones and emissions points. The results of the monitoring showed that the facility operated below the relevant air quality criteria and below the estimates in the AQIA submitted with the original EIS.

Soundin has prepared an AQIA in consideration of the Aecom Monitoring Report, the Original AQIA prepared by Pacific Environmental and the potential worst case scenario air emissions from the new incinerators. The AQIA is provided at **Appendix 3**, the results of which are described above. The AQIA concluded that the operation of the gin including the three

incinerators at full capacity would not be excepted to impact any sensitive receivers in the locality which are not related to the ginning operation.

The RivCott gin has not had previous issues with complaints from nearby sensitive receivers or any compliance action taken by the EPA.

Part 4 Applying for a Resource Recovery Order or Exemption

The EPA's Eligible Wate Fuels Guidelines requires the following information to be submitted with an application for an exemption to use agricultural biomass as an eligible fuel. In consultation with the EPA it was determined that a variation to the existing sites EPL could be used to provide the exemption rather than a new application. A detailed response including A GHG assessment would be provided with the licence variation application. However, **Table 6** provides responses to the information requirements in the EWFG.

Table 6: EWFG Requirements

Requirement	Response
Proponent(s) details	
1.1 Applicant's details including: name, address, phone number, the ACN and/or ABN of the proponent.	RivCott Pty Ltd, 50 Conargo Road Carrathool NSW 2711, 6990 5060, SamBuster@RivCott.com
1.2 If using a representative, the representative or consultant's details.	SKM Planning Pty Ltd, 6 Murphy Crescent, Griffith NSW 2680
1.3 If the application is on behalf of another person, please provide the contact details of that person, including an ACN and/or ABN.	N/A
Background information on the waste material	
2.1 Description of the waste.	Cotton trash is an agricultural by-product made up of leaves, sticks, soil, lint soil, and cotton seed fragments, all of which have been separated from the cotton lint during the ginning process. Cotton trash is incinerator for energy elsewhere in the world and is also used for cattle feed.
2.2 What is the source of the waste or waste-derived material?	Cotton trash is an output of the cotton ginning process. The source of the waste would be the field which the bale being processed has been harvested. Cotton producers who

	transport cotton bales to the RivCott gin are generally located within 250 km of the site.
2.3 What processes has the material undergone? Including mechanical, chemical and biological description of the process, treatments, storage, transport, and any sample results	Cotton is grown from seed in irrigated paddocks in the Riverina. Cotton farmers implement an integrated pest management system with their agronomist to minimise the likelihood of outbreaks and reduce reliance on insecticides. Farmers treat their crops with a wide range of pesticides and herbicides based on several factors which can change year from year. The potential pesticides which would be found in cotton from the Rivcott catchment are identified in **Table 5** above. Cotton is harvested mechanically utilising a cotton harvester specially designed to pick cotton fibre from plants. The harvester is positioned parallel to the rows of cotton and as the machine moves forward the picker heads reach into the cotton plants and rotate rapidly to pull the cotton fibres from the plants. During this process most of the seeds and debris are left behind. The picked cotton is then pushed up into the harvester via belts and augers and into the cleaning system which removes additional debris, leaves, stems and hulls through a series of screens and blowers. The cleaned cotton is then baled within the harvester and wrapped with plastic. The wrapped bale is dropped in the paddock and is stored on site until the farmer arranges transportation to the cotton gin. The bales are transported via road trains to the gin. Bales are then stored in RivCott's paddocks until the allocated gin run comes up. The cotton ginning process is laid out in **Section 1.1**. The proposal would include the direct transfer of cotton gin trash from the gin via a blower / pipe to the incinerator room (refer to plans at **Appendix 1**).
2.4 What is the expected volume and consistency of the material to be supplied over time?	As discussed above, gin trash represents 9% of every cotton bale processed through the site. The RivCott EPL permits the processing of 150,000 tpy of cotton which equates to 13,500 tpy of cotton trash. At full production, the gin produces 9 tonnes per hour of cotton trash. The three incinerators have been sized to permit the incineration of a maximum of 10 tonnes per hour. Any remaining cotton trash at the end of the ginning day would be utilised prior to the first gin run the next day for system start up.

	Cotton trash is generally consistent from farm to farm and contains leaves, sticks, soil, lint cotton and cotton seed fragments.
Development consent and approvals	
3.1 Details of development consent status, whether a request for development consent has been submitted, is in progress or has been obtained.	Development consent is in place for the cotton gin. DA 161314 was approved by the Western Joint Regional Planning Panel on 12 August 2014. The approval permits 150,000 bales of lint cotton to be processed at the site. The EPL permits the processing of 150,000 tonnes per year of unprocessed cotton. This modification application, if approved, would permit the installation and use of the incinerators.
3.2 Provide all development consent application documents with the application.	The existing development consent is attached at **Appendix 4**.
Site management and quality control	
4.1 Where is the facility?	50 Conargo Road, Carrathool NSW
4.2 Is the proposed facility licensed by the EPA?	The EPL is attached at **Appendix 5**.
4.3 What is the facility's environment protection licence (EPL) number?	20717
4.4 What quantity of eligible waste fuel will be stored and used at the facility?	13,500 tonnes per year of cotton trash would be used as an eligible heat source. The use of the incinerators as a source of heat for the ginning process would mean that cotton trash would not need to be stored or disposed of on site.
4.5 How is the material going to be stored at the facility?	The trash is proposed to be transported from the gin directly to incinerators via a blower / pipe. The trash would be stored temporarily in the incinerator room prior to being transferred to the incinerators via a walking floor system.
4.6 What procedures are in place to manage the input and output quality of the material over time?	Cotton gins, (RivCott included) asses the incoming moisture and difficulty of removing the gin trash and vary the temperature they us to dry the cotton and the number of cleaning machines to remove the gin trash.

4.7 What contingency plans exist for the receipt of waste during shutdown or failed delivery?	Should the gin be shutdown or out of operation, no trash would be produced and the incinerators would not be in operation. Should the blower / pipe belt system fail to deliver the trash to the incinerators, manual handling would be required. Front end loaders would transport the trash from the gin to the incinerator room. This would only occur under extraordinary conditions. Should there be an issue with the incinerators and ginning was required to continue, propane would be used to heat the cotton and the trash would be temporarily stored onsite in stockpiles until the incinerators are back online.

Characterisation of the waste material

5.1 What is the chemical composition of the material?	The Bluefield Renewable Energy Laboratory Testing report provided a detailed analysis of a representative cotton trash sample from the RivCott Gin (see **Appendix 6**). The elemental composition of the trash is provided in the table below.

Total Element Content (mg/kg) Element	Cotton Waste (CW) (mg/kg)	Cotton pellet (CP) (mg/kg)
Al	494±121.8	362.986±9.426
As	<0.5	0.066±0.01
Ba	15.4±6.8	13.196±0.704
Cd	0.5±0.3	0.009±0.001
Co	<0.5	0.169±0.029
Cr	3.1±1.4	4.129±4.497
Cu	6.4±1.9	2.788±0.232
Fe	243.8±60.7	336.235±73.781
Mn	27±5.1	19.726±2.315
Mo	2±0.9	0.582±0.302
Ni	1.3±1	1.845±2.163
Pb	2.1±1.5	0.169±0.029
Sb	<0.5	0.011±0.001
Se	1±0.3	0.049±0.014
Sn	2.7±1.4	1.441±0.049
Ti	42.6±14.3	18.287±0.799
V	0.8±0.1	0.476±0.036
Zn	13.5±10.8	9.67±2.269
Hg	2.3±0.4	0.014±0.002

5.2 What are the typical properties or characteristics of the material?	Riverian cotton growing conditions are very uniform. It is all irrigated (no dryland), planted and harvested under the same environmental impacts (sun, rain, temperature, time of planning and harvesting) and all growers follow the same practises (herbicide and pesticide) and use the same few Australian varieties. Therefore, the consistency is very, very similar between growers. Cotton gin trash received at the RivCott gin contains small leaf fraction, clean lint, hulls, stick/stems, grass, seed, motes, small leaf and pin trash.

5.3 What is the calorific value and combustion efficiency of the material?	An investigation into the use of cotton trash as a biofuel source was carried out by John Allision for the Tandou Cotton Gin near Katherine (see **Appendix 7**). As part of these investigations, the characteristics of the fuel were tested at HRL Technology who specialise in determining the characteristics of fuel for combustion. The tests undertaken were to AS 1038.5 - 1998 Coal and Coke - Analysis and Testing - Gross calorific value. The cotton gin trash contained 8% moisture, 10% ash and had a net calorific value of 15.5 Mj/kg Cotton trash therefore has substantial heat value. 46 kg of gin trash is produced per bale of cotton which equates to 764 MJ/ bale of heat value which surpasses the heat requirement to dry the lint produced from each bale. Evidence of the power output of the cotton gin trash is provided in the report prepared by Bluefield Renewable Energy Pty Ltd which tested the cotton gin trash in Singapore using pyrolysis (see **Appendix 6**).
5.4 What are the properties of the material that make it suitable for its proposed use?	Gin trash is just cotton plant material that is either Not mature seed or mature lint. It is mostly cotton stalk material, branches, leaf, cotton bole “hules” but is also immature lint and seed. As biomass it is very combustible like any other plan material.
Higher order reuse opportunities	
6.1 How is the material currently being managed (e.g. landfilled, other reuse, recovery option)?	The cotton trash is presently stockpiled on site. Some of the trash is sent to farms in the region to be used as a soil amendment under the Gin Trash Exemption 2016. However, due to high transportation costs, farmers have been less likely to pick up the trash from the gin site in recent years.
6.2 Demonstrate that there are no practical, higher order reuse opportunities for the waste in the region.	There are other practical higher order reuse opportunities for the trash including composting and use as a soil amendment. However, the use of the trash for these purposes is not economically or environmentally sustainable for the following reasons: • The reuse of the waste stream as a soil amendment is possible but requires increased transportation costs and there needs to be farmers willing to accept the trash under the Gin Trash Exemption. RivCott’s experience is that farmers are hesitant to accept the

	trash due to the high transportation costs and the mechanical requirements to work the trash into the soils which adds to the cost of reuse. • There are no composting facilities within proximity to the site which will accept the waste. It is expected that Wormtech's yearly tonnage limits would be taken up by FOGO from the evolving kerbside programs in the region and deceased birds from poultry production facilities. • The recycling of the waste stream is not possible. • The proposal permits RivCott to realise and recover the embodied energy from the cotton gin trash which is considered a suitable reuse of the waste stream within the waste hierarchy.
Information on potential air impacts	
8.1 What is the current concentration of air emissions from the emission unit?	The EIS for the cotton gin development application included an AQIA prepared by Pacific Environmental. The dispersion modelling provided in the AQIA demonstrated compliance with the relevant air quality standards for annual TSP, PM_{10} and $PM_{2.5}$ at all nearby receivers. Following the construction and commissioning of the cotton gin, AECOM carried out air emissions testing in 2016 which showed that the actual emissions experienced at the cotton gin were below the predictions in the AQIA. A revised AQIA has been prepared by Soundin and is provided **at Appendix 3**.
8.2 Do the current air emissions comply with the relevant regulatory requirements in the Protection of the Environment Operations (Clean Air) Regulation 2010 (the Clean Air Regulation)?	Refer to AQIA at Appendix 3
8.3 What will be the concentration of air emissions from the emission unit when using the proposed eligible waste fuel and how do they compare to the existing fuel?	Refer to AQIA at Appendix 3

8.4 Are principal air toxics present in the waste material or expected in the air emissions?	Refer to AQIA at Appendix 3
8.5 Will the emissions comply with all relevant regulatory requirements in the Clean Air Regulation?	Refer to AQIA at Appendix 3
8.6 Has an air quality impact assessment for the facility been carried out having regard to potential air pollutants? What were the results?	Refer to AQIA at Appendix 3
8.7 What air monitoring is proposed to be carried out?	The EPL would be varied to permit the use of the incinerators. The EPL would provide the monitoring requirements for the facility. Presently the EPL requires 37 monitoring points at the existing gin.
Specifications and standards	
9.1 Has a specification been developed for the proposed fuel material?	No specification has been developed for the cotton gin trash.
9.2 Does the material meet, or is it required to meet any existing specifications or standards?	There are no relevant standards for cotton gin trash.
9.3 Are there any agreements between the producer and the user of the waste-derived material to ensure the material is 'fit for purpose'?	No
9.4 What, if any, quality assurance/quality control (QA/QC) systems are in place to ensure consistency of calorific value, contaminant levels, quality and quantity of supply over time?	No procedures proposed. The cotton trash contains a generally consistent mixture of biomass.

6 Conclusion

This environmental assessment has assessed the potential environmental impacts associated with the proposed modification and provided Council and the EPA with a detailed review of the relevant legislation including Section 4.55(1A) of the EP&A Act. The following conclusions can be made based on the environmental assessment:

- The proposed modification can be considered substantially the same development as originally approved.
- A Section 4.55(1A) modification application is considered the most appropriate planning pathway to achieve the outcomes of the proposal. A modification would allow the use of the cotton gin for heat production under existing consents and not require an additional consent for the site which complicates regulatory actions and auditing.
- The modification application would not alter the general purpose of the site being the ginning of cotton. The proposal would also avoid unnecessary disposal or storage of the cotton trash.
- The hazards and risks associated with the operation of the facility including the incineration of cotton trash, given the context of the site and the existing safety controls and procedures on the site, would not cause an unacceptable impact on adjoining sites including occupants.
- The air quality impacts of the facility would not change as the site presently accepts mixed waste oils with levels of organic solvents. The facility operates under an existing EPL and is required to undergo a stringent air quality monitoring regime. The facility operates without exceedances of the air quality criteria in the Approved Methods or EPL.
- Given the existing industrial nature of the site and the surrounds and the bulk and scale (including height) of existing plant, the visual impact of the proposal is considered minor.
- The operation of the facility is required to meet stringent environmental controls established in the EPL (to be varied) to ensure potential impacts on sensitive and industrial receivers are mitigated, including noise and odour.

Overall, the environmental impacts of the proposal are considered minor and the modified would be considered substantially the same development as originally approved.

We request that this modification application be processed as efficiently as possible to permit the acceptance of organic solvents to meet the immediate needs of waste producers.

7 Appendices

Appendix 1 – Architectural Plans

Appendix 2 – Engineering Plans

Appendix 3 – Air Quality Impact Assessment

Appendix 4 – Existing Development Consent

Appendix 5 – EPL

Appendix 6 - Bluefield Renewable Energy Laboratory Testing report

Appendix 7– Tandou Study

Appendix 8 – Dillon Consulting TGBI Testing Report

Appendix 9 – Aecom Emission Testing Report

Appendix 10 – Cost Estimate

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