Expert Witness Statement South Gippsland Planning Scheme Amendment C99

1. Name and Address

   Mr Tim Pollock

   c/ - GHD 180 Lonsdale St Melbourne

2. Qualifications and Experience

   - BE (Hons.) Monash 1968
   - M. Eng. Sci. Monash 1972
   - Member Clean Air Society
   - Professional Experience
     – 2002 - 2014 Principal Environmental Engineer, GHD
     – 1988 – 2002 Principal Environmental Engineer, CSF, CMPS&F, Egis
     – 1985 – 1988 Research Fellow, Monash Univ.
     – 1975 – 1985 Senior Environmental Engineer, Caldwell Connell Engineers

3. Areas of Expertise

   I have specialised in dispersion modelling in marine and air environments, the latter for the last 15 years. In the last 10 years I have conducted many buffer constraint assessments on existing and proposed industries with potential off-site impact, and have presented papers on buffer methodology.

4. Expertise to Prepare Report

   I have reported on buffer constraint assessments on many cases for Planning Panel and VCAT proceedings and have conducted such assessments for a range of industries with off-site odour impact.

5. Instructions which defined Scope of Work

   I have received instructions from Thompson Geer on behalf of Burra Foods to conduct a buffer assessment at the Korumburra Milk Processing Plant located on Station Street, Korumburra, Victoria, and to prepare an expert witness statement relating to that assessment.

6. Facts, matters and Assumptions Relied Upon

   - Site inspection by GHD
   - Review of Plans and Reports provided by Thompson Geer
   - Meteorological data from TAPM

- The description of operations at Burra Foods has been based on information provided by Burra Foods
- My experience relevant to odour impact assessments

7. Documents to be taken into account
   - Documents provided by Thompson Geer
   - GHD report # 226910
   - GHD document # 238429 – Response to submissions
8. Identity of other significant contributor to the report

   Michael Asimakis. Michael is an Environmental Scientist who has been employed with GHD for 6 years specialising in meteorological/air dispersion modelling and buffer assessments on existing and proposed industries with potential off-site impact.

9. Summary of Opinions

   The substantive portion of my statement is given in the GHD report # 226910 attached.

10. My opinions are not provisional except where specifically qualified.
11. The analysis presented in this report is within my area of expertise.
12. I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

T J Pollock

6 November 2014

Burra Foods Pty Ltd

Korumburra Milk Processing Plant

Buffer Assessment

November 2014

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1. Introduction

GHD was engaged by Burra Foods Pty Ltd (Burra Foods) to conduct a buffer assessment at the Korumburra Milk Processing Plant located on Station Street, Korumburra, Victoria.

Burra Foods had concerns in relation to the new Structure Plan introduced by Amendment C70 to the South Gippsland Planning Scheme (sub clause 21.04-5), being concerns about the intensity of future residential development in close proximity to the Burra Foods facility.

Milk processing plants are likely to have occasional offsite amenity impacts, principally related to odour and noise. Once released, odour cannot be constrained to eliminate impacts on adjoining land. Consequently there will be impacts from time to time due to fugitive emissions under normal operations, or significant odour releases under upset or malfunction scenarios.

Burra Foods are concerned that these amenity impacts may affect the land zoned for residential use, given its close proximity to industrial operations and the evidence of existing odour complaints. If this land is densely developed for residential uses then the amenity issues and complaints currently experienced would be potentially escalated.

The purpose of an amenity buffer distance is to provide sufficient separation between sensitive land uses (such as residences) and industries that have the potential to generate emissions of dust and/or odour that can, on the occasion of an upset or malfunction, cause disamenity off-site.

Recommended buffer distances are specified by Environment Protection Authority Victoria (EPA) for a range of industry categories.

Where there is an industrial use **proposed** on a land parcel, then the provisions of Clause 52.10[1] in the State section of planning schemes apply. The Table to that Clause lists 'threshold distances' for a range of industry categories that generally follow those used in the EPA buffer guidelines. A threshold distance for the 'Manufacture of milk products' is listed. In effect, if the industry is specified in the Table to the Clause, then the corresponding threshold distance to the nearest Residential Zone must be met, otherwise a planning permit must be sought.

In the case of an **existing** industrial use, the EPA recommended buffer[2] (now termed separation) distance should be considered when preparing a planning scheme or planning scheme amendment (by means of an overlay for example) in order to minimise amenity impacts.

South Gippsland Shire Council (Council) in a letter dated 30 April 2013 addressed to Burra Foods responded to Burra Foods' letter dated 7 March 2013 regarding the management of the amenity interface between the milk factory and surrounding land. To inform their response Council sought advice from the Department of Planning and Community Development (DPCD) and the EPA. Council investigated the potential of applying the Clause 52.12 threshold distance to the site – as drawn at a fixed (ie. radial) radius from the spray dryer. The consequent buffer was envisaged to be enacted by applying an Environmental Significance Overlay (ESO) to the land encompassed by the buffer. The ESO would trigger the need for a planning permit for all new sensitive land uses and subdivisions and require referral of such applications to Burra Foods and to the EPA for consideration.

However, a radial buffer is a simplistic approach which does not account for site specific factors such as the local meteorology. Thus to support the ESO preparation Council has requested

[1] Victorian Planning Provisions, Clause 52.10 "Uses with Adverse Amenity Potential"

[2] EPA Recommended Separation Distances for Industrial Residual Air Emissions, Publication 1518, March 2013

Burra Foods undertake some modelling to determine the extent of land currently and (in the light of plant expansions) in the future likely to be affected by the milk plant operations.

Thus this report considers the type and scale of operations of the Burra Foods plant and examines the industry categories in the buffer guidelines and Victorian Planning Provision (VPP) separation distances. The local meteorological conditions are also considered to assess whether, and to what extent, the buffer distance could be made to be directionally dependant in order to give a more equal risk of exposure to disamenity in the event of a process upset at this site.

The directional buffer adapts the default radial buffer to take account of the directions of good and poor dispersion – found from the meteorological data representative of local conditions. In the directions of poor dispersion the buffer is extended and in the directions of good dispersion the buffer can be retracted. The effect is to ensure that the degree of protection from exposure to impact (deposition of milk powder or odour from the plant) in the event of a process upset is independent of the direction of the residences from the plant.

Since the initial issuing of this report, one of the assumptions relating to the plant COD loading at year 2017 has changed. This resulted in a reduced buffer for the waste water treatment plant which in turn reduces the envelope buffer in an arc from the north-west to the north-east by approximately 45 m. This revised report documents that change.

The findings, conclusions and recommendations of this buffer assessment should be read in conjunction with the Limitations presented in Chapter 8.

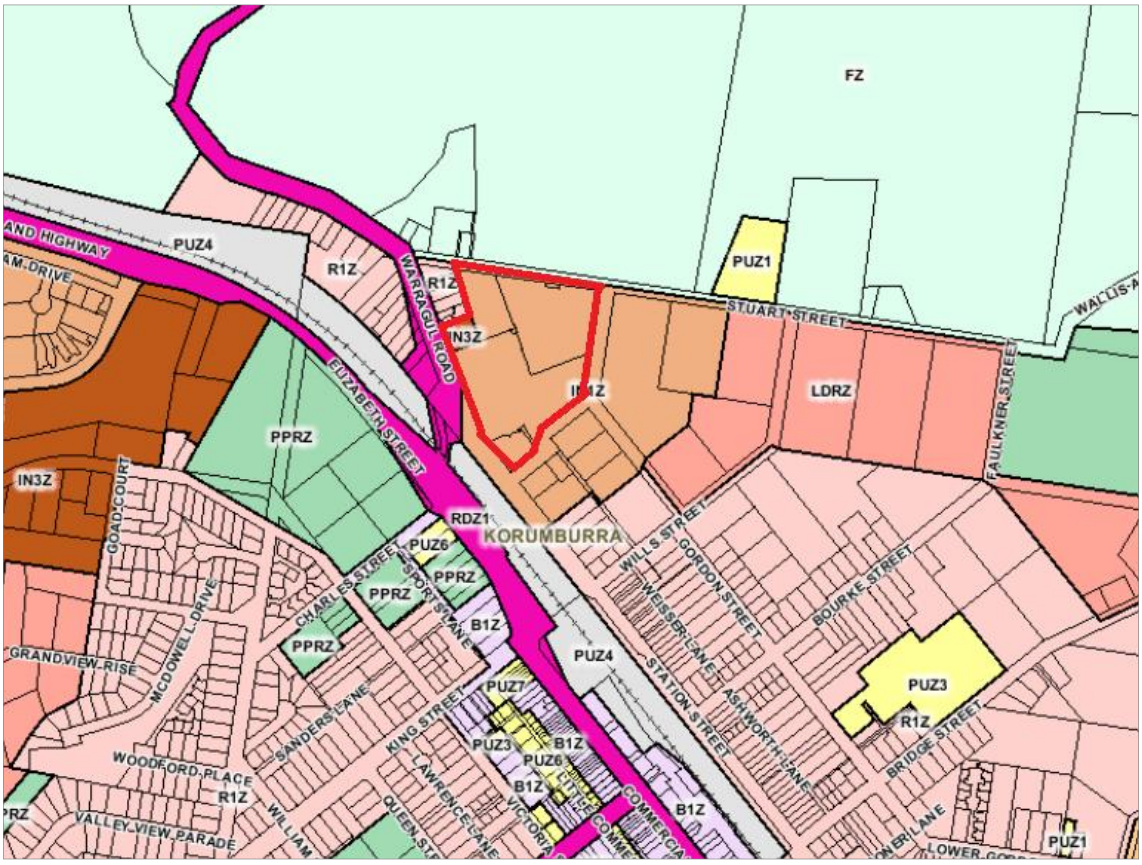
2. Project description

2.1 Location and land use

The Korumburra Milk Processing Plant is located at 47 Station Street, Korumburra, Victoria, and is subject to the provisions of the Planning Scheme operated by South Gippsland Shire Council. Korumburra Butter Factory / Burra Foods have been operating in Korumburra for over 113 years with operations re-commencing in 1991 after suspension of activity in 1974. An aerial photograph of the site is provided in Figure 1.

The milk processing plant, as shown below, is located on land zoned for Industrial 1, and is in turn surrounded by: (i) Farming (FZ) directly north of the site, (ii) Low Density Residential (LDRZ) to the east, General Residential 1 (GR) to the southeast, (iv) Public Park and Recreation Zone to the southwest and (v) a mixture of General Residential 1 (GRZ1) and Industrial 3 (IN3Z) to the west.

The LDRZ provides for low density residential development, a dwelling per minimum of 0.4 hectares.



Source: http://www.dpcd.vic.gov.au/planning

2.2 Nearest sensitive land uses

Sensitive land uses are now defined[3] to include residential premises, child care centres, pre-schools, primary schools, education centres or informal outdoor recreation sites. The nearest current sensitive land uses in relation to the milk processing plant are residences located directly south and west of the facility; just outside the site boundary within the land zoned GRZ1. The nearest residence on the land currently zoned LDRZ is located 170 m from the eastern site boundary of the Burra Foods plant.

2.3 Amendment C70

Amendment C70 replaced the existing Korumburra Planning Scheme provisions with new provisions to implement the Korumburra Structure Plan July 2010. In particular subclause 21.04-05 is replaced.

Burra Foods wish to maintain a buffer between the industry and future residential development to minimise potential for future land conflicts.

[3] EPA Recommended Separation Distances for Industrial Residual Air Emissions, Publication 1518, March 2013 – section 13

1:5,000

0 50 100 150

metres (at A4)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

N
W E
S

LEGEND

Site Boundary

GHD

CLIENTS PEOPLE PERFORMANCE

Burra Foods
Buffer Assessment

Job Number 3130792
Revision A
Date 02/10/13

Site Location

Figure 1

G:\DIR\JOBDIR\WORKSPACENAME.WOR

8/180 Lonsdale St Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com.au W www.ghd.com.au

Google Earth Imagery 2013. Created by:M.A

3. Manufacturing process

3.1 Key operating processes

Burra Foods have established a milk processing plant capable of handling 1.4 million litres of milk per day. The products currently being produced are cream cheese and frozen milk derivatives, milk powders, domestic industrial ingredients and nutritional powder formulations. The general process activities (inputs and outputs) for the current and proposed operations are provided below, with a site layout (current and proposed) shown in Figure 2.

3.1.1 Milk and cream receival and storage

Milk and cream are received daily in road tankers ranging in volume from 25,000 – 40,000 litres. These tankers are unloaded via flexible hoses and stored in silos. In the peak season (October – December) up to 1.4 million litres of milk and 50,000 litres of cream are received daily.

3.1.2 Milk and cream pasteurisation and separation

The first step in the process is to separate the milk into cream and skim milk. This is done by the use of centrifugal force through 2 separators at a 20°C temperature. These are known as "Cold Bowl "separators and are different from the norm, the norm being separation at 60°c. The reason Burra has adopted the cold bowl technology is to ensure quality and reduce bacterial growth. From the separators the skim milk and cream components are chilled to 5°C then stored for use in the manufacture of the above mentioned products.

3.1.3 Evaporation

Evaporation of milk products increases the solids content from about 9-13% (depending on what product is being produced at that time) to 50 to 55%. A vacuum is generated within the evaporator to lower the boiling point. As part of the evaporation process the outgoing product is cooled using the incoming milk stream. As part of the evaporation process there is a condensate stream generated (35-42 m^3/hour). This is cooled to approximately 20 °C via a cooling tower and treated to be reused within the factory.

3.1.4 Ammonia compressor plant

Expansion of ammonia liquid requires heat and this heat sink is used to chill water and create ice as a source of chilled water. Ammonia expansion is also used to refrigerate air forced through evaporators in freezer cells. The ammonia compressor plant receives and re-compresses ammonia gas to liquid. Heat generated in the compression is removed via two cooling towers located on the roof of the boiler house.

3.1.5 Steam boiler

The three steam boilers are a water tube design using natural gas. The plant has a capacity of 18 tonnes per hour

3.1.6 General storage

There can be as much as 900,000 litres of milk or milk concentrates stored on site at any one time.

3.1.7 Waste Water Treatment Plant (WWTP)

The WWTP consists of a high solids divert system, a 500 kL upfront waste buffer tank, a 50 kL anoxic pre-selector, three 500 kL aerobic bioreactors, four 50 kL gravity-settling tanks, two sand filters, a 250 kL final storage tank, a 250 kL aerobic digester, a 250 kL clean water tank, a DAF, Micro Filtration, Reverse, Osmosis plant, and a 2 ML emergency storage tank.

The high solids divert system protects the reactors from food overloading. Diverted solids are recycled as pig food.

The average flow of effluent directly through the treatment plant for the last 12 months has been 510 kL per day which can range from 320 kL/day to 850 kL/day depending on wash cycles.

The average COD loading into the plant is 450 - 600 kg per day. The BOD/COD ratio for milk effluent is approximately 0.65, so this equates to an average BOD loading of 292 - 390 kg per day.

The code of practice for small WWTP's[4] states that one person is equivalent to 50 gBOD/day which allows for the calculation of the equivalent population (e.p). Thus the current e.p of the plant (up to 390 kgBOD/day) is 7,800 people.

The new production process which was commissioned in early April 2014 has increased the BOD loading to 455 kg/day which equates to an e.p of 9,100 people.

With government assistance over the last 12 months Burra has undertaken water recovery and waste handling works and has spent $1.4m on a micro-filtration membrane plant and a dissolved air flocculation plant. These seek to ensure that extra volumes meet EPA requirements. Both are now being commissioned.

3.2 Future upgrades

Burra Foods expect to continue to grow and envisage an increase of daily processing in the future. This most recent initiative is designed to supply not only the commodity milk powder products but also to specialise in dairy nutritionals.

Burra Foods' objective is to supply infant formula for the growing market in China .The product is to be a high quality milk powder, nutritional formulations and functional dairy ingredients with exceptional standard of products and flexibility.

Recently Burra established a wet mix plant and would like in the future to include new twin evaporators and a dryer, as part of a new specialty power mixing and hydration process. The latter is currently being planned for but is not confirmed to be built, requiring $90m financing, however if it does go ahead Burra Foods hope it could be built and operational by 2017 at the earliest.

New production processes and water recovery systems have seen the volume of biological dissolved oxygen (BOD) loading to the WWTP increase by approximately 300-400 kL per day in extra volume and by 80-100 kg of chemical oxygen demand (COD) per day.

If future plans proceed the future COD load into Burra Foods WWTP are estimated to increase to be 900 kg/day. This equates to a BOD loading of 585 kg per day, equating to an e.p of 11,700 people.

Note that this figure has changed from the original GHD report dated December 2013, this is due to a reduction in the proposed COD loading for the proposed future upgrade. The original estimate of 2612 kg/day has reduced to 900 kg/day as provided by Burra Foods.

[4] EPA Victoria - Code of practice for small WWTP's June 1997

3.3 Potential air emissions

3.3.1 Particulates and general constituents

Milk dryer

The primary source of fine particulates ($PM_{2.5}$ and PM_{10})[5] would be from the existing milk dryer and proposed new dryer. Particulate emissions from these driers are ducted to a baghouse to retrieve product. The baghouse emissions are released via a 32.5 m stack.

A possible upset scenario that could lead to off-site dust impact is to be a failure of one or more of the filter bags – leading to an unmitigated emission of dust from the milk drying process.

Very recently there was an incidence with dust emissions. It was caused by faulty air filters/bags in the milk dryers supplied to Burra. Immediate action was taken to replace the filters/bags and assistance was provided to residents who were affected by the dust emissions. The EPA issued a minor abatement notice but it has now been rescinded as the problem has been rectified.

Burra has committed to install a further safeguard measure to prevent dust emissions by introducing a water curtain inside the exhaust stack, so that if some dust gets through the system (eg a bag fails) water sprays will act to scrub it from the stack. The curtain is activated by an alarm when sensor-monitored in-stack dust levels exceed a set-point value.

Boilers

Emissions from the natural gas boilers include oxides of Nitrogen (NOx) and Carbon Monoxide (CO).

3.3.2 Odour

WWTP

The predominant source of odour generation is from the on-site WWTP providing treatment to waste streams prior to discharge to the local creek.

Possible upset scenarios that would generate increased odour impact include: anaerobic conditions, emergency tank being used, failure of aerators and overloading of the plant in peak season.

Odour control includes a biofilter but this is only used in emergency situations should there be an overload of the plant. A biofilter will be commissioned by December 2014 to deodorise air from the DAF sludge tanks and buildings housing the new DAF plant.

3.4 Noise emissions

The identified noise sources at the facility include blowers, pumps in the WWTP area and at the ammonia compressor plant.

The other major noise source onsite is from the delivery trucks. Trucks deliver milk to the plant on a 24 hour basis.

The general plant operations are all enclosed within buildings which mitigates most noise.

[5] Particulate matter with an equivalent aerodynamic diameter of 2.5 micrometres or less

3.5 EPA licence

Burra Foods' EPA licence (#46572) for Milk processing (D07) allows for the discharge of treated process water and condensate to Coalition Creek via the existing wetlands. The licence does not include any discharge to air conditions. However, the licence does stipulate general amenity conditions. The three amenity conditions are as follows:

- Offensive odours must not be discharged beyond the boundaries of the premises;
- Unacceptable noise (including vibration) must not be emitted beyond the boundaries of the premises; and
- Nuisance airborne particles must not be discharged beyond the boundaries of the premises.

3.6 Complaint history

3.6.1 Odour

Burra Foods have supplied odour complaint data from the past 3 years which indicate that 55 complaints were received since 2011 due to the commencement of the plant upgrade installation of the milk dryer and boilers. Some of these complaints have been determined to be sewer related and not connected with Burra Foods WWTP. Upset overloading occurred at the WWTP resulting in detectable odour off-site.

Over the last 12 months the complaints have reduced significantly, down to less than 10 due to the optimisation of onsite processes. A number of odour complaints have been made by the resident located 170 m east from the eastern site boundary, which is located next to the WWTP downwind and in a gully. The new equipment will greatly reduce any odour as it has the capacity to take twice the volume of waste to the WWTP, rather than some sitting in tanks.

However, to the extent that existing residents are within the zone of potential odour impact, it may be the case that they have acclimatised to the occasional exposure – for these residents, in effect it has become part of the background palette of ambient odour. This situation may not be replicated with the development of new residential areas within the land zoned currently LDRZ – new residents may find odour from the milk plant unusual and objectionable and this may result in an increased number of complaints.

3.6.2 Dust

There have been 9 complaints regarding dust or particulates in the period Oct/Nov 2014. Complaints were received about the recent incident caused by faulty air filters/bags in the milk dryers.

3.6.3 Noise

There have been some noise complaints but none of these have been sourced to Burra Foods.

Figure 2 Site layout

GHD ALECTIA BURRA FOODS AUSTRALIA

PROPOSED SITE PLAN AND AERIAL PHOTO

Date November 2013
Job Number 31-30828
Scale 1000
Revision A

4. Meteorology

No observational meteorological data of sufficient quality was available for Korumburra. The characterisation of local wind patterns requires accurate site-representative hourly recordings of wind direction and speed over a period of at least a year. There is a substantial distance to the nearest meteorological observation data sites. These are located in the Latrobe Valley, Pakenham in outer Melbourne, Rhyll (Phillip Island) and Pond Creek (Wonthaggi) to the south. Given that the terrain is complex between the plant and each of these sites, it is unlikely that any of the sites will be representative of wind conditions at the process plant. Therefore, to undertake the buffer distance assessment, a synthetic data set, representative of the local meteorological conditions at the processing plant was constructed using the 3D prognostic modelling package TAPM, according to the EPA Victoria meteorological data file construction procedure.[6]

4.1 TAPM modelling

A TAPM simulation to synthesise meteorological data at the Korumburra milk processing plant was created and the site meteorology was determined for the selected year 2008, based on synoptic observations, local terrain and land use information with a resolution of 300 m. The TAPM model parameters are summarised in Table 1. All TAPM parameters were selected to comply with EPAV (2012) meteorological data file construction guidelines.

Table 1 TAPM model parameters

Parameter	Value
Modelled Year	2008
Domain centre	UTM: 55 H 397,435 m E, 5,746,380 m N Latitude = 38° 25' 30" Longitude = 145° 49' 30"
Number of vertical levels	25
Number of Easting Grid Points	41
Number of Northing Grid Points	41
Outer Grid Spacing	10,000 m x 10,000 m
Number of Grid Levels	4
Grid Level Spacing	Level 2 – 3,000 x 3,000 m Level 3 – 1,000 x 1,000 m Level 4 – 300 x 300 m
Total Inner Grid Size	12.3 km x 12.3 km

[6] EPAV, 2012. Construction of Input Meteorological Data Files for AUSPLUME. EPA Victoria, Publication 1459, April 2012.

4.2 Regional climate and prevailing meteorology

The local climate at the Korumburra milk processing plant is affected by broader regional patterns of synoptic pressure and wind with embedded weather systems. Synoptic features vary in intensity and location according to the season. For instance, during summer a high-pressure belt is usually found over or just to the south of Australia, bringing warm weather while the subtropical easterlies cover most of the continent. In winter, the subtropical high-pressure belt is usually located further north over the continent, allowing westerly winds and occasional frequent strong cold fronts to affect southern Australia.

4.3 Wind pattern

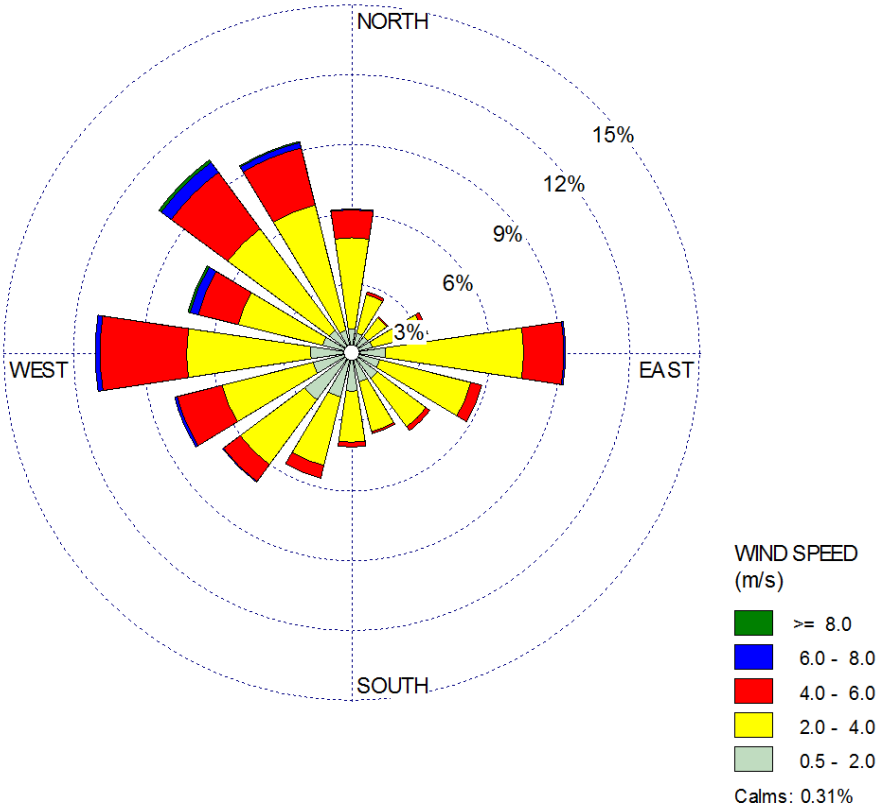
The effect of wind on odour dispersion patterns can be examined using the general wind climate and atmospheric stability class distributions. The general wind climate at a site is most readily displayed by means of wind rose plots, giving the incidence of winds from different directions for various wind speed ranges.

The features of particular interest in this assessment are: (i) the prevailing wind directions and (ii) the relative incidence of more stable light wind conditions (defines peak impacts from ground-based sources).

4.3.1 Annual and seasonal variation in wind

The average wind rose for the entire data period is shown in Figure 3 and indicates that predominant annual average wind directions are from the west (WSW to NNW) comprising of 46 per cent of incident winds, with lesser extents from the east comprising of 9 per cent of incident winds. The annual average wind speed measured was 3.0 m/s. The observed wind speed distribution indicates that the largest proportion of high wind speeds (> 6 m/s) are from the northwest and the largest proportion of light winds (< 2 m/s) are from the southwest.

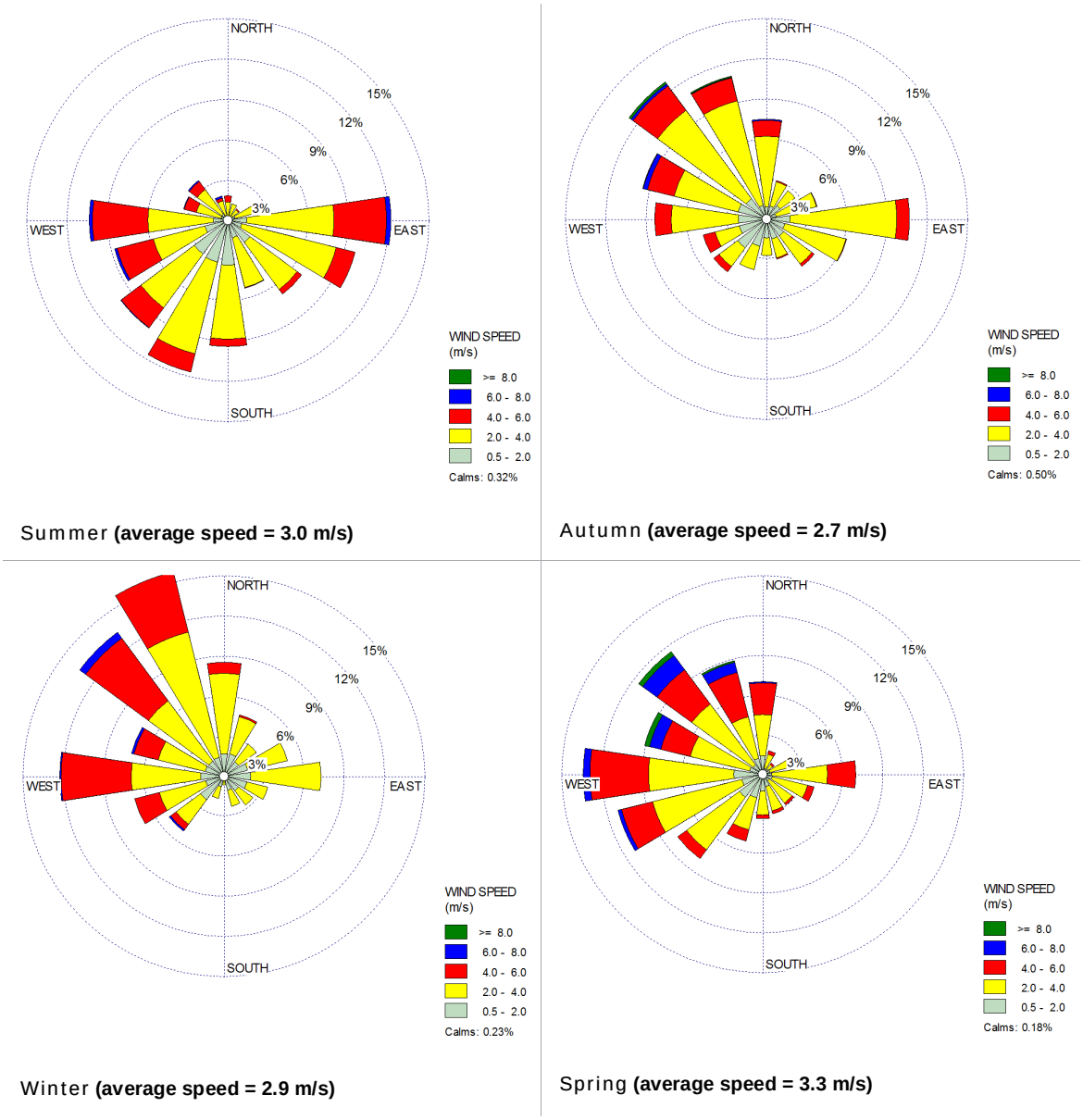
Figure 3 Annual wind rose for Korumburra



The seasonal wind roses in Figure 4 below show that:

- In winter the winds are predominantly from the west to north-northwest; this observation reflects a combination of cool air drainage flows from the surrounding hills and the broader synoptic scale westerly winds during winter.
- In summer the winds are equally divided between the west-southwest and east primarily due to the summer sea breezes, alignment of the local valley and synoptic scale winds with regular cold fronts.
- Autumn and spring are transitional seasons with a mixture of both winter and summer observations.

Figure 4 Seasonal wind roses for Korumburra



Summer **(average speed = 3.0 m/s)**

Autumn **(average speed = 2.7 m/s)**

Winter **(average speed = 2.9 m/s)**

Spring **(average speed = 3.3 m/s)**

4.4 Pattern of atmospheric stability

In the Pasquill/Gifford atmospheric stability scheme, stability is classified into six classes, namely A through F. A, B and C stability classes represent strongly, moderately and slightly unstable atmospheres respectively. Under unstable conditions dispersion of emissions from near-ground sources is good due to convectively vertical turbulent mixing. The stability category D denotes neutral atmospheric conditions (strong winds in moderate temperatures or lighter winds on overcast to partly cloudy days). Categories E and F denote slightly and moderately stable atmospheres when dispersion is poorest, as vertical mixing of air is suppressed. Stable atmospheric conditions occur in the absence of strong gradient winds, and mostly on nights with clear skies. They are often associated with ground-based radiation forced temperature inversions, sometimes with fog, mist or frost.

Neutral stability (D class) conditions occur most frequently and along with the prevailing wind direction can indicate the most common direction for potential odour impact. Under night-time E and F class conditions, odour emissions from ground based sources; result in a downwind plume that is detectable to a greater distance than during the day. It is commonly these conditions that result in odour complaints at maximum range.

Figure 5 shows the stability rose for the entire data period. Neutral (D), unstable (A, B and C classes) and stable (E and F) atmospheric conditions all occur in approximately equal portions of 33 per cent. Figure 5 shows that the majority of stable winds are from the north-northwest and east.

Figure 5 Annual stability rose for Korumburra

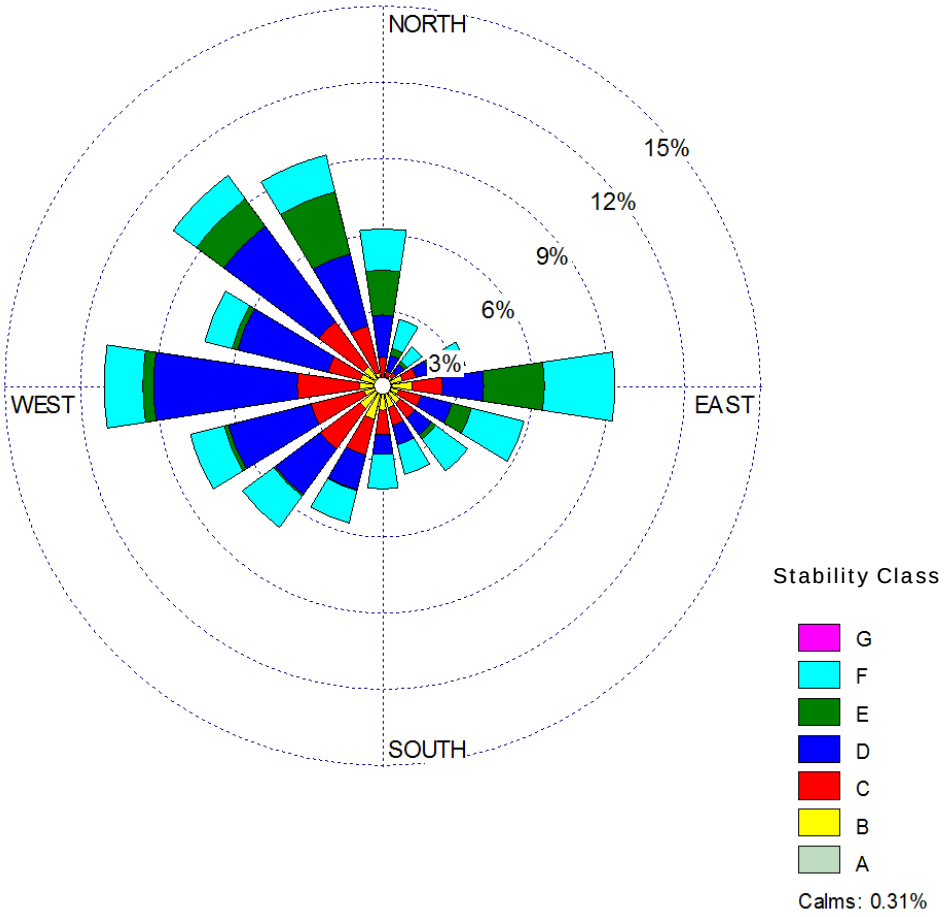
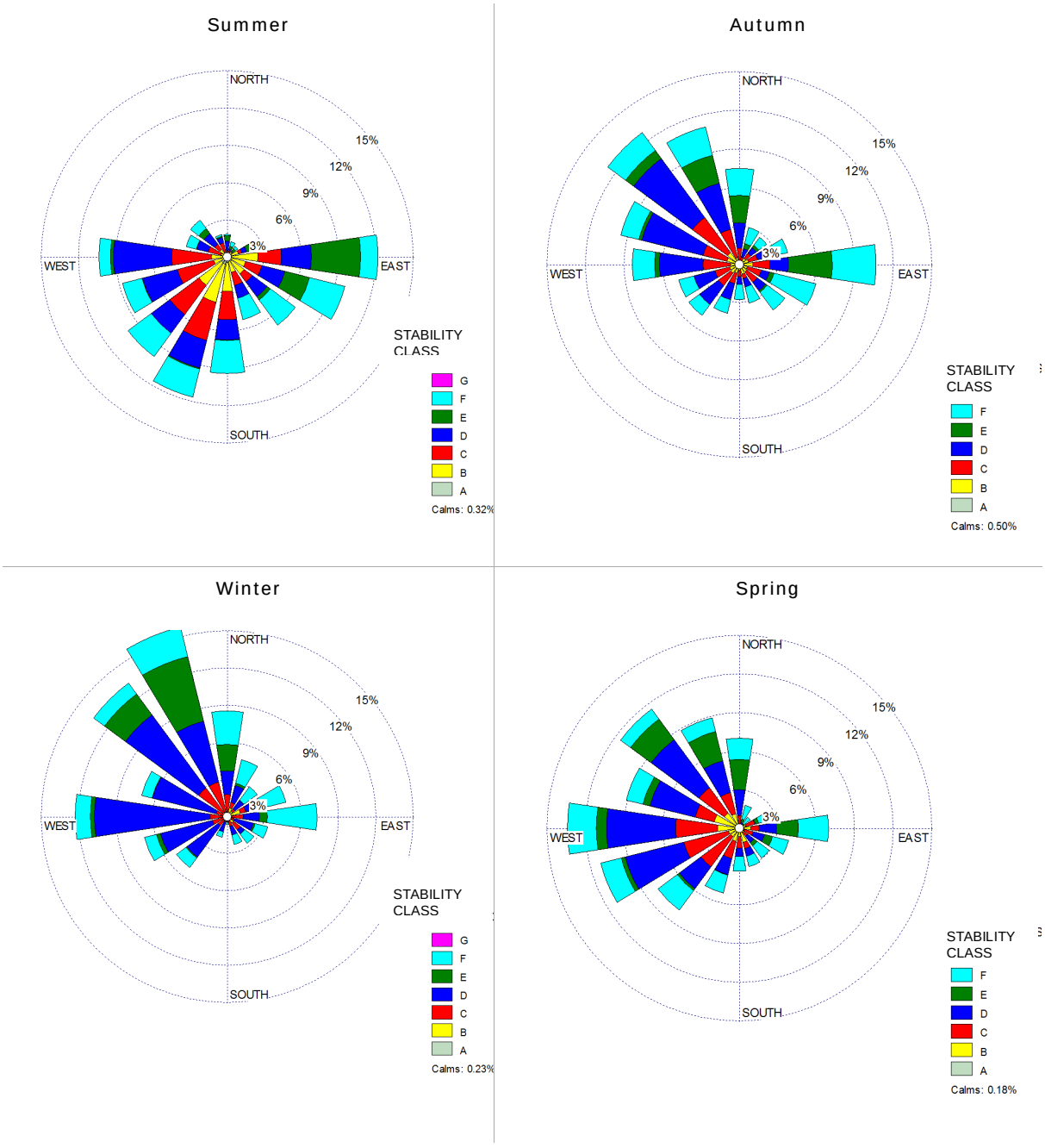


Figure 6 shows the following seasonal variation trends in atmospheric stability:

- In summer, the peak occurrence of stable winds is from east and southerly winds;
- In winter, stable winds predominate from the north-northwest;
- In autumn, stable winds are split between east and north-northwest directions; and
- In spring, stable winds predominate from the northwest, but there is reasonable degree of variability.

Figure 6 Seasonal stability roses for Korumburra



5. Relevant buffer guidelines

Two classes of buffer /separation distance guidelines are relevant in the context of planning in Victoria. Where an industrial use is proposed on a land parcel, then the provisions of Clause 52.10[7] in the State section of planning schemes apply. In effect, if the industry is specified in the Table to the Clause, then the corresponding threshold distance to the nearest Residential Zone, Business 5 Zone, Capital City Zone or Docklands Zone must be met, otherwise a planning permit must be sought.

In the case of an existing industrial use, then EPA recommend buffer distances should be considered when preparing a planning scheme or planning scheme amendment. A buffer distance is a planning instrument used to provide separation of sensitive land uses (i.e. residential, schools, hospitals) from existing premises with the potential for off-site emissions (odour or dust) that can cause disamenity in the event of an upset/malfunction. Under routine operations, odour impact is to be confined on-site so that an external buffer should not be required.

Council investigated the potential of applying the Clause 52.12 threshold distance to the site – as drawn at a fixed radius from the spray dryer. The consequent buffer was envisaged to be enacted by applying an Environmental Significance Overlay (ESO) to the land encompassed by the buffer. The ESO would trigger the need for a planning permit for all new sensitive land uses and subdivisions and require referral of such applications to Burra Foods and to the EPA for consideration.

However, a radial buffer is a simplistic approach which does not account for site specific factors such as the local meteorology. Thus to support the ESO preparation Council has requested Burra Foods undertake some modelling to determine the extent of land currently and (in the light of possible plant expansions) in the future likely to be affected by the milk plant operations.

5.1 Threshold separation distances

The table to Clause 52.10 does include an entry for the 'manufacture of milk products' requiring a buffer distance of 300 m.

Clause 52.10 provides the minimum separation distance required from any part of land in a residential zone. The purpose of the Clause is to require a permit to be sought before milk processing activities can be established within 300 m of a residential zone, based on the adverse amenity impacts of such industries. However, as the industry is already established in this case it is therefore not appropriate to apply the 300 m buffer to the milk processing plant (milk dryer stack) for air emissions.

5.2 EPA buffer guidelines

EPA publish[8] recommended buffer distances for selected industry categories (EPA Guidelines). Buffer distances can define zones of land off-site from the industry premises which are constrained from development for sensitive land uses. Sensitive land uses include residences, hospitals, schools, caravan parks and informal recreation sites.

The EPA Guidelines recommend a buffer distance of 100 m for 'milk processing'. This buffer is to protect against an amenity impact from an upset occurring at the spray dryer i.e. dust and particulates. The WWTP at Burra Foods would also require a buffer in the event of an upset or malfunction to protect against offsite odour impact. The EPA recommended separation

[7] Victorian Planning Provisions, Clause 52.10 "Uses with Adverse Amenity Potential"

[8] EPA Recommended Separation Distances for Industrial Residual Air Emissions, Publication 1518, March 2013

distances includes a category for sewage treatment plants (STPs). The separation distance is linked to the type of plant and the size of the population that they serve.

Generally the threshold distances for a given industry are the same as the corresponding separation distance for that industry as specified by the EPA guideline. However, in this case (as also for concrete batching) the threshold distance is triple that of the separation distance. Though there is no documented reason for this discrepancy, it is considered that it relates to the wider ambit of off-site impact considered in Clause 52.10. 'Adverse Amenity' appears not to be defined in the Victorian Planning Provisions (VPPs), however, it may include considerations of traffic noise from vehicles entering and exiting the premises, noise from plant operations on-site and light spill impacts that are outside the scope of the EPA guideline. GHD propose that this 300 m buffer be used for all potential noise sources.

5.2.1 Application to Burra Foods WWTP

The plant at Burra Foods can be considered to be a mechanical/biological wastewater plant. Although this WWTP is treating milk waste rather than domestic waste, the separation distances for the latter can be adopted for Burra Foods provided it is 'normalised' by the BOD loading. This was done in Section 3.1 and the consequent e.p. equivalent to a STP is given below and used with the formula given in Table 6 of the guideline to determine a separation distance.

Thus the separation distance required for the current operations with an e.p of 7,800 is 200 m while the separation distance now required with an e.p of 9,100 is 210 m and if future plans proceed with an e.p of 11,700 is 227 m. Given that the increase in capacity is likely to occur in the near future, GHD recommend that the 227 m buffer apply to the WWTP to account for odour emissions.

GHD has applied the 100 m buffer distance to the two milk dryer stacks and the 227 m buffer distance to the WWTP and is shown in Figure 7. The two buffer distances have been scribed from the envelope of potential sources as required in the EPA separation guidelines (indicated by the dark blue line around the WWTP sources). From the figure it can be seen that the 100 m buffers from the spray dryer stacks are mostly confined within the site boundary with a marginal extension across the eastern site boundary and a larger extension across the western boundary to encompass ~4 existing residential premises. The 227 m buffer from the WWTP extends well outside the site boundary to encompass a number of existing residences including the residence east of the site which has lodged a number of odour complaints. The 227 m buffer extends east (up to ~200 m) to encompass a portion of the land in the Low Density Residential zone. It also extends some 210 m north into land zoned for Farming.

5.3 Appropriate buffer for Burra Foods

In assessing buffer requirements for the facility, GHD understands that the plant has the following features:

- A baghouse on the inlet to the spray drying stack to capture particulates – preventing them from being released into the atmosphere; and
- A biofilter within the WWTP to be used in an emergency situation should there be an overload of the plant.

On the basis of the above features, GHD concludes that a buffer of 100 m would be appropriate for the spray dryers and that a buffer of 227 m is required for the WWTP to account for all potential air emissions.

However, the above buffers in the EPA guidelines refer only to odour/dust emissions not noise. There are no specific buffer guidelines for noise. The most relevant guideline would be Clause 52.10 which is to protect existing residents from adverse amenity when a new industry is

proposed to be located nearby. As discussed earlier a milk processing facility in Clause 52.10 has a recommended buffer distance of 300 m. Thus 300 m should be used in the absence of any other specific guideline to protect the existing residents from any off-site noise impact. The 300 m distance would apply to any of the identified noise sources in Section 3.4. Figure 7 also shows the default 300 m when applied to the envelope of potential noise sources. The 300 m buffer encompasses a number of existing residents and portion of land under question to be rezoned from low density to future urban residential.

Any land encompassed by the three default buffer zones (100 m, 227 m and 300 m) outside of the site boundary should, as a minimum, be included in the Environmental Significance Overlay (ESO). The ESO would trigger the need for a planning permit for all new sensitive land uses and subdivisions and require referral of such applications to Burra Foods and the EPA for consideration with these buffers. GHD recommends that any land within these buffers is not rezoned to allow more intense urban residential use as it would increase the possibility of further odour and noise complaints.

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metres (at A4)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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LEGEND

- Site Boundary
- EPA Buffers
- Dryer Stack
- Odour Source Envelope
- Noise Source Envelope
- 52.10 Threshold Distance

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Default Buffers

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Revision A
Date 20/11/2014

Figure 7

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6. Directionally-dependant buffer

Where site-representative meteorological data is available, the directions of good and poor dispersion can be identified as shown in Chapter 4. Further, if the 12 month dataset is configured to the approved dispersion model Ausplume format (deriving atmospheric stability category), then dispersion modelling can be conducted using a nominal odour source emission rate to assess the directional change in extent from a default radial buffer[9].

The buffer so formed is sized to have the same enclosed area as the radial default buffer and is termed a directional buffer. A directional buffer has the advantage that the protection afforded by its separation is independent of the direction from the source. Note that the directional buffers only apply to those buffers for air emissions as local meteorology does not have the same effect on noise as it does to air emissions.

Directional buffers were formed for the 100 m and 227 m radial buffers using the Korumburra 2008 meteorological dataset (refer to Section 4.1). It is these two buffers that are required for air emissions. A nominal 10 m x 10 m area source with a nominal constant emission rate was taken to represent the odour emissions in the event of a process upset. Dispersion modelling using Ausplume V6.0 was conducted, and the 99.5% contour level that gave the same enclosed area as a 100 m and a 227 m radius circle was selected.

From Table 2 it is seen that the extent of the contour is irregular, with distances greater than 100 m to the west, northeast and easterly directions (out to 140 m to the west). To the southwest, the extent of the contour is significantly less than 100 m, down to 56 m. This contour effectively gives the departure from the fixed 100 m radius that would be required if an equal exposure to disamenity was to be given in the event of an upset/malfunction at the Burra Foods site.

Table 3 shows the directional variation in the 227 m buffer in response to local meteorology. Again, it can be seen that the contour is irregular with distances greater than 227 m to the west, northeast and easterly directions (out to 318 m to the west). To the southwest, the extent of the contour is significantly less than 227 m, down to 127 m. This contour effectively gives the departure from the fixed 227 m radius that would be required if an equal exposure to disamenity was to be given in the event of an upset/malfunction at the Burra Foods site.

From Figure 8 it can be seen that the directional buffers extend further east and west compared to the default buffers shown in Figure 7, approximately 40 m east and 85 m west. A contraction is seen to the south with a small extension to the north. Note that the 100 m directional buffers for the spray dryers are contained within the 227 m WWTP directional buffer.

[9] Clarey P, Pollock T "Integrating Separation Distances with Dispersion Modelling" Enviro 04, 28 Mar – 1 April, Darling harbour, Sydney

Table 2 Directional variation in 100 m buffer in response to local meteorology

Direction		Range	% of mean	Direction		Range	% of mean
Sector	**deg.**	**(m)**	**range**	**Sector**	**deg.**	**(m)**	**range**
N	0	95	95	S	180	95	95
	15	113	113		195	93	93
	30	97	97		210	69	69
NE	45	112	112	SW	225	56	56
	60	120	120		240	65	65
	75	93	93		255	93	93
E	90	116	116	W	270	140	140
	105	104	104		285	122	122
	120	81	81		300	126	126
SE	135	79	79	NW	315	84	84
	150	96	96		330	89	89
	165	93	93		345	93	93

Table 3 Directional variation in 227 m buffer in response to local meteorology

Direction		Range	% of mean	Direction		Range	% of mean
Sector	**deg.**	**(m)**	**range**	**Sector**	**deg.**	**(m)**	**range**
N	0	216	95	S	180	216	95
	15	257	113		195	211	93
	30	220	97		210	157	69
NE	45	254	112	SW	225	127	56
	60	272	120		240	148	65
	75	211	93		255	211	93
E	90	263	116	W	270	318	140
	105	236	104		285	277	122
	120	184	81		300	286	126
SE	135	179	79	NW	315	191	84
	150	218	96		330	202	89
	165	211	93		345	211	93

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metres (at A4)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

N W E S

LEGEND

- Site Boundary
- Directional Buffers
- Odour Source Envelope
- Dryer Stack
- Default 227 m Buffer

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Directional Buffers

Figure 8

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7. Conclusions and recommendations

7.1 Conclusions

The analyses provided in this report lead to the following conclusions. They should be read in conjunction with the Limitations of Chapter 8.

Based on GHD's knowledge of Burra Foods plant and relevant buffer guidelines, it is concluded that:

- All dust emissions generated in the milk drying process (milk spray dryers) will be captured and treated via the baghouse and the water curtain inside the chimney;
- Any potential odour upset at the WWTP will be avoided by a biofilter to deodorise the air from the back sludge tanks and buildings housing sludge, by December 2014;
- There have been some odour and dust complaints sourced to the plant while there has been no noise complaints sourced to the plant;
- In the case of an existing industrial use, the EPA recommended buffers for residual air emissions are: (i) a 100 m buffer from the spray dryers and (ii) a 227 m buffer from the envelope of WWTP sources to cater for future growth of the Burra Foods plant;
- There are no specific buffer guidelines for noise. The most relevant guideline would be 300 m as specified in Clause 52.10 for milk processing facilities;
- The default 300 m and 227 m buffers extend east to encompass a portion of the land in the Low Density Residential zone. They also extend north into land zoned for Farming and encompass a number of existing residences surrounding the plant within residential zoned land;
- The effect of accounting for local meteorology is to develop a directional buffer that increases the default value of the buffers for residual air emissions to the east and west. This extension increases the amount of land encompassed to the east zoned Low Density Residential.

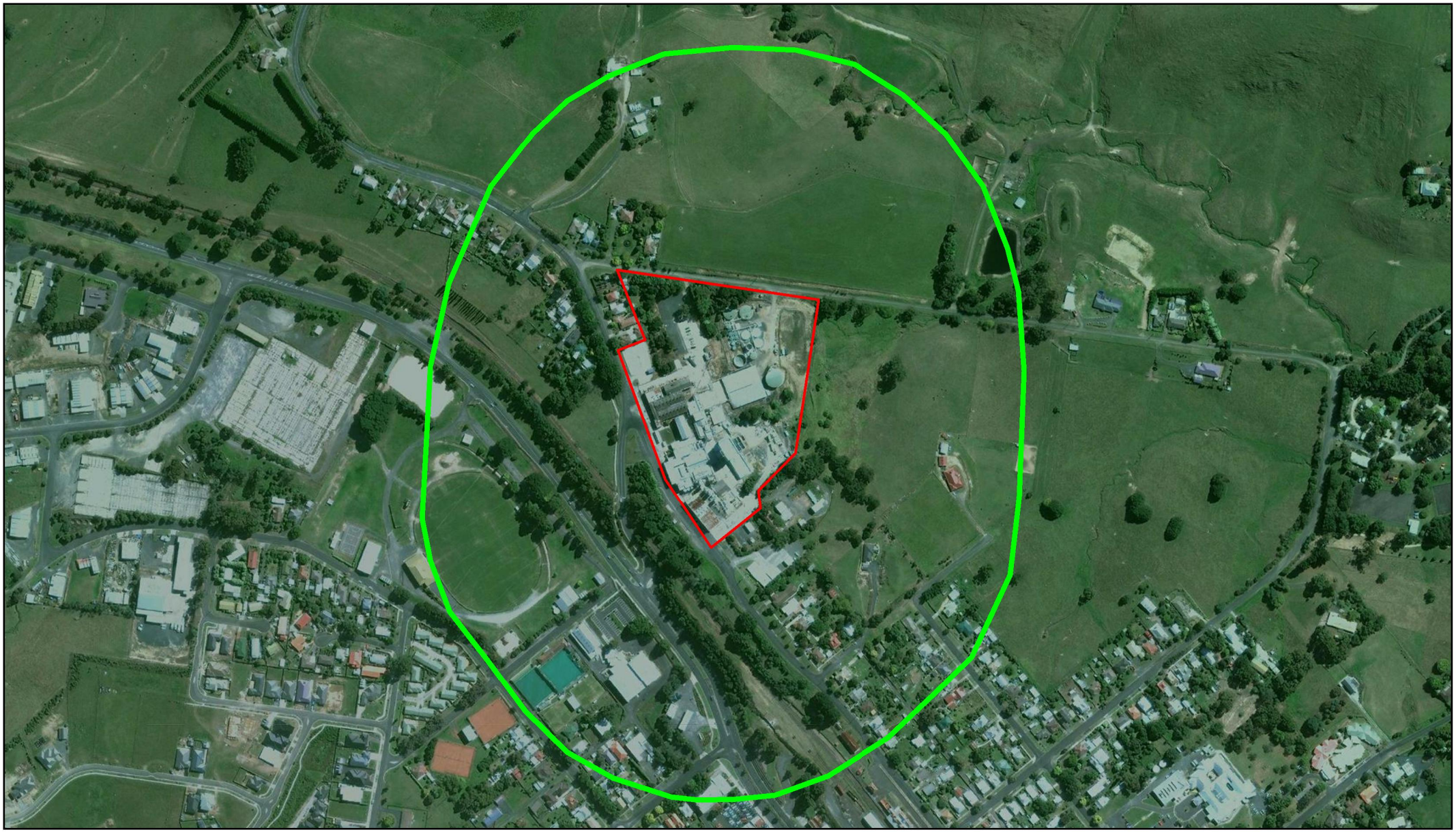
7.2 Recommendations

The following recommendations are focussed on defining the extent of the ESO so that the operations of Burra Foods at the Korumburra plant are not constrained by inappropriate residential development in proximity to the plant.

- GHD recommends that the 100 m and 227 m directional buffers for the potential air emissions namely dust from the dryer stack and odour from the WWTP be included in the ESO rather than the default buffers for the two sources. This would give a more equal risk of exposure to disamenity in the event of a process upset at this site to cater for future growth of the Burra Foods facility; and
- GHD also recommends that the 300 m default buffer for noise and light emissions be included in the ESO.

The recommended ESO is presented in Figure 9 below which is the outer envelope of the 227 m directional buffer and 300 m default buffer for noise and light emissions.

The ESO would trigger the need for a planning permit for all new sensitive land uses and subdivision and require referral of such applications to Burra Foods and the EPA for consideration with these buffers. GHD recommend that any land within these buffers does not get rezoned to allow more intense urban residential use as it would increase the possibility of further odour and noise complaints. The new residents may find odour or noise from the milk plant unusual and objectionable and this may result in an increased percentage of complaints from these residents.



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metres (at A4)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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LEGEND

Site Boundary

Recommended ESO

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Revision A
Date 20/11/14

Recommended ESO

Figure 9

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7.3 Planning scheme amendment C99

Public exhibition of Planning Scheme Amendment C99 (Burra Foods Buffer – the recommended ESO) occurred across July 2014. A total of 91 submissions were received of which 74 objected and 17 supported the proposed Amendment.

Council resolved to reduce the buffer area in response to submissions and to align it with title boundaries. Burra accepts this. However where submissions cannot be resolved, an Amendment must be referred to an Independent Planning Panel (Panel) for consideration.

One of the common themes from the submissions was that the GHD report was flawed based on the fact that it was conducted for Burra Foods without an independent assessment; however EPA has since reviewed the GHD report and was satisfied that it adequately addressed the issues of meteorology and dispersion modelling. Overall the EPA considered that the analysis presented in the GHD report for the scope of application of the ESO to be justifiable.

The other main issue related to the purpose of the ESO, and how a buffer could prevent or a least guarantee the protection of people and property from emissions in the future.

The purpose of the ESO is:

- To implement the State Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning polices
- To identify areas where the development of land may be affected by environmental constraints
- To ensure that the development is compatible with identified environmental values

In this case the ESO will be used to prevent future residential encroachment on industrial facilities. ESOs can be used in planning schemes to minimise this encroachment. EPA has identified that residential encroachment on critical industrial facilities as one of its current focus areas.

The EPA acknowledge that even with good pollution control technology in place and best practices adopted, there may be still unintended emissions from industrial facilities due to for instance, equipment failures, accidents and abnormal weather conditions. For this reason, EPA recommend that separation distances be maintained between industrial land and sensitive land uses.

EPA sets the appropriate buffer distance for each industry category that, from experience, they know is sufficient to minimise complaints. GHD has identified the recommended distances to be applied to the Burra Foods facility within this report.

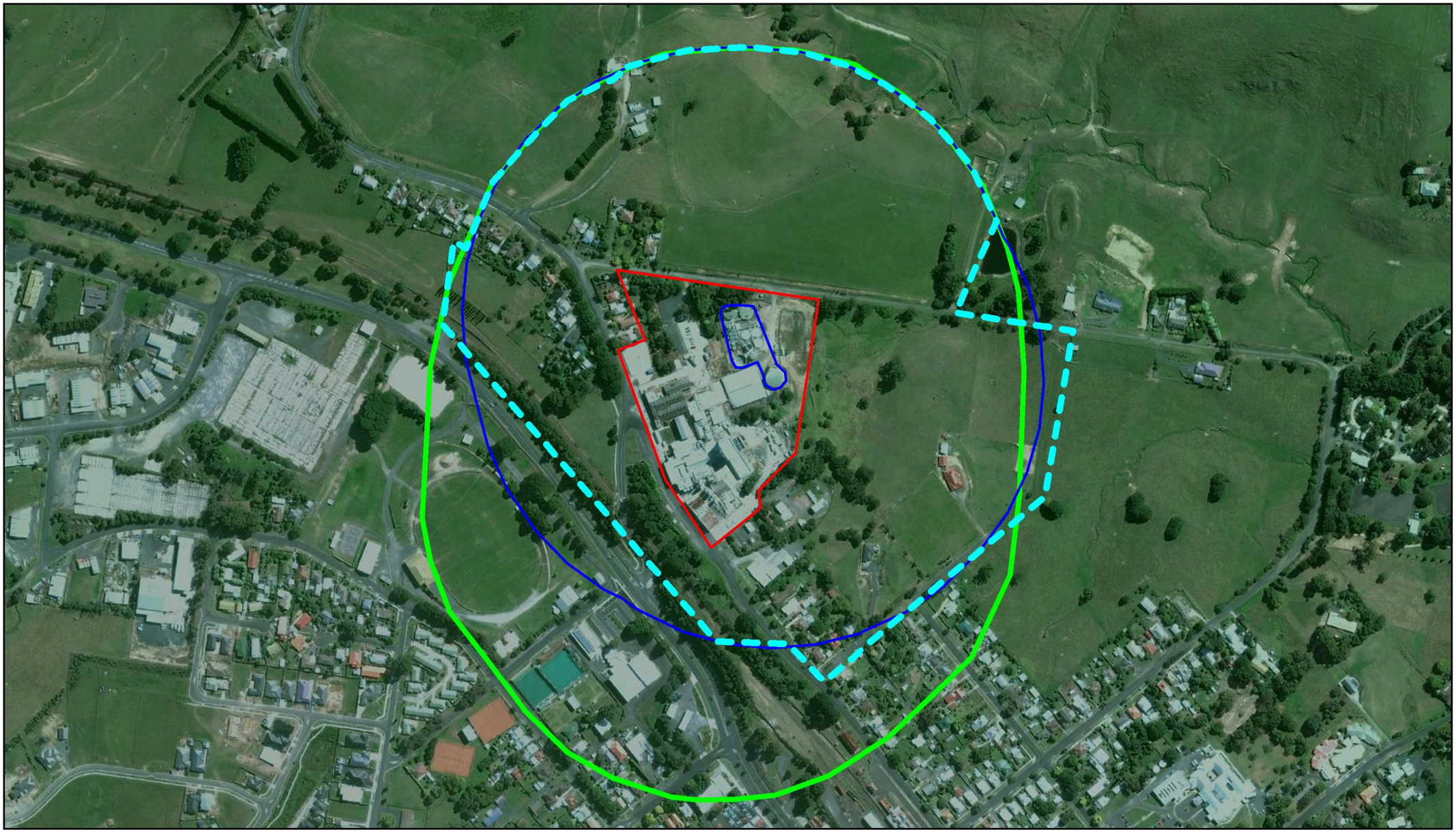
A buffer ensures that the dust/odour plume released during a process upset/malfunction has time and distance as it moves downwind to dilute the dust/odour by mixing with the surrounding ambient air. The degree of dilution will determine whether the plume has diluted to the point where it will not cause significant impact at residences at or beyond the buffer range.

Burra Foods however will still need to meet its environmental objectives which is as per EPA licence all offensive odours must not be discharged beyond the boundaries of the premises and nuisance airborne particles must not be discharged beyond the boundaries of the premises. EPA is working with Burra Foods to develop a strategy to ensure compliance with its licence and minimise its impact beyond the boundary.

7.4 Reduction of the ESO8 buffer area

In the recent Warrnambool Fonterra C90 Amendment Case, Fonterra initially requested a buffer of 500 m measured from the factory's waste water treatment facility to be achieved through application of a Development Plan Overlay. The C90 panel considered the request and formed the view that a 300 m buffer consistent with Clause 52.10 as the appropriate outcome. The panel also recommended that, where logical, the buffer should be mapped to lot (title) boundaries to avoid the situation of landowners being half in or half out of the buffer area. Fonterra presented odour modelling evidence which identified the need for a 420 m buffer based on normal operations and upset operations. Partly based on local conditions and the absence of a history of complaints the C90 panel formed the view that 300 m is an appropriate buffer distance.

Applying the C90 recommendations to C99 reduces the buffer size while still capturing the key areas of interest. Aligning the buffer to lot boundaries also provides some logical improvements (shown in Figure 10). GHD supports these key amendments and the reduced ESO8.



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metres (at A4)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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LEGEND

- Site Boundary
- Recommended Reduced ESO
- 300 m Buffer from WWTP
- Original Recommended ESO

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Recommended Reduced ESO

Figure 10

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8. Limitations

This Report has been prepared by GHD for Burra Foods and may only be used and relied on by Burra Foods for the purpose agreed between GHD and Burra Foods.

GHD otherwise disclaims responsibility to any person other than Burra Foods arising in connection with this Report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this Report were limited to those specifically detailed in the Report and are subject to the scope limitations set out in the Report.

The description of operations at Burra Foods has been based on information provided by Burra Foods.

The opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the date of preparation of the Report. GHD has no responsibility or obligation to update this Report to account for events or changes occurring subsequent to the date that the Report was prepared.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD described in this Report. GHD disclaims liability arising from any of the assumptions being incorrect. The results of the analysis presented in this report are also subject to the limitations of the Ausplume modelling software package.

GHD has prepared this Report on the basis of information provided by Burra Foods, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the Report which were caused by errors or omissions in that information.

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1	M. Asimakis	T. Pollock	T. Pollock*	M. Koller	M. Koller*	24/11/14
2	M. Asimakis	T. Pollock		M. Koller	M. Koller*	25/11/14

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