Appendix G

Preliminary Land Use Conflict Risk Assessment

Land Use Conflict Risk Assessment

Planning Proposal Industrial Rezoning for land located at Lot 1 DP 783330, Lots 1 to 12 DP 976660 &
Lots 14 to 20 DP 97660
Bruxner Highway Casino

HEALTH SCIENCE ENVIROMENTAL EDUCATION
ENVIRONMENTAL AUDITOR

Land Use Conflict Risk Assessment

Planning Proposal Industrial Rezoning for land located at Lot 1 DP 783330, Lots 1 to 12 DP 976660 & Lots 14 to 20 DP 97660 Bruxner Highway Casino

Prepared for: JM & GA Imeson
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Version: Final
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1. Introduction

Tim Fitzroy & Associates has been engaged by JM and GA Imeson to undertake a Land Use Conflict Risk Assessment (LUCRA) to accompany a *Planning Proposal* to Richmond Valley Council for land located at Lot 1 DP 783330; Lots 1 to 12 DP 976660; Lot 14 section 6 DP 97660, Lot 15 section 6 DP 97660, Lot 16 section 6 DP 97660, Lot 17 section 6 DP 97660, Lot 18 section 3 DP 97660, Lot 19 section 6 DP 97660 and Lot 20 section 6 DP 97660 Bruxner Highway, Casino to permit industrial rezoning (see Locality Plan **Illustration 1.1**).

The subject site covers an area of approximately 16.20ha. The key constraint regarding the proposed rezoning is the adjoining rural residential dwelling to the east located on Lot 20 section 7 DP 976660. Offsite constraints include adjoining cattle grazing land to the north, east and south, the rural residential dwelling to the east located on Lot 1 DP 706664, the proposed Hemp Plantation and Processing Facility to the north and the proposed residential precinct to the south and south east.

The subject site is zoned as follows under the Richmond Valley LEP 2012:

- RU1 Primary Production.

LUCRA's were initially conceived in the *Living and Working in Rural Areas Handbook* (Department of Primary Industries et.al 2007) by the Centre for Coastal Agricultural Landscapes in partnership with the Northern Rivers Catchment Management Authority as a tool to better manage potential land use conflicts between residential development and rural activities and environmental attributes/assets on the NSW North Coast. The Department of Planning and Environment (DPE) has chosen to request that the applicant adopt the LUCRA tool to better identify potential land use conflicts risks associated with the proposed rezoning and where necessary propose mitigation options to address any unacceptable risks.

The *Planning Proposal* should be designed to minimise instances of incompatibility such that adjoining residential and rural practices are not inhibited and natural ecosystems and attributes are enhanced where possible. Where such instances do arise, measures to ameliorate potential conflicts should be devised wherever possible.

Conflict between residential dwellings/rural activities and industrial land uses is likely to occur where land uses directly abut, or are sufficiently close to, industrial and such that they are likely to be affected by industrial activities. Such conflict can arise from noise, dust and odour generating activities.

When considering potential land use conflict between residential dwellings/rural activities and industrial activities it is important to recognise that all industrial activities:

- should incorporate reasonable and practicable measures to protect the environment in accord with the Protection of the Environment Operations Act (POEO) and associated industry specific guidelines; and
- are legally conducted as required by other legislation covering workplace health and safety.

Nevertheless, certain activities practised by even the most careful and responsible operator may result in a nuisance to an adjacent residential dwellings through, for

example, unavoidable odour drift and noise impacts. Typical conflicts between industrial use and residential dwellings/rural activities as provided in **Table 1** below:

Table 1 Typical Conflicts between Industrial development and adjoining residential dwellings/rural activities

Noise	• Industrial equipment, machines, transport. • Ancillary equipment associated with industrial processing • Road Traffic
Odour	• Chemicals. • Fuels
Health concerns	• Chemicals.
Water	• Hydrocarbons in surface and ground water. • Runoff

The actual width of the any buffer should in practice be dependent on the most limiting factor involved (i.e. the factor that will require the widest buffer). In theory, this would lead to all other factors being adequately addressed.

Illustration 1.1

Site Locality Plan

Disclaimer: This report has been generated by various sources and is provided for information purposes only. Spatial Services does not warrant or represent that the information is free from errors or omission, or that it is exhaustive. Spatial Services gives no warranty in relation to the information, especially material supplied by third parties. Spatial Services accepts no liability for loss, damage, or costs that you may incur relating to any use or reliance upon the information in this report.

1.1 Scope of Works

This assessment has been undertaken to determine the potential land use conflicts between the future owners/occupiers of industrial premises at Lot 1 DP 783330; Lots 1 to 12 DP 976660; Lot 14 section 6 DP 97660, Lot 15 section 6 DP 97660, Lot 16 section 6 DP 97660, Lot 17 section 6 DP 97660, Lot 18 section 3 DP 97660, Lot 19 section 6 DP 97660 and Lot 20 section 6 DP 97660 Bruxner Highway Casino and

- the rural residential dwelling at adjoining property to the east:
    - Lot 20 section 7 DP 976660
- the rural residential dwelling at property further to the east:
    - Lot 1 DP 706664
- the farming activities at adjoining properties to the:
    - north (Lot 320 DP 755727);
    - east (Lot 20 section 7 DP 976660);
    - south (Lot 49 DP755727 and Lot 1 DP772608); and
    - south east (Lot 2 DP772606)
- the potential future Residential Precinct to the:
    - south (Lot 49 DP755727 and Lot 1 DP772608); and
    - south east (Lot 2 DP772606).
- The potential future Hemp Plantation and Processing Facility to the:
    - north (Lot 320 DP 755727).

This Land Use Conflict Risk Assessment (LUCRA) is to accompany a *Planning Proposal* to Richmond Valley Council for land located at Lot 1 DP 783330; Lots 1 to 12 DP 976660; Lot 14 section 6 DP 97660, Lot 15 section 6 DP 97660, Lot 17 section 6 DP 97660, Lot 18 section 3 DP 97660, Lot 19 section 6 DP 97660 and Lot 20 section 6 DP 97660 Bruxner Highway, Casino.

The total area of the subject development site is approximately 16.20 ha. The current lot configuration is:

- Lot 1 DP 783330 (2,007m^2);
- Lots 1 to 12 DP 976660m (2,016m^2 each);
- Lot 14 section 6 DP 97660 (2.03ha);
- Lot 15 section 6 DP 97660 (1.619ha);
- Lot 16 section 6 DP 97660 (1.619ha);
- Lot 17 section 6 DP 97660 (1.619ha);
- Lot 18 section 3 DP 97660 (1.619ha);
- Lot 19 section 6 DP 97660 (1.619ha); and
- Lot 20 section 6 DP 97660 (1.244ha).

The tasks involved in undertaking this assessment were to:

Step 1: Gather information

- Determine the nature of the land use change and development proposed.
- Assess the nature of the precinct where the land use change and development is proposed.
- Appraise the topography, climate and natural features of the site and broader locality
- Conduct a site inspection

- Describe and record the main activities of the surrounding agricultural land use and their regularity, including periodic and seasonal activities that have the potential to be a source of complaint or conflict
- Consider the impacts of residential development on the natural attributes of the site

Step 2: Evaluate the risk level of each activity

- Record each activity on the risk assessment matrix, and identify the level of risk of a land use conflict arising from the activity.

Step 3: Identify the management strategies and responses that could help lower the risk of the issue resulting in a dispute and conflict

- Identify management strategies for each activity
- Prioritise Strategies
- Provide Performance targets for each activity

Step 4: Record the results of the LUCRA

- Summarise the key issues, their risk level, and the recommended management strategies

Illustration 1.2
Existing Lot Layout

N

0 50 100 150 200 250

1cm = 50m
1:5000

NOTE:
This preliminary layout has been completed in accordance with the instructions provided by JM & CA Imeson.
In this respect preliminary desktop data has been used to form this layout. The final layout is subject to the completion of a detailed survey & engineering plans. Accordingly, the conclusions reached within this report may be modified by the author upon the completion of the final design plans & site inspection. Newton Denny Chapelle accepts no responsibility for any loss or damage suffered, however so arising, to any person or corporation who may use or rely on this report.

REV	DATE	AMENDMENT
A		
B		
C		
D		
E		

SOURCE PLAN: www.maps.six.nsw.gov.au - accessed 06.02.17

k:\jobs\2017\17044 - imeson\planning\planning plans\nda plans\ - imeson.dwg - industrial rezoning

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PLAN - INDUSTRIAL REZONING INVESTIGATION AREA

CLIENT: JM & CA IMESON

LOCATION: LOT 48 & 49 DP755727, LOTS 1 & 2 772606 & LOT 1 DP 633101 BRUXNER HIGHWAY CASINO NSW

DATE: 06.02.17 REF: 17/044
SCALE: 1 : 4000@A3 DRAWN: bk

2. Gather Information

2.1 Nature of the land use change and development proposed

The subject site is under beef cattle grazing (pers.com Jeff Imeson (15 January 2018). Mr Imeson's family has owned the property for over 100 years. Mr Imeson's Grandfather Edga Charles and Great Uncle, Harold commenced dairy grazing at the subject site in the 1920's prior to the commencement of beef cattle grazing in the 1930s.

Grazing of dairy cattle occurred from the 1920's to the 1950's. Beef cattle grazing has been the dominate use of the property since the 1950's to the present. According to Jeff Imeson (pers.com) the subject site has never been cultivated while the previous dairy was located in the southern side of the adjacent property to the west (within the existing Industrial Estate).

There is no dwelling onsite. Site improvements include: fencing, accessway, cattle yards, pasture, shade trees and drainage channels.

This Land Use Conflict Risk Assessment (LUCRA) is to accompany a *Planning Proposal* to Richmond Valley Council for land located at Lot 1 DP 783330; Lots 1 to 12 DP 976660; Lot 14 section 6 DP 97660, Lot 15 section 6 DP 97660, Lot 16 section 6 DP 97660, Lot 17 section 6 DP 97660, Lot 18 section 3 DP 97660, Lot 19 section 6 DP 97660 and Lot 20 section 6 DP 97660 Bruxner Highway, Casino to be rezoned for industrial development.

2.2 Nature of the precinct where the land use change and development is proposed

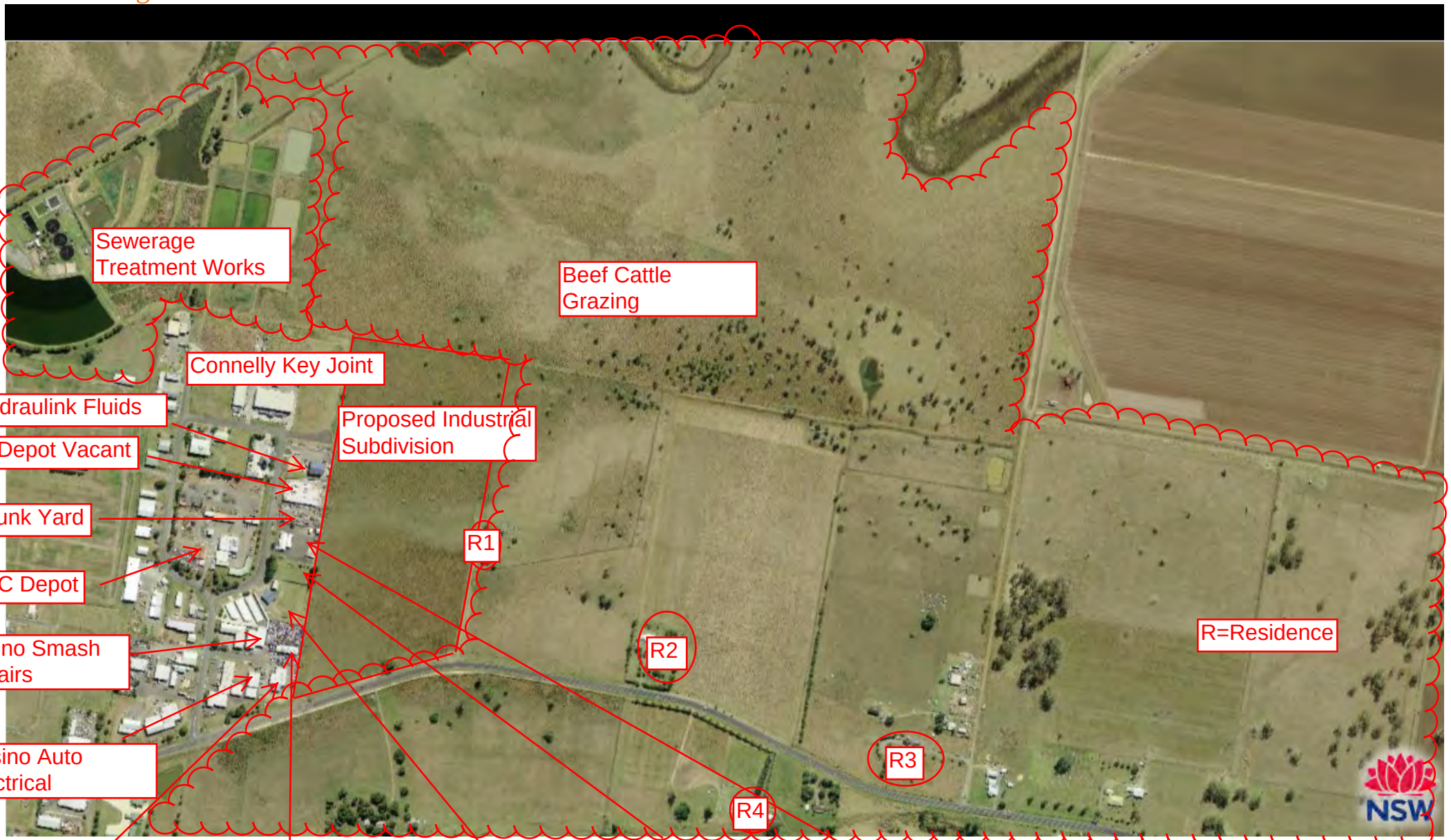
The subject site is zoned as follows under the Richmond Valley LEP 2012:

- RU1 Primary Production.

The subject site is under beef cattle grazing. Surrounding landuses include the existing Industrial Precinct to the west, the proposed residential precinct to the south, proposed Hemp Plantation and Processing Facility to the north, existing rural dwellings (2) to the east, grazing of stock to the north, north east, east, south, south west and south east. The Bruxner Highway forms the southern boundary (see surrounding land uses in **Illustration 2.1**).

Illustration 2.1

Surrounding Land Uses



- Potential Future Use of Lot 320 DP 755727, Proposed Hemp Plantation and Processing Facility

TFA are aware of recent publicity with respect to a proposed Hemp Plantation and Processing Facility on Richmond Valley Council (RVC) owned land to the immediate north of the subject site. Discussions were held between Tim Fitzroy and Council's Development Engineer Mike Perkins on this matter on 23 April 2018. Mr Perkins advised that no Developmnet Application has as yet been received by RVC and therefore no information could be provided on the development. Until such time as a formal Development Application has been submitted to RVC TFA are not in a position to speculate with respect to any potential land use conflicts between the proposed industrial rezoning of the subject site and a potential future Hemp Plantation and Porcessing Facility on Lot 320 DP 755727.

- Potential Future Residential Precinct to the:
  - south (Lot 49 DP755727 and Lot 1 DP772608); and
  - south east (Lot 2 DP772606).

TFA have been engaged by JM and GA Imeson to undertake a Land Use Conflict Risk Assessment (LUCRA) to accompany a *Planning Proposal* to Richmond Valley Council for land located at Lot 1 DP 633101, Lot 1 DP 772606, Lot 2 DP 772606, Lot 48 & 49 DP 755727 Bruxner Highway, Casino to permit a residential rezoning.

TFA have identified that there is a potential land use conflict between the proposed industrial and residential rezoning in particular with respect to Lot 49 DP755727 and Lot 1 DP772608 Lot 2 DP772606 given the proximity to the closest points of each of the sites.

A review of businesses within the Industrial Precinct indicates the presence of Light Industrial uses in the form of:

- Vehicle Repair and Services: Casino Smash Repairs; Casino Auto Electrical; Richmond Valley Auto Dismantlers and Mechanical Repairs;
- Landscape Supplies: Kingsbrae Sand, Casino Hire and Landscape Supplies;
- Casino Car Wash;
- The Bolt Shop;
- Smiths Carpentry and Joinery;
- Depot: Richmond Valley Council; Riverina Stock Feed Sock;
- Building & Engineering: Connelly Key Joint, Hydraulink Fluids.

2.3 Local Topography

The relief of the subject site varies between approximately 26 and 25m AHD to the Richmond River. The site is within the Lower alluvial plains of the main tributary streams of the Richmond River Alluvial Plain. The soils within the subject sites are deep (>200 cm), poorly to moderately well- drained alluvial Black Earths and Structured Clay.

The majority of the site has a slight slope to the north.

2.4 Meteorology

The climate and meteorology for the locality has been summarised in **Table 2.1** based on monthly climate statistics for the Casino Airport Automatic Weather Station (AWS) with respect to 9am and 3pm statistics.

The Casino AWS is situated at an elevation of 21 m, approximately 2km south of the site. The records are based on 1995 to 2018.

Wind Regime

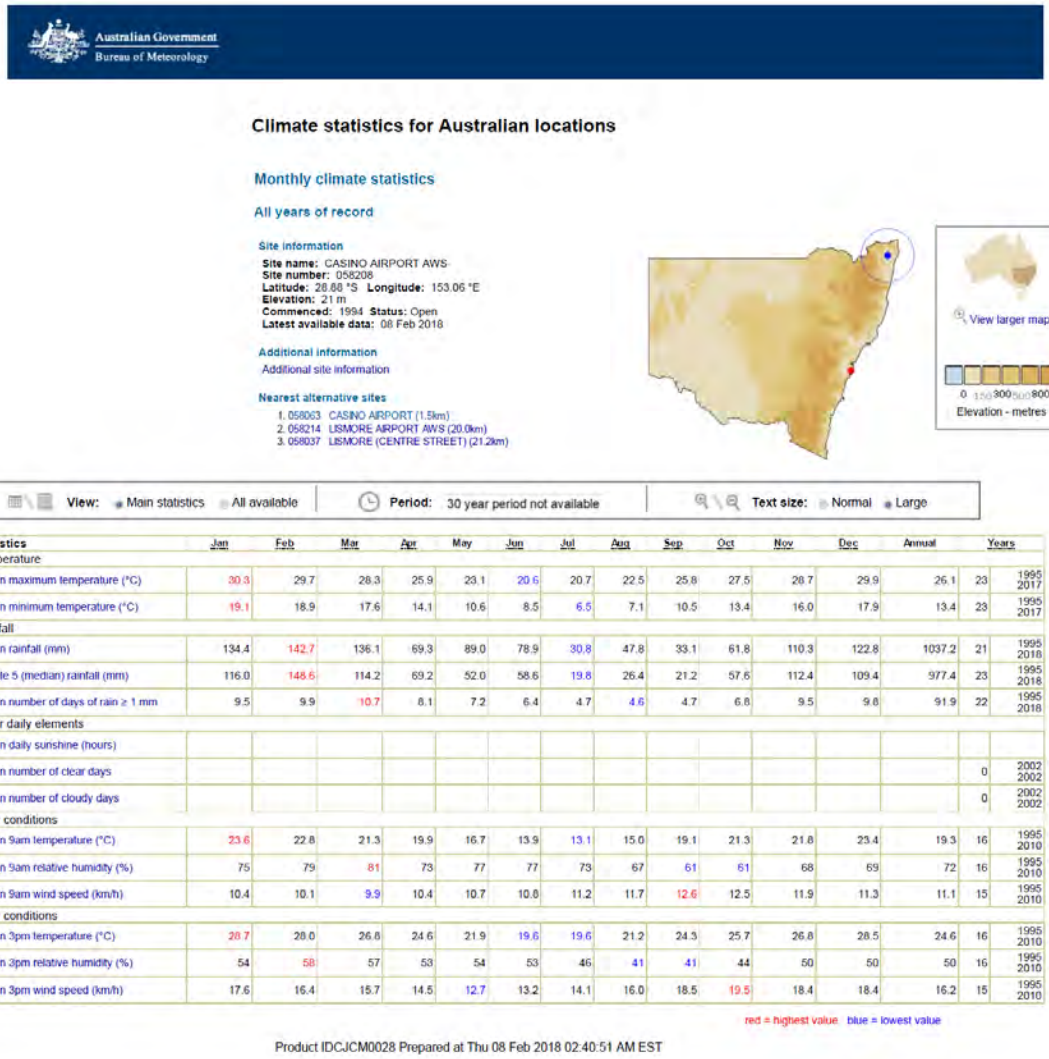
The wind regime for the site is based on annual wind roses for Casino Airport AWS.

Annual wind roses for the times of 9am and 3pm are shown in **Illustration 2.2**. The wind roses are based on records from 1995 to 2010. The annual wind roses indicate that light to moderate winds are generally experienced from all directions. The wind roses also indicate the following:

- winds in the mornings are typically light winds from the west and south-west and to a lesser extent from the north;
- winds in the afternoon are typically more moderate winds from the south, north-east, south-east and east; and
- Calm conditions are experienced 8% of the time in the morning and only 1% of the time in the afternoons.

The wind frequency towards any of the sensitive receptors is less than 35% if three quadrants are added together (e.g. south east + south-east + south).

Table 2.1 Monthly Climate Statistics –Casino Airport AWS



Australian Government
Bureau of Meteorology

Climate statistics for Australian locations

Monthly climate statistics

All years of record

Site information

Site name: CASINO AIRPORT AWS
Site number: 058208
Latitude: 28.88 °S Longitude: 153.06 °E
Elevation: 21 m
Commenced: 1994 Status: Open
Latest available data: 08 Feb 2018

Additional information

Additional site information

Nearest alternative sites

1. 058063 CASINO AIRPORT (1.5km)
2. 058214 LISMORE AIRPORT AWS (20.0km)
3. 058037 LISMORE (CENTRE STREET) (21.2km)

View larger map

0 150 300 500 800m
Elevation - metres

View: Main statistics All available | Period: 30 year period not available | Text size: Normal Large

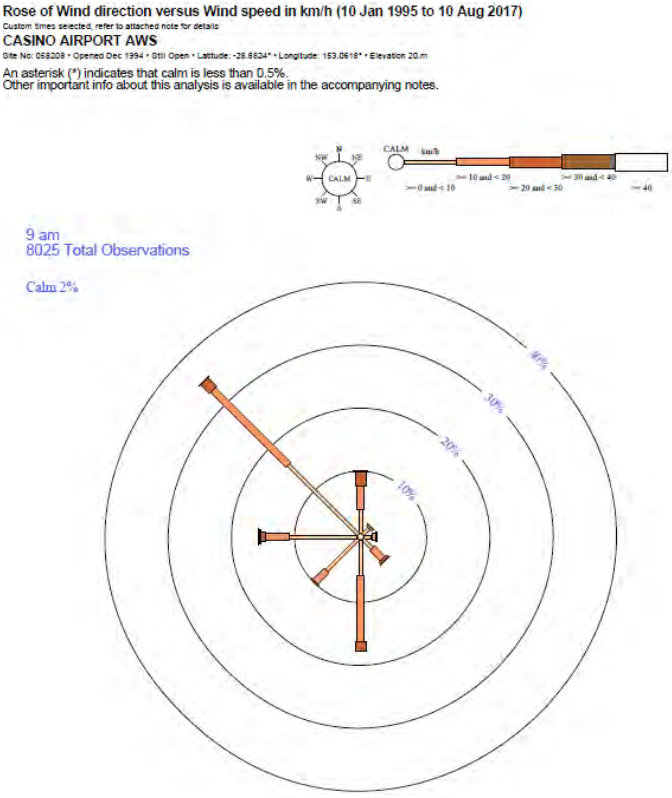
Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	
Temperature															
Mean maximum temperature (°C)	30.3	29.7	28.3	25.9	23.1	20.6	20.7	22.5	25.8	27.5	28.7	29.9	26.1	23	1995 2017
Mean minimum temperature (°C)	19.1	18.9	17.6	14.1	10.6	8.5	6.5	7.1	10.5	13.4	16.0	17.9	13.4	23	1995 2017
Rainfall															
Mean rainfall (mm)	134.4	142.7	136.1	69.3	89.0	78.9	30.8	47.8	33.1	61.8	110.3	122.8	1037.2	21	1995 2018
Decile 5 (median) rainfall (mm)	116.0	148.6	114.2	69.2	52.0	58.6	19.8	26.4	21.2	57.6	112.4	109.4	977.4	23	1995 2018
Mean number of days of rain ≥ 1 mm	9.5	9.9	10.7	8.1	7.2	6.4	4.7	4.6	4.7	6.8	9.5	9.8	91.9	22	1995 2018
Other daily elements															
Mean daily sunshine (hours)															
Mean number of clear days														0	2002 2002
Mean number of cloudy days														0	2002 2002
9 am conditions															
Mean 9am temperature (°C)	23.6	22.8	21.3	19.9	16.7	13.9	13.1	15.0	19.1	21.3	21.8	23.4	19.3	16	1995 2010
Mean 9am relative humidity (%)	75	79	81	73	77	77	73	67	61	61	68	69	72	16	1995 2010
Mean 9am wind speed (km/h)	10.4	10.1	9.9	10.4	10.7	10.8	11.2	11.7	12.6	12.5	11.9	11.3	11.1	15	1995 2010
3 pm conditions															
Mean 3pm temperature (°C)	28.7	28.0	26.8	24.6	21.9	19.6	19.6	21.2	24.3	25.7	26.8	28.5	24.6	16	1995 2010
Mean 3pm relative humidity (%)	54	58	57	53	54	53	46	41	41	44	50	50	50	16	1995 2010
Mean 3pm wind speed (km/h)	17.6	16.4	15.7	14.5	12.7	13.2	14.1	16.0	18.5	19.5	18.4	18.4	16.2	15	1995 2010

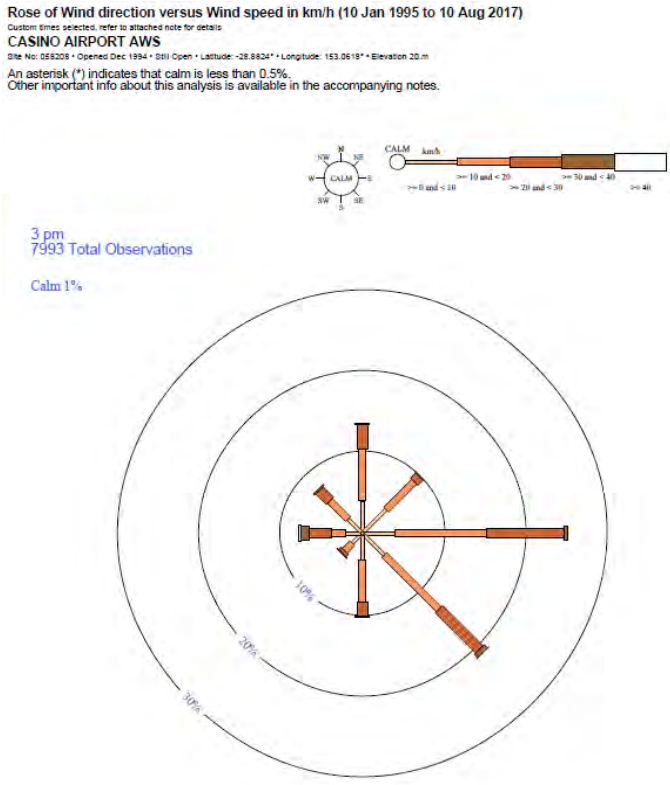
red = highest value blue = lowest value

Product IDCJCM0028 Prepared at Thu 08 Feb 2018 02:40:51 AM EST

Table 2.2 Annual Wind Directions and Strength

Direction	*9am*	*9am Wind Speed*	*3pm*	*3pm Wind Speed*
N	10%	Light-moderate	12%	Light-moderate-heavy
NE	3%	light	10%	Light-moderate
E	3%	light	25%	Light-moderate-heavy
SE	5%	light-moderate	21%	Light-moderate-heavy
S	18%	light-moderate	10%	Light-moderate-heavy
SW	10%	light	8%	Light-moderate-heavy
W	15%	Light-moderate	7%	Light-moderate-heavy
NW	35%	Light-moderate	7%	Light-moderate-heavy
Calm	1%	-	0%	-





Source: Bureau of Meteorology

Illustration 2.2 Annual Wind Roses (9am and 3pm) for Casino Airport

2.5 Site Inspection

A site assessment was undertaken on the 15 January 2018 by Tim Fitzroy in the company of the owner Jeff Imeson. On the day of the site assessment the weather was clear. The site is reasonably level and used for cattle grazing. The site adjoins the Casino Industrial Estate to the west and Bruxner Highway to the south. The remainder of the surrounding land uses are beef cattle grazing.

The business adjoining the subject site could be described as light industrial serviced based industry. Photographs of the site subject and surrounds were taken (see **Appendix A**).

2.6 Potential Land Use Conflicts

The following key items have been identified as potential land use conflicts as a result of the proposed development.

2.6.1 Noise

A variety of industrial land uses are located within the Industrial Precinct to the west from the subject site. Existing businesses within the closest proximity to the subject site (see **Illustration 2.1**) include:

- Smiths Joinery,
- Casino Car Wash,
- The Bolt Barn,
- Casino Auto Electrical;
- Richmond Valley Auto Dismantlers and Mechanical Repairs; and
- Casino Smash Repairs.

It is generally accepted that noise levels within an industrial estate will be higher than in either residential or commercial areas. Commonly, controls are required on noise from industrial premises because of the potential impact on adjacent residential or commercial zones in the vicinity. The recommended LAeq noise levels from industrial noise sources within an industrial zone is 70dB (A), see *Table 2.2 Amenity Criteria, Noise Policy for Industry* (NSW EPA, 2017).

Noise pressure waves disperse from a noise source through geometric spreading or divergence of noise wave which is often referred to as distance attenuation. Other variables which effect noise dispersion include: topography, ground cover, wind and temperature gradients, absorption of noise by air and the use of noise barriers or enclosures.

In a free field with no other variables acting, noise dispersion through distance attenuation along can be calculated at a receiver using the following formula:

Noise at receiver = noise from source (at distance d1) – 20 log (d2 / d1) (1)

Where:
d1 = distance in meters to source noise
d2 = distance in meters from receiver to noise source

Although ground cover and absorption in air have a slight effect, distance tends to be the dominant attenuation for source-receptor distances less than about 250 meters and frequencies below 2000 Hz. Disregarding barriers, wind and temperature effects, most close-range sound power to sound pressure level conversions can be based on this relationship.

Decibels (dB) are measured on a logarithmic scale, resulting in the following:

- An increase of 2 dB is hardly perceivable.

An increase of 10 dB is perceived as twice as loud. Therefore an increase of 20 dB is 4 times as loud and an increase of 30 dB is 8 times as loud etc.

The typical noise environment in a rural area is:

1. Daytime (7am to 6pm) Rating Background Level <40 dB(A)
2. Evening (6pm to 10pm) Rating Background Level <35 dB(A)
3. Night (10pm to 7am) Rating Background Level <30 dB(A)

Rural – *is an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse.*
Note: Where background noise levels are higher than those presented in column 3 due to existing industry or intensive agricultural activities, the selection of a higher noise amenity area should be considered (NSW EPA 2017).

The typical noise environment in a suburban area is:

1 Daytime (7am to 6pm) Rating Background Level <45 dB(A)
2 Evening (6pm to 10pm) Rating Background Level <40 dB(A)
3 Night (10pm to 7am) Rating Background Level <35 dB(A)

Suburban – *is an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the Following characteristic: evening ambient noise levels defined by the natural environment and human activity* (NSW EPA 2017).

Without the benefit of a Noise Impact Assessment it is not possible to confirm the rating background level at the nearest affected residence however given the proximity of the Bruxner Highway and the existing industrial precinct it is likely that the existing RBL is better reflected by the *Suburban Amenity Criteria* (NSW EPA 2017).

Clearly should the subject site be rezoned to industrial use noise impacts from industrial activities have the potential to impact existing residents to the east and potential future residents to the south and south east (across the Bruxner Highway).

Give that the onus is on the developer to take measures to minimise any potential land use conflict, measures to address noise impacts from the future Industrial Precinct would include:

- **Increasing the separation distance** (distance attenuation) between the noise source and receiver reduces the noise level. As a rule of thumb, each doubling of the distance from a noise source equates to a reduction of sound pressure level of 6 dB (the inverse square law). This does not apply close to a loud noise source. It may also be affected

by wind and temperature inversions for distances over 300 metres between the source and receiver.

- **Barriers** are most effective when they are located close to the noise source and block the line of sight between the source and receiver. The amount of noise reduction achieved depends on the height and mass of the barrier and the frequency of the noise (barriers are less effective for low-frequency noise). Noise barriers should have no gaps. Use of absorptive material on the side of the barrier facing the noise source can also help to reduce noise levels by reducing noise reflections.
- **Materials commonly used for noise barriers** include solid brick walls, concrete blocks or panels, earth mounds, trenches and cuttings. Natural topography and existing buildings can also provide an effective noise barrier and should be considered when developing a new noisy activity. Trees or other vegetation do not provide an effective noise barrier. Some limited attenuation may be gained where trees are densely planted but little attenuation is achieved for low frequencies.
- **Sound-absorptive materials** reduce the level of reflected sound. They are porous materials such as glass fibre, wool and mineral wool. Thin layers are capable of absorbing only high frequencies, whereas thicker layers can absorb a wider frequency range.

Common approaches to controlling noise at receiver locations, such as residential dwellings, can include a combination of the following three measures.

- **Site and building layout** can include the use of setbacks for a new house or changing the shape and orientation of the building to avoid sound being reflected into noise-sensitive rooms. Orientation and placement of rooms within a building can also help to minimise noise impact (e.g. placing bedroom and sensitive living areas furthest from a noise source and placing kitchen, bathroom or garage areas closest to the noise source).
- **Barriers and fencing** can be placed on the residential boundary to protect a house and external areas. Barriers and fencing can also be used within a property to provide a protected external recreation area such as a walled courtyard or garden. Solid building facades closest to the noise source will also act as a noise barrier. Other options include providing solid balconies designed to reflect sound away from a building.
- **Building construction methods** are also an important noise control strategy for receiver locations. The major controls are insulating building elements such as doors, walls, windows, floors, roof and ceilings. Options for window design include sealing air gaps around windows and doors, laminated or thick glass, and double-glazing. All external building elements need to be considered to ensure that noise insulation is effective. This is because even small gaps can significantly reduce the effectiveness of noise insulation measures. Ventilation needs to be considered in conjunction with any noise insulation work; mechanical ventilation (such as air conditioning) may be necessary and it is
  important to locate external units so as to avoid impacting neighbours.

As a guide to achieve compliance (by distance attenuation alone) with the Suburban Noise Amenity Criteria a buffer of:

- 60m is required at night (10pm to 7am)
- 32m is required at evening (6pm to 10pm)
- 20m is required at day (7am to 6pm).

Adopting the *precautionary principle* a nominal buffer of 60m from the closest point of industrial activities to the nearest sensitive receptor should be applied at the rezoning stage. Subject to further investigation this buffer may be reconsidered.

i. Air Quality

Potential sources of odour and dust from industrial premises and road traffic impacting on the residential dwelling houses include:

- ❖ Particulates, Volatile Organic Compounds (VOCs) and Odour from manufacturing industries;
- ❖ Hydrocarbons from vehicular servicing operations and vehicles travelling throughout the industrial area

Odour from industrial activities can arise from use of chemical, solvents, paints and fuels. Such detrimental odours can impact on residential amenity and have the potential to affect public health.

Residents' association of the odour with a chemical is sufficient to raise fears of exposure. In addition perceptions of an odour's acceptability and individual capacity to detect particular odours can vary greatly.

Factors affecting complaints from odour are influenced by the frequency, intensity, duration and offensiveness of the odour. An objectionable odour may be tolerated if it occurs infrequently at a high intensity, however a similar odour may not be tolerated at lower levels if it persists for a longer duration.

Background dust is generated from roads and exposed areas principally from vehicle movements. Local conditions, including wind strength and direction, rainfall, humidity and ambient temperatures, soil type, vegetative cover and type of on site activity determine the extent of the nuisance.

ii. Surface Water, Ground water and Soil and Sediment Runoff

Key environmental issues for industrial areas are

- o Diesel and petrol spills
- o Stormwater pollution
- o Increased sedimentation
- o Soil and groundwater contamination

The future industrial land release should be designed with Water Sensitive Urban Design (WSUD) Principles to ensure that any surface runoff will not impact on the adjoining farmland.

The general WSUD principles for any future subdivision road design and lot layout should include:

- ❖ The subdivision layout should promote the retention of existing landforms with cut and fill land re-shaping works being minimised, wherever possible.
- ❖ The retention of natural watercourses and drainage lines is recommended, wherever practicable.
- ❖ The layout of roads in a subdivision should be designed to fit the existing topography and landform features of the site.
- ❖ The road layout pattern should minimise road lengths running perpendicular to the slope of the site, in order to reduce run-off velocities.

- ❖ Road design should take into account the cleansing of stormwater through the use of grass swales, filter (buffer) strips, infiltration trenches etc.
- ❖ Road carriageways are required to be designed to minimise the amount of impermeable area through reduced road carriageway widths and / or porous pavements, in order to encourage infiltration of stormwater run-off into the soil strata.
- ❖ Any trunk drainage design should be based on a system of natural watercourses and designed to mimic natural conditions and in particular natural flows.
- ❖ The retention of the natural alignment and profile of watercourses, wherever possible.
- ❖ Water and stormwater quality improvement devices (SQIDs) such as detention basins, constructed wetlands, gross pollutant traps (GPTs), litter traps and sedimentation ponds should be designed as off-line systems, in order to maintain the physical integrity and aesthetics of the natural watercourse.
- ❖ Any stormwater outlets and discharge points are to be provided with energy dissipation devices, in order to minimise any potential scouring or erosion problems.
- ❖ The planting of indigenous vegetation within the subdivision, including any watercourse is recommended.
- ❖ All proposed WSUD treatment measures are to be considered upfront in the planning process and are to be incorporated into the proposed subdivision plan for the site at the time of lodgement of the Development Application. This is necessary to ensure all relevant WSUD treatment options are considered upfront for water quality and quantity objectives.

iii. Operating Times

General industrial operations are usually during daylight hours however it must be acknowledged that many operators may undertake during the early morning and evenings and night time to meet their market demand

3. Land Use Conflict Risk Assessment

3.1 Introduction

In this report, a risk assessment matrix is used to rank the potential Land Use Conflicts in terms of significance. The matrix assesses the environmental/public health and amenity impacts according to the:

- Probability of occurrence; and
- Severity of impact.

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The procedure of environmental/public health & amenity hazard identification and risk control is performed in three stages.

1. Environmental/public health & amenity hazard identification,
2. Risk assessment and ranking,
3. Risk control development.

Procedure:

1. Prepare LUCRA Hazard Identification and Risk Control form.
2. List all hazards associated with each activity.
3. Assess and rank the risk arising from each hazard before “controls” are applied on the LUCRA form.
4. Develop controls that minimise the probability and consequence of each risk using the five level methods. Record these controls on the form.
5. Re-rank each risk with the control in place to ensure that the risk has been reduced to an acceptable level. If the risk ranking is not deemed to be acceptable consideration should be given to whether the proposed activity should be allowed to proceed.

3.2 Risk Assessment and Risk Ranking

It is necessary to differentiate between an 'environmental hazard' and an 'environmental risk'. 'Hazard' indicates the potential for harm, while 'risk' refers to the probability of that harm occurring. For example, the presence of chemicals stored in a building is a hazard, but while the chemicals are stored appropriately, the risk is negligible. **Table 3.1** defines the hazard risks used in this report.

The Risk Ratings (severity of the risks) have been established by assessing the consequences of the risks and the likelihood of the risks occurring.

Table 3.1 Measure of Consequence

Level	Descriptor	Description	Examples/Implications
1	Severe	• Severe and/or permanent damage to the environment • Irreversible with management	• Damage or death to animals, fish, birds or plants • Long term damage to soil or water • Odours so offensive some people are evacuated or leave voluntarily • Many public complaints and serious damage to Council's reputation • Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
2	Major	• Serious and/or long-term impact to the environment • Long-term management implications	• Water, soil or air impacted badly, possibly in the long term. • Limited damage to animals, fish or birds or plants • Some public complaints Impacts pass quickly • Contravenes the conditions of Council's licences, permits and the POEO Act • Likely prosecution
3	Moderate	• Moderate and/or medium-term impact to the environment • Some ongoing management implications	• Water, soil or air known to be affected, probably in the short term • No damage to plants or animals • Public unaware and no complaints to Council • May contravene the conditions of Council's Licences and the POEO Act • Unlikely to result in prosecution
4	Minor	• Minor and/or short-term impact to the environment • Can be effectively managed as part of normal operations	• Theoretically could affect the environment or people but no impacts noticed • No complaints to Council • Does not affect the legal compliance status of Council

Level	Descriptor	Description	Examples/Implications
5	Negligible	• Very minor impact to the environment • Can be effectively managed as part of normal operations	• No measurable or identifiable impact on the environment

This report utilises an enhanced measure of likelihood of risk approach1 which provides for 5 levels of probability (A-E). The 5 levels of probability are set out below in **Table 3.2.**

Table 3.2 Probability Table

Level	Descriptor	Description
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or 'it has happened'
C	Possible	Could occur, or 'I've heard of it happening'
D	Unlikely	Could occur in some circumstances, but not likely to occur
E	Rare	Practically impossible

3.3 Risk Ranking Method

For each event, the appropriate 'probability' (i.e. a letter A to E) and 'consequence' (i.e. a number 1 to 5) is selected.

The consequences (environmental impacts) are combined with a 'probability' (of those outcomes) in the Risk Ranking Table (Table 3.3) to identify the risk rank of each environmental impact (e.g. a 'consequence' 3 with 'probability' D yields a risk rank 9).

The table yields a risk rank from 25 to 1 for each set of 'probabilities' and 'consequences'. A rank of 25 is the highest magnitude of risk that is a highly likely, very serious event.

A rank of 1 represents the lowest magnitude or risk, an almost impossible, very low consequence event.

Table 3.3 Risk Ranking Table

PROBABILITY	A	B	C	D	E
Consequence					
1	25	24	22	19	15
2	23	21	18	14	10
3	20	17	13	9	6
4	16	12	8	5	3
5	11	7	4	2	1

NOTE
A risk ranking of 25-11 is deemed as an unacceptable risk.

A risk ranking of 10-1 is deemed as an acceptable risk.

Thus, the objective is to endeavour to identify and define controls to lower risk to a ranking of 10 or below.

3.4 Risk Reduction Controls

The process of risk reduction is one of looking at controls that have and affect on probability such as the implementation of certain procedures; new technology or scientific controls that might lower the risk probability values.

It is also appropriate to look at controls which affect consequences e.g. staff supply with a mechanism to change impacts or better communications established. Such matters can sometimes lead to the lowering of the consequences.

Table 3.4 LUCRA Site Assessment

Site Feature	Condition/Comments	Potential Conflict
Noise	As a guide to achieve compliance (by distance attenuation alone) with the Suburban Noise Amenity Criteria a buffer of: ❖ 60m is required at night (10pm to 7am) ❖ 32m is required at evening (6pm to 10pm) ❖ 20m is required at day (7am to 6pm). Adopting the *precautionary principle* a nominal buffer of 60m from the closest point of industrial activities to the nearest sensitive receptor should be applied at the rezoning stage. Subject to further investigation by way of a Noise Impact Assessment this buffer may be reconsidered.	Moderate
Site Location: Vehicular Access	The subject site will have access from the Bruxner Highway. It is unlikely that the surrounding landuses will	Minor

	be significantly impacted by vehicle movements on the subject site.	
Operating Times	General industrial operations are usually during daylight hours however it must be acknowledged that many operators may undertake during the early morning and evenings and night time to meet their market demand The operating hours of future industrial premises especially with respect to the adjoining rural residential dwelling to the east have the potential to be a source of land use conflict.	Moderate to Major
Aspect	North and South	Negligible
Exposure	The wind roses indicate the following: • winds in the mornings are typically light winds from the west and south-west and to a lesser extent from the north; • winds in the afternoon are typically more moderate winds from the south, north-east, south-east and east; and • Calm conditions are experienced 8% of the time in the morning and only 1% of the time in the afternoons.	Negligible
Run-on and Upslope Seepage Site Drainage and Water pollution	Run-on or seepage from the development of the subject site on ongoing farm activities on the adjoining farmland will be minimal. The existing topography encourages runoff to a series of drains in a northerly direction The soils within the subject sites are deep (>200 cm), poorly to moderately well- drained alluvial Black Earths and Structured Clay. With a total area of approximately 16.20 ha there is ample capacity to assimilate and buffer water quality impacts via prudent Water Sensitive Urban Design	Minor
Dust	Background dust is generated from roads and exposed areas principally from vehicle movements. Local conditions, including wind strength and direction, rainfall, humidity and ambient temperatures, soil type, vegetative cover and type of on site activity determine the extent of the nuisance. The future industrial land release should be designed with Water Sensitive Urban Design	Minor

	(WSUD) Principles and specific conditions in accordance with the Protection of the Environment Operations Act 1997 to minimise the liberation of dust to sensitive receivers.	
Odour	Odour from industrial activities can arise from use of chemical, solvents, paints and fuels. Such detrimental odours can impact on residential amenity and have the potential to affect public health. Given the unknown nature of future industrial uses it is not possible to provide a definite risk rating however the proposed setbacks will provide the opportunity for some attenuation and amelioration.	Negligible to Minor
Air Quality Vehicles	Vehicle exhaust emissions can have a significant influence on local air quality in urban and suburban areas of Australia. Motor vehicles emit a variety of air pollutants that are known to be associated with adverse health impacts. Common air pollutants emitted by motor vehicles include fine particles, nitrogen oxides, volatile organic compounds such as benzene, toluene, ethylbenzene and xylene (BTEX). Exposure to these substances at particular concentrations is associated with a range of short and long term health effects, including on the heart and lungs. Air pollution concentrations tend to be highest adjacent to the road and decrease with distance from it. Areas that are not confined tend to have greater winds and breezes which in turn disperse and carry away air pollutants. The proposed Industrial rezoning has free flowing traffic and limited physical constraints therefore the risk to residents with respect to exposure to contaminates from vehicle related emissions is deemed to be negligible.	Negligible

The areas of moderate/major potential conflict outlined in Table 3.1 will be addressed through the following Risk Reduction Controls:

Table 3.5 Hazard Identification and Risk Control Sheet

Work undertaking				
Activity	**Identified Hazard**	**Risk Ranking**	**Method of Control**	**Controlled Ranking**
Noise	Noise from Industrial activities, mechanical equipment, vehicles , Out of hours activities	**C3 = 13** **Unacceptable**	Adopting the *precautionary principle* a nominal buffer of 60m from the closest point of industrial activities to the nearest sensitive receptor should be applied at the rezoning stage. Subject to further investigation by way of a Noise Impact Assessment this buffer may be reconsidered. The outcomes of a future Noise Impact Assessment will establish a project specific noise criterion for the future industrial land. Specific conditions would be ascribed to future Development Applications. Measures to mitigate noise impacts to an acceptable level may include: ❖ **Increasing the separation distance** ❖ **Installing Barriers and fencing** ❖ **Site and Building Layout** ❖ **Building construction methods**	**Further investigation required**

4 Conclusions and Recommendations

This Land Use Conflict Risk Assessment is based on:

- a review of Aerial Photography;
- a review of the existing lot layout;
- discussions with Property Owner Jeff Imeson;
- a site inspection;
- a review of the existing procedures and practices onsite; and
- a review of surrounding landuses.

This LUCRA has concluded that the subject site is suitable for consideration in Council's Industrial Land Strategy subject to the recommendations provided below:

1. A nominal buffer of 60m from the closest point of industrial activities to the nearest sensitive receptor should be applied at the rezoning stage.
2. A Noise Impact Assessment in accordance with the NSW Industrial Noise Policy (NSW EPA 2017) is to be prepared to assess the impact of the future Industrial Land Release on existing sensitive receptors

The outcomes of future Noise Impact Assessment will establish a project specific noise criterion for the future industrial land. Specific conditions would be ascribed to future Development Applications. Measures to mitigate noise impacts to an acceptable level may include:

- **Increasing the separation distance**
- **Installing Barriers and fencing**
- **Site and Building Layout**
- **Building construction methods**

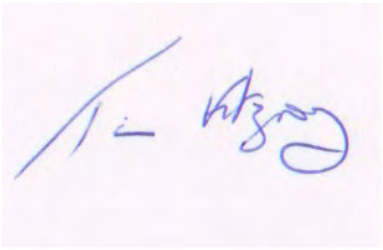
The proposed development should be designed to minimise instances of incompatibility such that normal rural residential amenity and farming practice are not inhibited. Where such instances do arise, measures to ameliorate potential conflicts should be devised wherever possible.

When considering potential land use conflict between rural dwellings, agricultural activities and industrial operations it is important to recognise that all agricultural and industrial activities:

- should incorporate reasonable and practicable measures to protect the environment in accord with the Protection of the Environment Operations Act (POEO) and associated industry specific guidelines; and
- are legally conducted as required by other legislation covering workplace health and safety, and the use and handling of chemicals.

Nevertheless, certain activities practised by even the most careful and responsible farmer may result in a nuisance to adjacent residential areas through, for example, unavoidable odour drift impacts.

This report has been prepared by Tim Fitzroy of *Tim Fitzroy & Associates.*



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References

Department of Primary Industries et al 2007 Living and Working in Rural Areas-a handbook for managing land use conflicts on the NSW North Coast, NSW

Planning Guidelines Separating Agricultural and Residential Uses, Queensland Department of Natural Resources 1997.

Personal Communication Jeff Imeson February 2018

Personal Communication Mike Perkins April 2018

Copyright and Usage

A Photographs

Photo A Looking Southwest

Photo B Looking East towards neighbouring Dwelling

Photo C Adjoining Industrial Use to the west

Photo D Adjoining Industrial Use to the west