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Australian Paper

Maryvale Pulp Mill

Buffer Requirements

July 2011

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Contents

Table Index

Figure Index

Appendices

Executive Summary

Australian Paper, as Australia's largest manufacturer of fine papers for print and office applications and for high quality packaging papers, employs over 1,400 Australians and supplies more than 500,000 tonnes of product within Australia and around the world. Australian Paper has two pulp mills, one of which is the Maryvale Pulp and Paper Mill (Maryvale Mill) located in Gippsland, east of Melbourne. The Maryvale Mill is Australia's largest integrated pulp and fine paper manufacturer and is an integral part of the Latrobe community.

The Maryvale Mill has been used as a pulp and paper mill for over 70 years, and has been instrumental in the growth of nearby townships of Traralgon and Morwell. As the largest private sector employer in the Latrobe Valley with approximately 900 employees, the Maryvale Mill makes a significant contribution to the local and regional economy. It is considered that the Latrobe Planning Scheme currently goes some of the way in recognising the Maryvale Mill operations and its importance to the local and wider economy within local policy. Maintaining sufficient buffers to the plant is therefore not only critical to the ongoing operation of the Maryvale Mill, but also indirectly to the social and economic viability of the region.

Australian Paper is committed to ongoing improvements to reduce air emissions, with significant investments having recently been made to upgrade and improve the plant. Overall, the investment in upgrading the Maryvale Mill has dramatically reduced its environmental footprint and provided a platform to underpin a sustainable future. Australian Paper has further plans to expand the Maryvale Mill in the future, which is anticipated to include the creation of a significant number of additional jobs and environmental improvements, and secure the long term future of the Maryvale Mill in the Latrobe Valley.

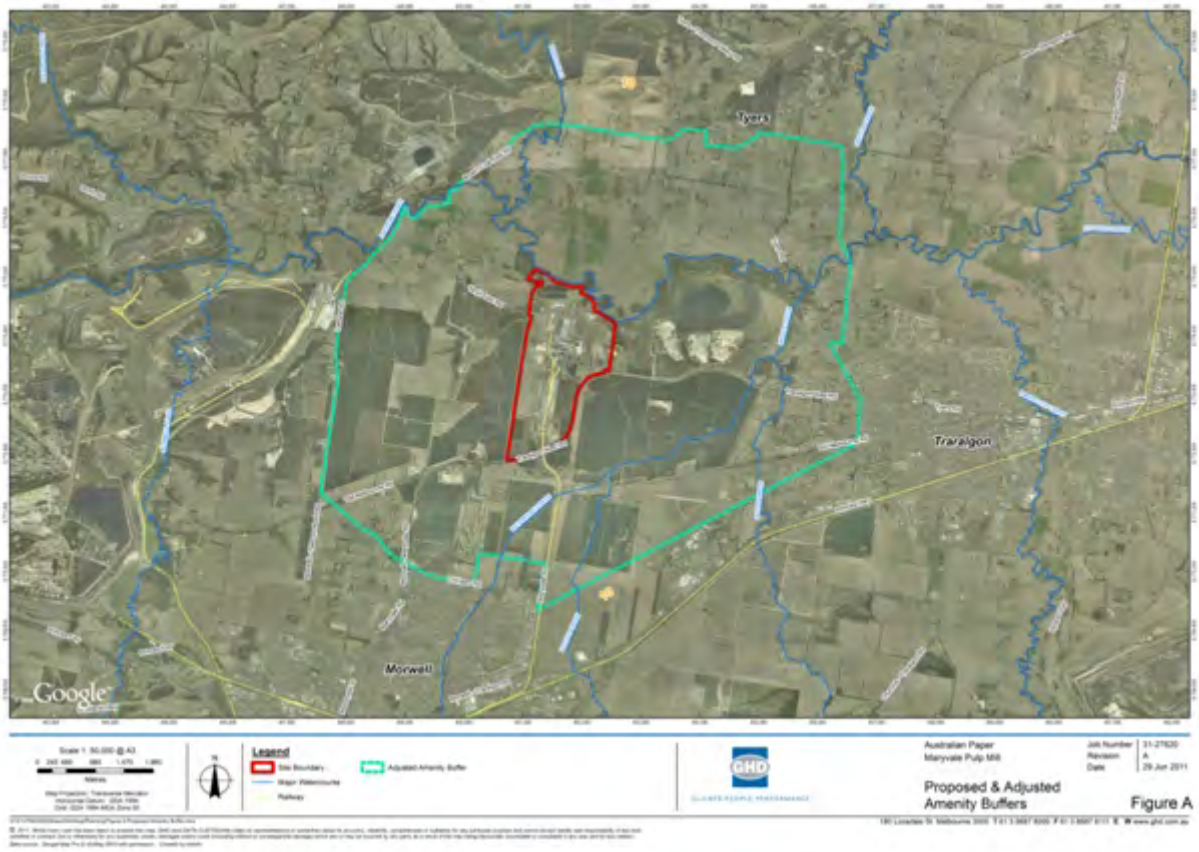
The Latrobe City Council is currently facing pressure to identify greenfields land for urban expansion within the area surrounding the Maryvale Mill. It is understood that the Maryvale Mill currently meets EPA noise and odour emission requirements. However further residential encroachment may compromise the Maryvale Mill's ability to continue to meet such requirements.

GHD Pty Ltd (GHD) has undertaken an assessment of odour emissions from the Maryvale Mill, and preliminary modelling suggests that fugitive odour emissions are the primary cause of odour impacts and recent odour complaint history. The modelling undertaken resulted in a contour plot that can be used to illustrate an odour buffer separation distance between the Maryvale Mill and further development of sensitive uses. While the 5 odour unit (OU) contour would represent a conservative separation distance from the Maryvale Mill to minimise odour complaint, the existing intrusion of the residential areas across this contour to the south and east suggests that a compromise separation distance as generally defined by the 10 OU contour is a more viable option. This has then been further adjusted to correspond with land that has already been identified for residential development (Figure A).

The State and Local policies, which guide decision making about land use and development, clearly emphasise the importance of the Maryvale Mill (economically, historically, and socially) for the region and beyond. The policy also provides the strategic basis for the implementation of amenity buffers to manage the potential impacts of noise and odour from large industries that require substantial separation from sensitive uses. However, the policy is not clear on how to implement such buffers, or how large the buffer needs to be. There is an opportunity to clarify the buffer required for the Maryvale Mill, so that

decision makers, developers, and other nearby landholders can make informed decisions about land use change and development, and its potential impact on mill operations.

Figure A Adjusted Amenity Buffer



This report recommends that in undertaking and implementing the findings of the current Traralgon Growth Areas Review, Latrobe City Council could reinforce the need to protect the Maryvale Mill from encroachment of sensitive uses by depicting a buffer area on the revised Traralgon Structure Plan and associated local policy regarding urban growth and development. Such amendments would be undertaken by Council as part of the Growth Areas Review. This recommendation is supported by the State Planning Policy Framework and the existing tools available within the suite of planning controls of the Victoria Planning Provisions.

1. Introduction

1.1 Purpose of this report

GHD Pty Ltd (GHD) was engaged by Australian Paper to prepare a strategic position paper. The purpose of this paper is to identify the issues and options impacting on the future operations of the Australian Paper Maryvale Pulp and Paper Mill (Maryvale Mill). This is required in the context of an increasingly encroaching urban area, and Council's completion of a Growth Areas Review of Traralgon.

This paper also seeks to advise on the regulatory matters associated with the future use and development of the site and surrounding land, and to advise on an appropriate strategy for protecting the ongoing interests of the Maryvale Mill. This will enable Australian Paper to make informed decisions regarding their future operations and potential for expansion within the subject site and take appropriate actions to protect them. The recommendations of this report explore opportunities for acknowledgement of an appropriate buffer, to be implemented as part of the City of Latrobe's Traralgon Growth Areas Review.

This paper may also be used as a briefing document to inform relevant agencies of the pertinent issues.

1.2 Methodology

In addition to discussions with Mr Rohan Wilks, Environmental Support Manager, Australian Paper, GHD has reviewed the following documents in preparing this paper:

- Latrobe Planning Scheme
- Morwell Structure Plan
- Traralgon Structure Plan
- Latrobe City Council Residential and Rural Residential Land Assessment, 2009
- Economic Development Strategy for Latrobe City
- Amendment C26 to the Latrobe Planning Scheme, including the Latrobe Regional Airport Master Plan Report, 2009
- Traralgon Growth Areas Review

Preliminary discussions have also been undertaken with the following staff from Latrobe City Council – Mr Swee Lim, Strategic Planner; Mr Jason Pullman, Strategic Planning Coordinator; and Ms Donna Starkey, Business Development Manager.

The site and surrounding locality was inspected in May 2011.

2. Australian Paper

2.1 Australian Paper Background

Australian Paper has a long history of producing quality paper products for Australian consumers. Australian Paper is Australia's largest manufacturer of fine papers for print and office applications and produces high quality packaging papers. Australian Paper now employs over 1,400 Australians and supplies more than 500,000 tonnes of product within Australia and around the world. Australian Paper is committed to delivering long-term sustainable returns and environmental and social benefits for all our stakeholders.

Australian Paper has two pulp mills: Shoalhaven Paper Mill located in Bomaderry, south of Sydney and Maryvale Mill located in Gippsland, east of Melbourne.

2.2 Maryvale Pulp Mill

The Maryvale Mill is located at Morwell-Maryvale Road, Maryvale, and has been used as a pulp and paper mill for over 70 years. Australian Paper recently upgraded the pulp mill which produces pulp that is turned into paper products, ranging from paper bags, to photocopying and writing paper. Some of Australia's leading A4-sized papers including REFLEX and Australian Copy are made at the Maryvale Mill. The Maryvale Pulp and Paper Mill is Australia's largest integrated pulp and fine paper manufacturer and is an integral part of the Latrobe community. As the largest private sector employer in the Latrobe Valley with approximately 900 employees, the Mill makes a positive contribution to the local economy. It is estimated to contribute $340 million in GDP within the region. An additional 2,500 people are also indirectly employed by the mill in support industries. This highlights the economic and state significance of the Maryvale Mill to the surrounding immediate and wider area. Maintaining sufficient buffers to the site is therefore not only critical to the ongoing operation of the Mill, but also indirectly to the social and economic viability of the region.

Australian Paper is committed to ongoing improvements to reduce air emissions. The Maryvale Mill was recently upgraded at a cost of $350 million to install the best available technology in bleaching and pulping, resulting in significant environmental improvements. Overall, the investment in upgrading the Maryvale Mill has dramatically reduced its environmental footprint and provided a platform to underpin a sustainable future. Australian Paper has further plans to expand the Maryvale Mill in the future, which is anticipated to include the creation of a significant number of additional jobs and environmental improvements, and secure the long term future of the Maryvale Mill in the Latrobe Valley.

3. Site and Context

3.1 Regional Context

Maryvale Mill is located in the heart of Gippsland, Victoria, 160 kilometres east of Melbourne, in Maryvale within the Latrobe Valley. Nearby Morwell and Traralgon are key growth areas for the Latrobe City Council.

The City of Latrobe adjoins the Wellington Shire to the east, the Baw Baw Shire to the north west and the South Gippsland Shire to the south west.

A location map is provided at **Figure 1**.

3.2 Surrounding Locality

The immediate area surrounding the site consists primarily of private and commercial tree plantations, farming and associated land uses, and Pine Gully Reservoir to the west. Pine Gully is the storage used by Australian Paper's Maryvale mill and the reservoir where recycled water produced at the Gippsland Water Factory (GWF) will be piped for industrial re-use.

Soft and hardwood plantations are located adjacent to the south east. Further to the south of the site is the Morwell Golf course, Maryvale Hospital and Crinigan Road Bushland Reserve. Crinigan Road forms the northern boundary of residential and mixed use development of the Morwell locality. The Maryvale Private Hospital and existing dwellings in the north of Morwell are located approximately 2 to 2.5 kilometres to the south of the site. Additional land has recently been rezoned north of Crinigan Road, approximately 1.3 kilometres from the Maryvale Mill.

To the east of the site is the Latrobe Regional Airport, and further east the Traralgon township. Traralgon is accessed from the site via Old Melbourne Road and Traralgon West Road. Abutting the Latrobe River north of the site is primarily rural landholdings with scattered residential dwellings and the foothills of the Great Dividing Range. Rural living areas on the western outskirts of Traralgon, along Scruby Lane, are approximately 2.5 kilometres from the Maryvale Mill site. Between these rural living areas and the subject site is also some farmland though it appears that there are few if any dwellings within that farm land (land is developed with the plantations mentioned above).

To the north of the site, farmland includes a number of dwellings on 2-4 hectare allotments, generally located around Christensens Road and Littles Lane at Tyers. These properties are between 1.6 to 2 kilometres from the Maryvale Mill.

A context plan is provided at **Figure 4**, and illustrates the site in relation to surrounding uses and key landmarks.

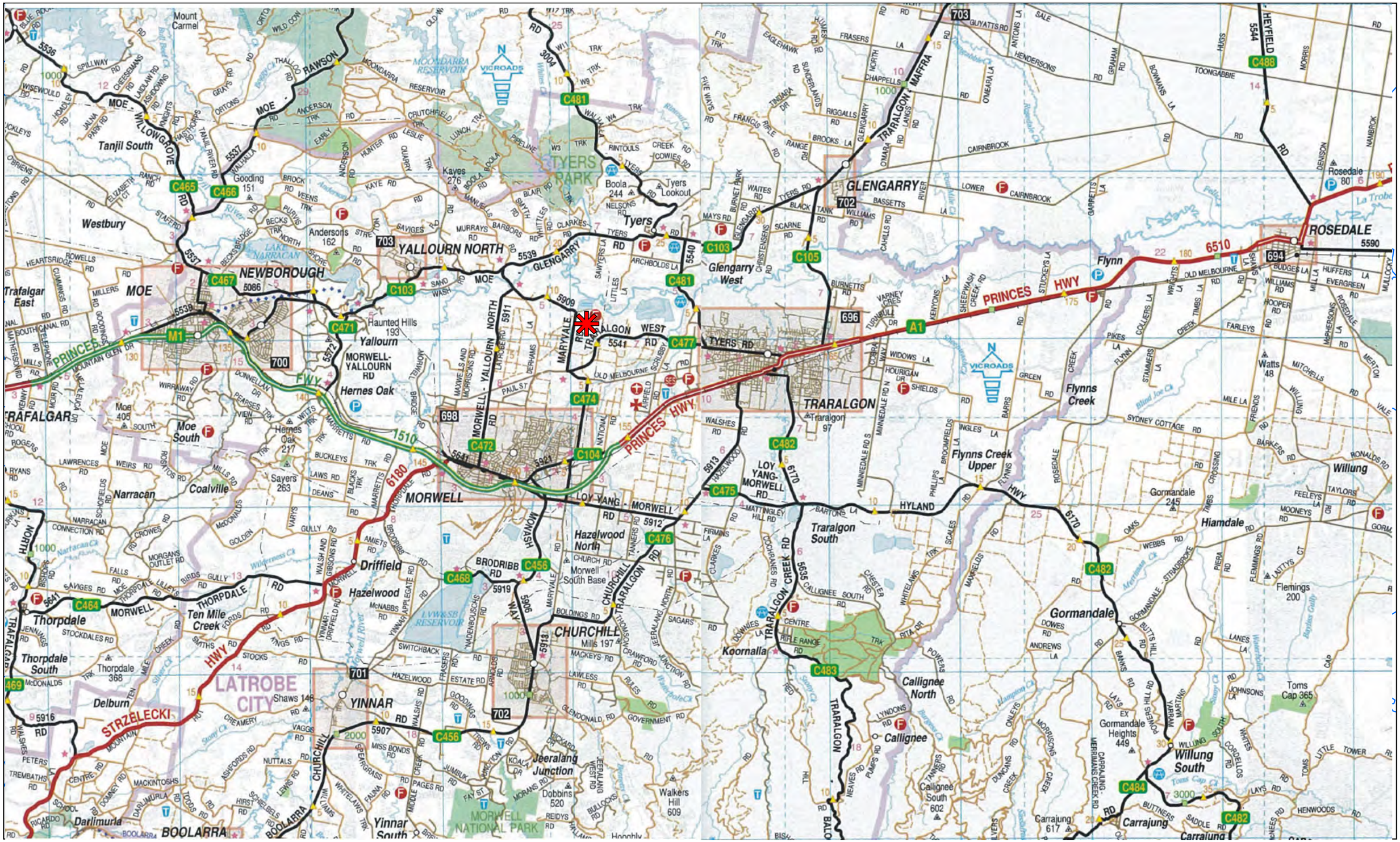
3.3 Maryvale Mill

The Maryvale Mill is irregular in shape and is located at Morwell-Maryvale Road, north of Morwell. The site adjoins Traralgon West Road to the south-eastern boundary and the Latrobe River to the north.

The landholding comprises some 840 hectares, although the Maryvale Mill operations occupy some 340 hectares at the western extent of the allotment. The Maryvale Mill site is a controlled industrial site with much operational plant and associated buildings.

The balance of the landholding contains a number of large water polishing ponds, a landfill for the mill and several broad acre tree plantations. There are three existing sand extraction operations presently conducted within this the land holding. These 'sandpits' have been in operation for many years and have current EPA extraction licences. Maryvale Sands, Latrobe Valley Sands and Ready Mix (CSR) currently lease these areas from Australian Paper.

Photographs of the site and existing buildings are provided at **Figures 2** and **3**. These photographs show various views of the Maryvale Mill operations from within the site.



0 1.25 2.5 5
Kilometers

N

LEGEND

Localtion of Maryvale Pulp Mill

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Australian Paper
Maryvale Pulp Mill

Job Number	31-27620
Revision	A
Date	27 Jun 2011

Locality Map

Figure 1

G:\31\27620\GIS\Maps\Working\Planning\Figure 1 Locality Plan Street map.mxd

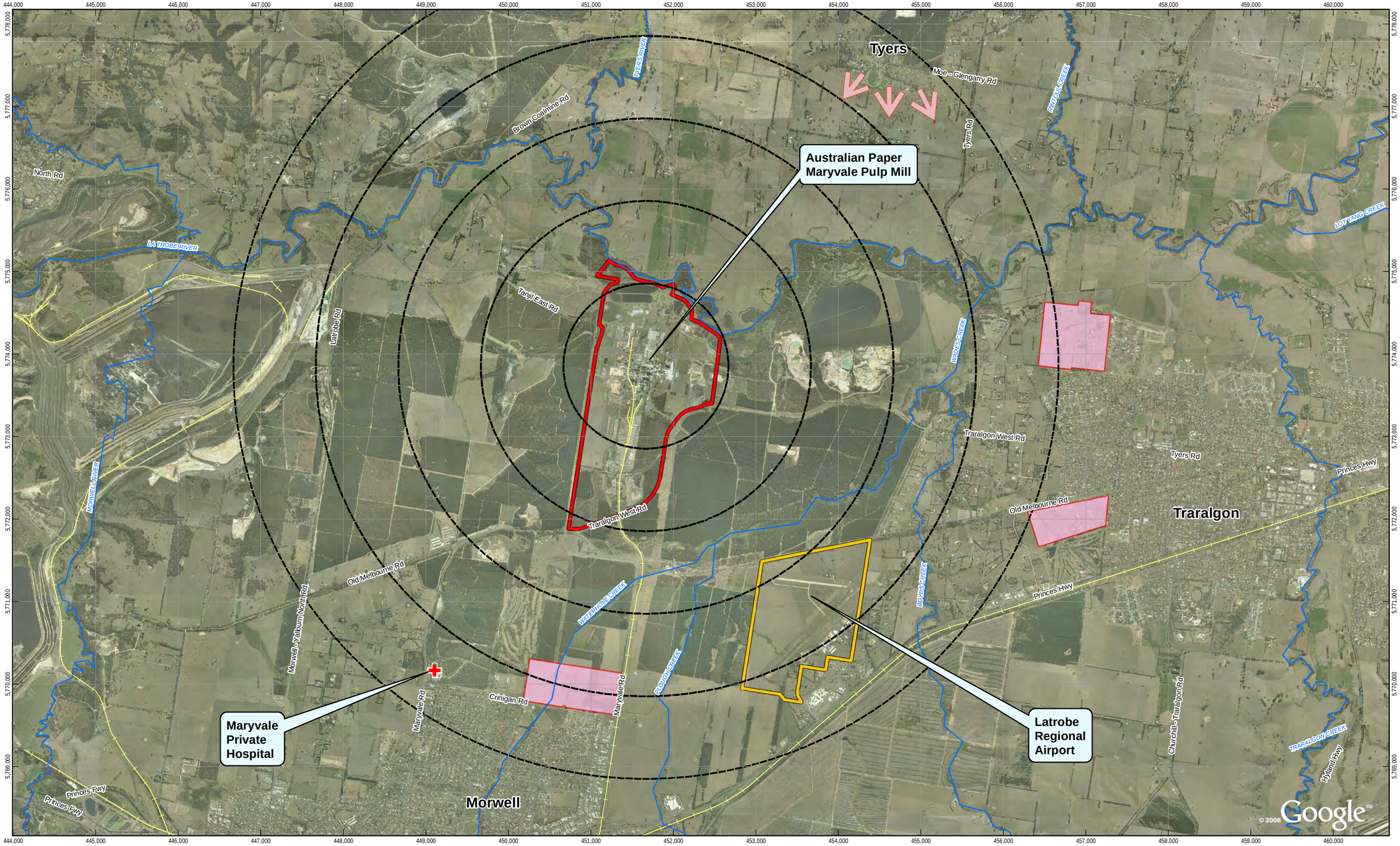
Data source: VicRoads Country Directory Edition 7 with permission. Created by:lrsmith

180 Lonsdale St. Melbourne 3000 **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** **W** www.ghd.com.au

Figure 2
Site Photograph

Figure 3
Site Photograph

31/27620/GIS/Maps/Working/Planning/Corel/Figs 2 and 3.cdr



Scale 1: 40,000 @ A3

0 205 410 820 1,230 1,640

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Legend

- Site Boundary
- Major Watercourse
- Railway
- New Residential Land
- Latrobe Regional Airport
- 1 - 5km Buffers
- Long Term Urban Expansion

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Australian Paper
Maryvale Pulp Mill

Job Number	31-27620
Revision	A
Date	29 Jun 2011

Site Context Plan

Figure 4

G:\31\27620\GIS\Maps\Working\Planning\Figure 4 Site Context Plan.mxd

Data source: Google Map Pro & VicMap 2010 with permission.. Created by:lrsmith

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4. Regulatory Framework

The Latrobe Planning Scheme is the principal planning context, which regulates how the site can be used and developed. The function of a Planning Scheme is to facilitate fair, orderly, economic and sustainable use of land. Relevant provisions of the Latrobe Planning Scheme are documented as follows.

4.1 Latrobe Planning Scheme

4.1.1 State Planning Policy Framework

The State Planning Policy Framework (SPPF) contains a statement of general principles for land use and development planning in Victoria. The SPPF sets out specific policies relating to environmental, social and economic factors. The sections of the SPPF which are most relevant to the site and its development, are detailed below.

Clause 11 – Settlement

The objective of this Clause is to ensure a sufficient supply of land is available for residential, commercial, industrial, recreational, institutional and other public uses, and to facilitate the orderly development of urban areas.

Comment: This is relevant given the current pressure for the identification of greenfields land for urban expansion within the area surrounding the Maryvale Mill. This policy has the ability to provide strategic justification for urban expansion which encroaches upon the Maryvale Mill.

Clause 13 – Environmental Risks

Clause 13.04-1 seeks to assist the control of noise effects on sensitive land uses through ensuring that development is not prejudiced, and that community amenity is not reduced by noise emissions through using a range of building design, urban design and land use separation techniques as appropriate to the land use functions and character of the area.

The SPPF seeks to protect industrial land for further industrial development, by "*ensur*[ing]*, wherever possible, that there is suitable separation between land uses that reduce amenity and sensitive land uses*" (Clause 13.04-2). This Clause requires the planning authority to consider the EPA's guidelines *Recommended Buffer Distances for Industrial Residual Air Emissions* in assessing this requirement.

Comment: This policy is relevant given the emission of noise and odour from the Maryvale Mill site. It is understood that the Maryvale Mill currently meets EPA noise and odour emission requirements, however further residential encroachment may compromise the Mill's ability to continue to meet such requirements.

Clause 16 – Housing

This Clause seeks to ensure that land supply continues to be sufficient to meet demand. Clause 16.01 states that the need to identify strategic redevelopment sites for large residential development and to ensure housing stock matches changing demand by widening housing choice, particularly in the middle and outer suburbs. Clause 16.01-5 seeks to deliver more affordable housing closer to jobs, transport and

services by improving housing affordability by ensuring land supply continues to be sufficient to meet community demand.

Comment: Whilst this policy focuses on housing provision in Metropolitan Melbourne, it is a relevant consideration for key regional centres such as Morwell and Traralgon. It highlights the importance of maintaining jobs (reasonably) close to housing.

Clause 17 – Economic Development

This Clause contains a number of policies which seek to protect industry from encroachment of sensitive uses and also seek to protect sensitive uses from adverse amenity impacts caused by industry. Some of these policies are summarised below.

Clause 17.01-1 seeks to ensure, "*appropriate buffer areas can be provided between the proposed industrial land and nearby sensitive land uses and protect industrial activity in industrial zones from the encroachment of unplanned commercial, residential and other sensitive uses which would adversely affect industry viability",* and *"Avoid approving non-industrial land uses, which will prejudice the availability of land for future industrial requirements, in identified industrial areas".*

Clause 17.02-1 seeks to protect industrial activity in industrial zones from the encroachment of unplanned commercial, residential and other sensitive uses which would adversely affect industry viability and to avoid approving non-industrial land uses, which will prejudice the availability of land for future industrial requirements in identified industrial areas.

Clause 17.02-2 further outlines the objective to facilitate the sustainable development of industry, and provide adequate separation and buffer areas between sensitive uses and offensive or dangerous industries to ensure that residents are not affected by adverse environmental effects, nuisance or exposure to hazards.

The Industrial 2 Zone, in which the Mill is located, is only used for industrial areas that require large separation distances and which are of State significance. Pursuant to Clause 17.02-3, it is a State objective "*to protect industrial land of State significance to ensure availability of land for major industrial development, and protect heavy industrial areas from inappropriate development and maintain adequate buffer distances from sensitive or incompatible uses"*.

Comment: This policy clearly highlights the importance of facilities such as the Maryvale Mill and maintenance of appropriate separation between industry and urban areas. It provides a strategic basis for the implementation of amenity buffers.

4.1.2 Local Planning Policy Framework

The Local Planning Policy Framework (LPPF) sets a local and regional strategic policy context for a municipality and usually consists of the Municipal Strategic Statement (MSS) and specific local planning policies. The MSS provides a profile of the municipality and sets out planning, land use and development objectives. These are given effect to through the zoning and overlay provisions. Relevant strategies of the MSS are summarised below. The Latrobe Planning Scheme does not contain any local planning policies.

Clause 21.04 – Built Environment Sustainability

Clause 21.04 identifies the importance to develop clear directions and strategies through consultation with the community ensuring sustainable and balanced development throughout the Latrobe Valley.

The towns of Moe, Morwell, Traralgon and Churchill are recognised as being part of a 'networked city' as well as being places with unique characteristics which contribute to the local sense of place and provide diversity. Relevant to the subject site, being located centrally between Morwell and Traralgon, each town has developed its own role and function, with Morwell as a centre for government offices and industry and Traralgon as a commercial centre. Notwithstanding the 'networked city concept' it remains Latrobe City Council policy that each town grow in its own right and maintain a 10 to 15 year urban land supply within them through objectives and strategies including;

- To build upon the existing structure of the towns and settlements to create an integrated network of urban areas; and
- Consolidate development within and around the existing towns and avoid unnecessary urban expansion and rural subdivision.

Clause 21.05 – Main Towns

The relevant Planning Scheme identifies the urban areas of Churchill, Moe, Morwell and Traralgon as the most populated towns in the municipality. However, all these towns are enveloped by a variety of constraints including coal and stone mining activities and associated buffers, land subject to inundation, industry, inter-town corridors and land that is fragmented into small rural allotments. It is noted that estimates of current residential land supply suggest that in Morwell there is only a five year supply and in Traralgon there is only a four year supply, highlighting the need for increased rezoning and development to assist in meeting the desired 10 to 15 year urban land supply target.

Relevant objectives and strategies include:

- *To facilitate development in accordance with the specific Town Structure Plan* [refer **Figures 5 and 6**];
- *Encourage consolidation of urban settlement within the urban zoned boundaries in accordance with the adopted structure plans;*
- *Reduce industrial-residential land use conflicts;* and
- *Provide buffers between industrial and existing (and potential) sensitive use areas.*

Clause 21.06 – Small Towns

This Clause provides policy on the future growth and development of Tyers, located approximately 3.5 kilometres north east of the site. The policy seeks to protect the development potential of agricultural land to the south of the township (towards the Maryvale Mill site) for future urban expansion.

Clause 21.07 – Economic Sustainability

Within the Latrobe City Council area there are distinct linkages between the natural environment and economic sustainability. The natural environment provides resources such as coal, timber and farmland that help drive the economy. The natural environment is also where the waste from economic activity is put by way of emissions to air, water and land. Council acknowledges the need to facilitate a vibrant and dynamic environment, through applying strategies such as;

- *Provide a balanced approach to economic development taking into account economic, social and environmental values.*

Clause 21.07-8 provides an overview of the timber industry. The policy seeks to:

- *Encourage environmentally sustainable timber production;*

- *Support and encourage timber processing and value-adding industries; and*
- *Strategically plan for road and rail haulage in conjunction with the industry.*

The Planning Scheme notes the particular economic significance of the Maryvale Mill to the region and beyond. It states that:

"Australia's largest paper-making complex, Australian Paper Maryvale Mill can produce more than 500,000 tonnes of paper every year. It is also an industry leader in environmental sustainability - it recycles large amounts of water, uses waste products as energy sources, and has some of the best effluent treatment processes in Australia. With three pulp mills, five paper making machines and a waste processing plant, more than 900 people work at Maryvale Mill and the surrounding Australian Paper Plantations. An additional 2,500 people are indirectly employed by the mill in support industries. The Gippsland timber industry is also a prominent employer in the Latrobe City area."

This highlights the economic significance of the Maryvale Mill to the surrounding immediate and wider area.

Clause 21.07-4 (Coal Buffers Overview) has gone so far as to nominate an area 1 kilometre wide on the western end of the Australian Paper Mill site at Maryvale so as to protect the Maryvale Mill from coal operations in the Yallourn mine as well as providing for future expansion.

Clause 21.04 – Heritage

Clause 21.04 of the Planning Scheme notes the significance of the Maryvale Mill to the history of the region. It states that "*the greatest change to the cultural landscape was to come in the twentieth century with the exploitation of the vast brown coal reserves, which led to the creation of the industrial empire of the State Electricity Commission and the rise of major industries such as the Australian Paper Mills. In the space of 30 years – less than a generation - whole towns were born, while some disappeared and others were changed forever*".

Key comment:

The State and Local policies, which guide decision making about land use and development, clearly emphasise the importance of the Maryvale Mill – economically, historically, and socially – for the region and beyond. The policy also provides the strategic basis for the implementation of amenity buffers to manage the potential impacts of noise and odour from large industries that require substantial separation from sensitive uses.

However, the policy is not clear on how to implement such buffers, or how large the buffer needs to be. There is an opportunity to clarify the buffer required for the Maryvale Mill, so that decision makers, developers, and other nearby landholders can make informed decisions about land use change and development, and its potential impact on Mill operations. This opportunity is explored further within section 6 of this paper.

4.1.3 Zones

Industrial Zone 2

The subject site is zoned Industrial 2 Zone pursuant to the Latrobe Planning Scheme (refer Zones and Overlays plan, **Figure 6**). The purpose of this zone is to:

- *Provide for manufacturing industry, the storage and distribution of goods and associated facilities in a manner which does not affect the safety and amenity of local communities.*
- *To promote manufacturing industries and storage facilities that require a substantial threshold distance within the core of the zone.*
- *To keep the core of the zone free of uses which are suitable for location elsewhere so as to be available for manufacturing industries and storage facilities that require a substantial threshold distance as the need for these arises.*

Pursuant to Clause 33.02-1, 'Industry' is listed as a Section 2 Use; therefore a planning permit is required for use and buildings and works within the Industry 2 Zone.

The Department of Planning and Community Development's guidelines "*Using Victoria's Planning System*" notes that the Industrial 2 Zone "*is for large industrial areas which have a core more than 1 500 metres from residential areas and are of state significance. Note that special requirements apply to the 'core' area of this zone (the area more than 1 500 metres from a residential zone) as this area is a resource intended to be reserved for uses which require that degree of separation from residential and similar areas. Each industry in the core area will be considered on its merits depending upon its effect on neighbouring industries and communities. Generally, uses that do not depend on such a location are discouraged*."

Public Use Zone 1

A small section of the site is excised from the landholding, and is zoned Public Use Zone for the purpose of service and utility. This site is owned by Gippsland Water.

The objective of this zone is to:

- *Recognise public land use for public utility and community services and facilities;*
- *To provide for associated uses that are consistent with the intent of the public land reservation or purpose.*

Surrounding Land

The following zones currently surround the land:

- Road Zone – Category 1
- Special Use Zone Schedules - 1, 5 and 7
- Public Conservation and Resource Zone
- Farming Zone

4.1.4 Overlays

An overlay is a planning provision used to ensure that important aspects of the land are recognised. Overlays indicate the type of development and/or protection, which may be appropriate in that area. In the case of the subject site multiple overlays are applicable.

Design and Development – Schedule 1

The purpose of the Design and Development Overlay is to identify areas which are affected by specific requirements relating to the design and built form of new development.

Schedule 1 to the overlay relates to major pipeline infrastructure and states the design objective to;

- *Ensure that all building and works in particular buildings designed to accommodate people are sufficiently separated from high pressure pipelines to avoid a safety hazard.*

It is understood that this overlay relates to gas supply pipelines, which connect into the northern part of the site.

Land Subject to Inundation

This overlay applies only the north east corner of the site along the Latrobe River.

The purpose of this overlay is:

- *To identify land in a flood storage or flood fringe area affected by the 1 in 100 year flood or any other area determined by the floodplain management authority;*
- *To ensure that development maintains the free passage and temporary storage of floodwaters, minimises flood damage, is compatible with the flood hazard and local drainage conditions and will not cause any significant rise in flood level or flow velocity;*
- *To reflect any declaration under Division 4 of Part 10 of the Water Act, 1989 where a declaration has been made;*
- *To protect water quality in accordance with the provisions of relevant State Environment Protection Policies, particularly in accordance with Clauses 33 and 35 of the State Environment Protection Policy (Waters of Victoria);* and
- *To ensure that development maintains or improves river and wetland health, waterway protection and flood plain health.*

Under the provisions of this overlay a planning permit is required to construct a building or carry out works in this overlay.

Comment:

It is noted that a planning scheme amendment (Amendment C9) is currently underway to more accurately define flooding in the region. The new flooding provisions are based on updated data from four flood studies carried out in Latrobe City between 2000 and 2007, together with revised mapping for three smaller towns provided by the West Gippsland Catchment Management Authority (WGCMA).

This amendment will have the effect of introducing a new Floodway Overlay to a small portion of the north-western most part of the site, and increasing the area affected by the Land Subject to Inundation Overlay in the northern and eastern parts of the site.

Wildfire Management Overlay

The purpose of this overlay is:

- *To identify areas where the intensity of wildfire is significant to pose a threat to life and property.*
- *To detail the minimum fire protection outcomes that will assist to protect life and property from the threat of wildfire;* and
- *To ensure that development which is likely to increase the number of people in the overlay area:*

- o *Satisfies the specified fire protection objectives;*
- o *Does not significantly increase the threat to life and surrounding property from wildfire.*

Pursuant to Clause 44.06 a permit is required to construct a building or carry out works associated with 'industry' and 'timber production'. However, it is noted that a permit is not required if the buildings or works is consistent with a fire risk management plan, where the fire risk management plan has been prepared to the requirements of the relevant fire authority and has been submitted to, and is to the satisfaction of, the responsible authority prior to the commencement of buildings or works.

Key comment:

The existing Industrial 2 Zone adequately identifies the Maryvale Mill as a State significant industry, and is an appropriate zone for an industry requiring substantial buffers to sensitive uses. The relatively small size of the Industrial 2 Zone however does not itself provide sufficient separation for this type of industry, and there is an opportunity to implement an additional Overlay to identify a buffer area. It is recommended that an Environmental Significance Overlay is an appropriate tool to do so, and this is explored further in Section 6 of this report.

Yallourn Open Cut
TO YALLOURN NORTH
Mining License Boundary
Gippsland Brown Coalfelds
Golf Course
TO MARYVALE
Major Gas Pipe
Crinigan Road Bushland Reserve
Maryvale Hospital
Soccer Stadium
Flood Affected Land
7
Gippsland Brown Coalfields
1
Flood Affected POS
Alexanders Rd
Flood Affected Land
6
TO TRARALGON
Proposed Traralgon Bypass
Hourigan St
8b
8a
TO MOE
2
Latrobe Rd
Vary St
Flood Affected POS
McDonald St
8c
Commercial Rd
3
Water Storage Basin
Princes Dr
Flood Affected Land
5
4
9
Flood Affected Land
Flood Affected Land
Major Gas Pipe
Gippsland Brown Coalfields
Morwell Open Cut
TO CHURCHILL
Gippsland Brown Coalfields

Legend

- Township Boundary
- Non-Urban Land
- Existing Open Space
- Proposed Public Open Space
- Existing Urban Areas
- Existing Residential Opportunity
- Future Residential
- Primary Activity Centre
- Existing Industrial
- Future Industrial
- School
- Major Institutional Facility
- Urban Coal Buffer
- Existing Floodplain
- Industrial Buffer
- Existing Airport Environs Overlay
- Transit City Precinct
- Town Entrance
- Possible Future Neighbourhood Centre
- Rivers/Creeks

Transport Infrastructure

- Main Roads
- Roads
- Rail Line
- Train Station
- Future Road Connection
- Future Pedestrian Link

Source: Latrobe Planning Scheme

Beca

Latrobe City
a new energy

LATROBE PLANNING SCHEME - LOCAL PROVISION

MORWELL STRUCTURE PLAN

Figure 5

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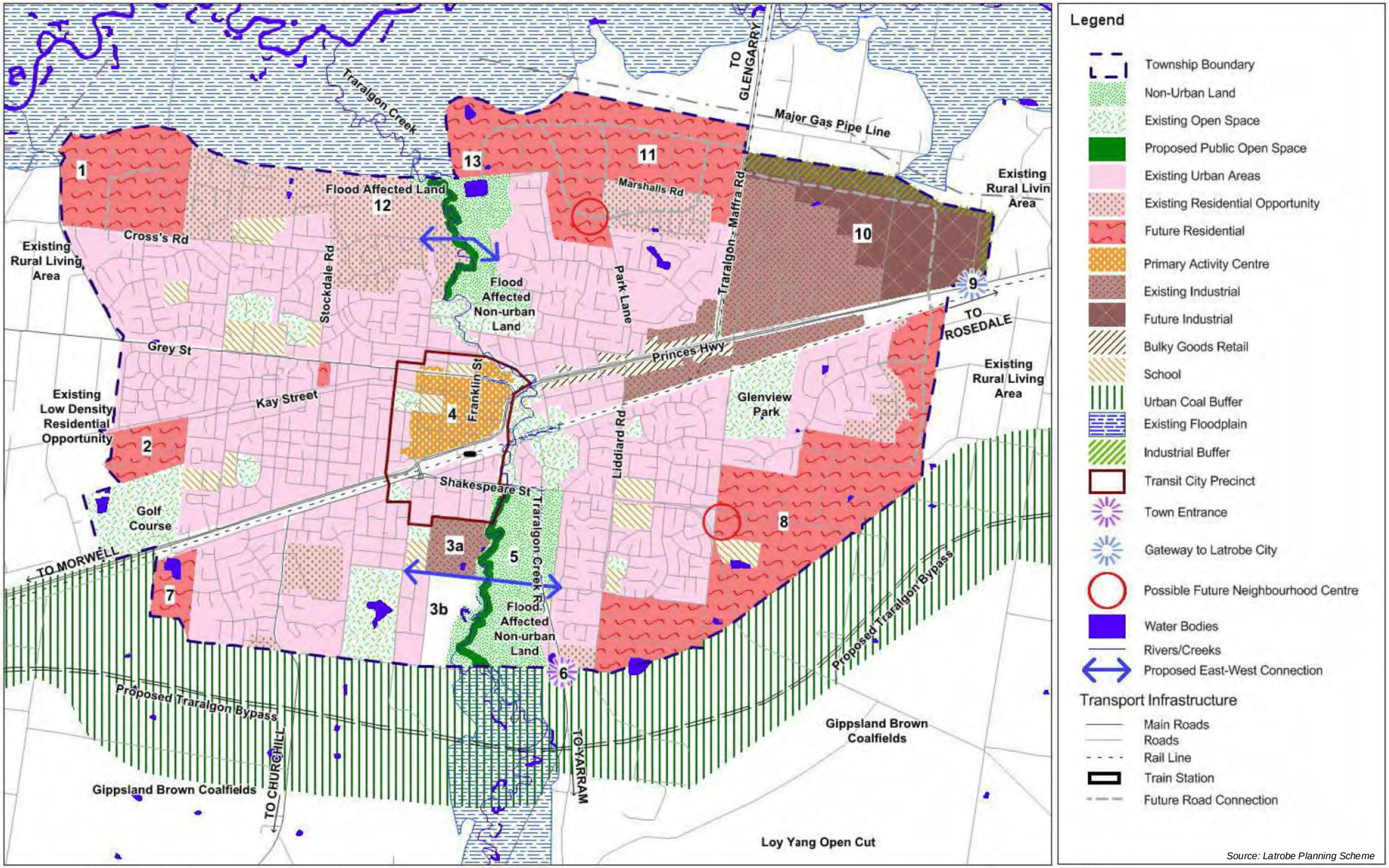
POLICY

0 1,000 2,000
metres

31/27620/GIS/Maps/Working/Planning/Corel/Figure 5 Morwell Structure Plan.cdr



Legend

- Township Boundary
- Non-Urban Land
- Existing Open Space
- Proposed Public Open Space
- Existing Urban Areas
- Existing Residential Opportunity
- Future Residential
- Primary Activity Centre
- Existing Industrial
- Future Industrial
- Bulky Goods Retail
- School
- Urban Coal Buffer
- Existing Floodplain
- Industrial Buffer
- Transit City Precinct
- Town Entrance
- Gateway to Latrobe City
- Possible Future Neighbourhood Centre
- Water Bodies
- Rivers/Creeks
- Proposed East-West Connection

Transport Infrastructure

- Main Roads
- Roads
- Rail Line
- Train Station
- Future Road Connection

Source: Latrobe Planning Scheme

beca

Latrobe City
a new energy

LATROBE PLANNING SCHEME - LOCAL PROVISION

TRARALGON STRUCTURE PLAN

Figure 6

N

POLICY

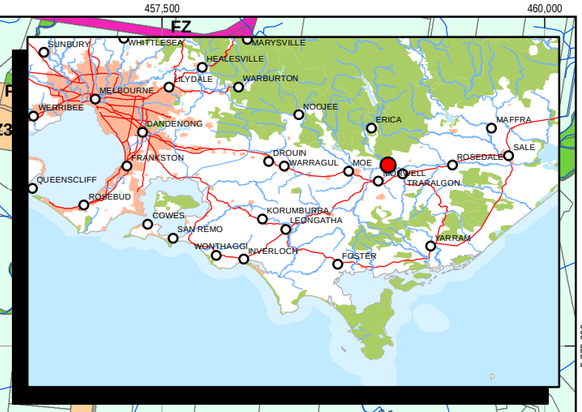
0 1,000 2,000
metres

31/27620/GIS/Maps/Working/Planning/Corel/Figure 6 Traralgon Structure Plan.cdr

Zoning Legend

Planning Zones

- Residential 1
- Low Density Residential
- Rural Living
- Farming
- Business 1
- Business 2
- Business 4
- Business 5
- Industrial 1
- Industrial 2
- Industrial 3
- Mixed Use
- Public Conservation & Resource
- Public Park and Recreation
- Public Use 1 - Service & Utility
- Public use - Transport
- Road – Category 1
- Urban Flood
- Special Use
  - SUZ1 - Brown Coal
  - SUZ5 - Morwell River Diversion
  - SUZ7 - Latrobe Regional Airport



Scale: 1:40,000 @ A3

0 200 400 800 1,200 1,600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Legend

- Site Boundary
- Railway
- Major Watercourse

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Australian Paper
Maryvale Pulp Mill

Job Number	31-27620
Revision	A
Date	29 Jun 2011

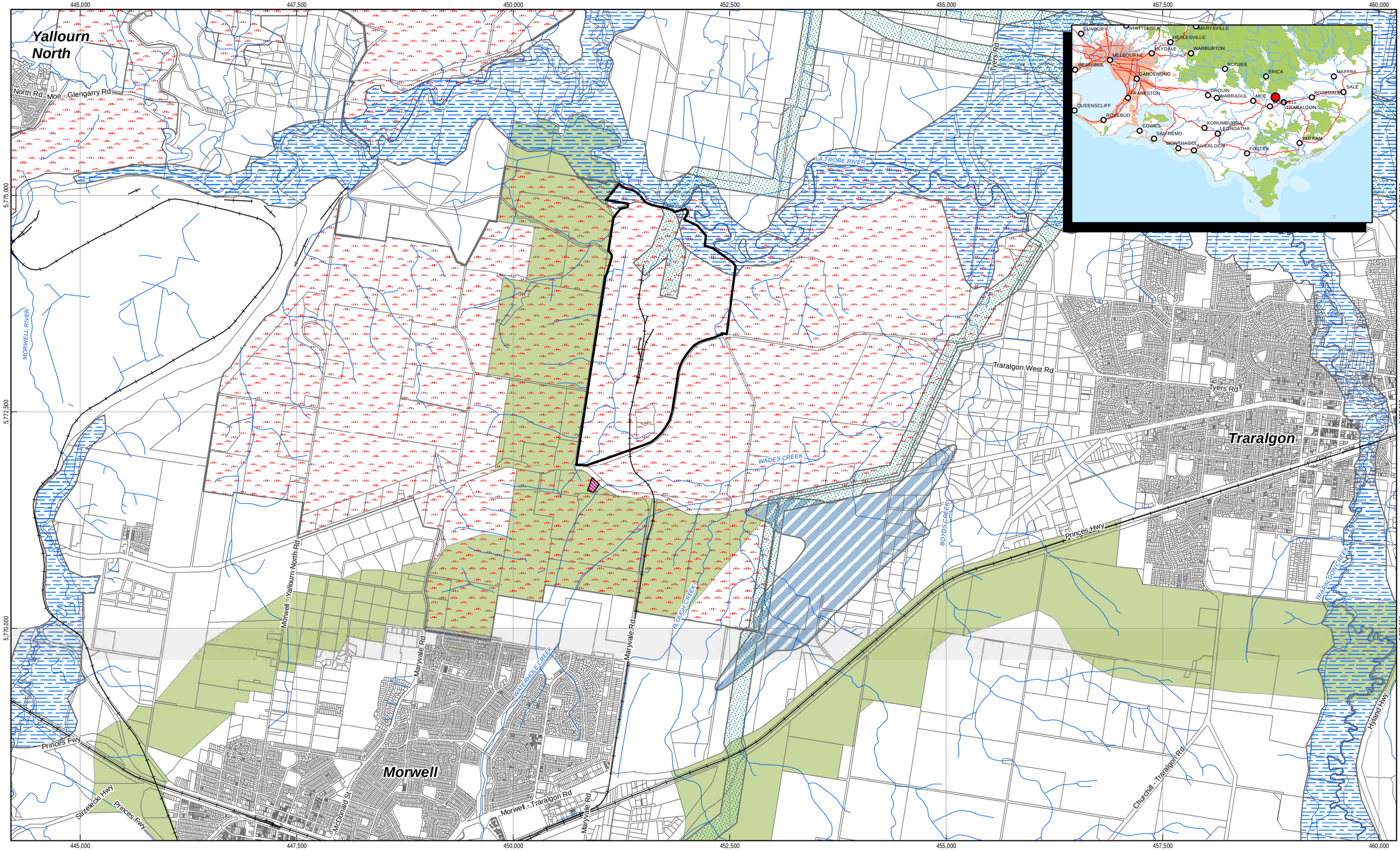
Existing Zones

Figure 7

180 Lonsdale St. Melbourne 3000 **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** **W** www.ghd.com.au

G:\31\27620\GIS\Maps\Working\Planning\Figure 7 Zones Plan.mxd

Data source: VicMap 2010 with permission. Created by:lrsmith



Scale: 1:40,000 @ A3

0 195 390 780 1,170 1,560

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Legend

- Site Boundary
- Railway

Planning Overlays

- Design & Development 1
- Land Subject to Inundation
- Wildfire Management
- Airport Environs 2
- Eenvironmental Significance 1
- Heritage
  HO68 - Jack Dwyer's House

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Australian Paper
Maryvale Pulp Mill

Job Number	31-27620
Revision	A
Date	29 Jun 2011

Existing Overlays

Figure 8

180 Lonsdale St. Melbourne 3000 **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** **W** www.ghd.com.au

G:\31\27620\GIS\Maps\Working\Planning\Figure 8 Overlays Plan.mxd

Data source: VicMap 2010 with permission. Created by:lrsmith

4.1.5 Particular Provisions

The requirements of these particular provisions apply to specified categories of use and development.

52.10 Uses with adverse amenity potential

The purpose of this provision is to appropriately design and locate industries that may cause offence or unacceptable risk to the neighbourhood. This Clause is not applied as a minimum buffer, but rather applies as a threshold or trigger as to whether a planning permit is required under the Industrial Zones and provides guidance to decision making about the appropriateness of the proposed use or development, having regard to adverse amenity potential.

The Industrial 2 Zone, in which the Maryvale Mill is located, refers to this Clause in the assessment of new industrial uses. New industrial uses will be considered to be appropriate in the context of the minimum threshold distance specified in Clause 52.10. Additionally, the suitability of any proposed buildings or works for the types of industries and warehouses shown in the table to Clause 52.10, will be considered having regard to Clause 52.10. Whilst it is considered that existing use rights apply (refer discussion below), further development on the site and expansion of facilities will require a planning permit, and decision makers will have regard to the minimum threshold distances specified in this Clause.

The threshold distance for paper or paper pulp production involving combustion of sulphur or sulphur containing materials is 5 kilometres, from land within a residential zone (includes Residential 1 Zone and Township Zone) and land used for a hospital or an education centre. It is also listed as a 'Note 2' meaning that it may therefore require an assessment of risk to the safety of people located off the land.

In addition, other methods not listed in the table to the Clause under paper or paper pulp production is a Note 1. Therefore, the threshold distance is variable, dependent on the processes to be used and the materials to be processed or stored.

It is noted that the site is located within the specified 5 kilometre minimum threshold distance from existing residential zoning in the townships of Morwell and Traralgon located to the east and south, and to the Maryvale hospital, to the southwest (refer to **Figure 4**).

Key comment:

In this instance, it is considered necessary to more clearly define a buffer for the Maryvale Mill, to assist decision makers in land use planning for urban growth and development. The Mill will not be able to continue to meet expectations of planning authorities if further encroachment of urban areas continues. If planning authorities continue urban encroachment without due consideration of the Mill's need to protect its buffers, its operations and future expansion opportunities will be eroded. Options for specifying an appropriate site specific buffer are outlined in section 6 of this paper.

4.1.6 General Provisions

Clause 63 Existing Uses

Pursuant to Clause 63 of the Latrobe Planning Scheme, a use is deemed to have existing use rights if:

- *The use was lawfully carried out immediately before the approval date.*

- *A permit for the use had been granted immediately before the approval date and the use commences before the permit expires.*
- *A permit for the use has been granted under Clause 63.08 and the use commences before the permit expires.*
- *Proof of continuous use for 15 years is established under Clause 63.11.*
- *The use is a lawful continuation by a utility service provider or other private body of a use previously carried on by a Minister, government department or public authority, even where the continuation of the use is no longer for a public purpose.*

Consistent with the above, it is considered that existing use rights exist for the Maryville Mill.

As stated earlier, 'industry' is a Section 2 use under the existing Industrial 2 zoning. Pursuant to Clause 63 of the Planning Scheme, a use in Section 2 of a zone for which an existing use right is established may continue provided:

- *No building or works are constructed or carried out without a permit. A permit must not be granted unless the building or works complies with any other building or works requirement in this scheme.*
- *Any condition or restriction to which the use was subject continues to be met. This includes any implied restriction on the extent of the land subject to the existing use right or the extent of activities within the use.*
- *The amenity of the area is not damaged or further damaged by a change in the activities beyond the limited purpose of the use preserved by the existing use right.*

Comment: Importantly, the Maryvale Mill has existed in this location for more than 70 years. The Mill was instrumental in the growth and development of Morwell and Traralgon, as detailed in the Latrobe Heritage Study and summarised in section 4.2.1.

4.1.7 Definitions

The following terms have been taken from Clause 74 of the Latrobe Planning Scheme and relate to land use terms referred to in this paper.

It is considered that 'Sawmill' and 'Industry' best describe the use of the site.

Table 1 Planning Scheme Land Use Definitions

Land Use Term	Definition
Accommodation	Land used to accommodate persons. It includes Dwelling, Group accommodation, Camping and Caravan Park, Corrective Institution, Dependent persons unit, Host farm, Residential building, Residential village, Retirement village
Dwelling	A building used as a self contained residence and must include a) a kitchen sink, b) food preparation facilities, c) a bath or shower and, d) a closet pan and wash basin
Sawmill	Land used to handle, cut, and process timber from logs.
Industry	Land used for any of the following operations: a) any process of manufacture; b) dismantling or breaking up of any article; c) treating waste materials; d) winning clay, gravel, rock, sand, soil, stone, or other materials (other than Mineral, stone, or soil extraction); e) laundering, repairing, servicing or washing any article, machinery, or vehicle, other than on-site work on a building, works, or land; or f) any process of testing or analysis. If on the same land as any of these operations, it also includes: a) storing goods used in the operation or resulting from it; b) providing amenities for people engaged in the operation; c) selling by wholesale,

Land Use Term	Definition
	goods resulting from the operation; and d) accounting or administration in connection with the operation. Includes Rural industry.
Rural industry	Land used to: a) handle, treat, process, or pack agricultural produce; or b) service or repair plant, or equipment, used in agriculture.

4.2 Strategic Planning Context

The following documents are considered to have strategic importance to the site and its development potential, and continuing operations. The documents provide strategies and directions to ensure overall objectives can be achieved for an area. In many cases, these strategic documents have been incorporated and referred to within the Latrobe Planning Scheme.

4.2.1 Latrobe City Heritage Study, July 2010

The Latrobe City Heritage Study was prepared in July 2010 and implemented into the Planning Scheme as Amendment C14. The study notes that the Maryvale Mill was instrumental in the urban growth and development of surrounding townships of Morwell, Traralgon and Tyers. The following is a summary of some of the key findings in relation to the Maryvale Mill and its relationship to surrounding urban land uses.

In 1937 the Australian Paper Manufacturers (APM) established a pilot paper pulp plant at Maryvale, north of Morwell, after securing a government agreement that gave the company favourable access to forests. The aim was to exploit lower-quality timber left after sawlogs had been felled for pulp manufacture. A 900 acre site that included two dairy farms was chosen. Water was available from the Latrobe River and a direct transmission line from Yallourn provided power. The plant was expanded after the Second World War to meet the need for timber for building materials and to reduce Australia's almost total dependence on softwood pulp imports. Besides developing the large complex at Maryvale, APM has developed tracts of land in the Latrobe Valley for pine plantations and established forestry camps such as the Boola Boola forestry camp near Tyers.

A major employer in study area, APM has also provided houses for its employees in Traralgon and Morwell, as well as hostels and work camps. This contributed to the significant growth of both of these towns in the post-Second World War era.

The Heritage Study notes that "*it was the opening of the APM mill complex in 1937 and massive expansion of the SEC after the Second World War … that would have the most profound impact upon the three main towns* [Morwell, Traralgon and Moe] *... All experienced significant population growth in the period after the Second World War when they were transformed from small country towns to large urban centres...* "

"When APM located its paper mill at Maryvale in the 1930s, employees moved into Morwell as well as Traralgon. APM built houses for staff and workers, as well as a staff hostel in the town. To meet the demand for housing temporary accommodation was supplied at a number of sites. In 1947 APM established the Derham's Hill transit camp for its Maryvale workers, which at its peak in 1956 accommodated about 500 people.

It was in Traralgon that APM's decision in the 1930s to build a paper mill had the most impact. APM built 1,000 houses for its employees in Traralgon. The APM estates were influenced by garden suburb

planning ideas and included generous areas of open space. An elite group of six houses was also built by APM for senior staff in Kay, Clarke and Grey Streets. Workers were able to buy their houses by paying a deposit and using their rent to contribute to the balance. Now a major component of housing in Traralgon, the APM estates reveal insights to company housing and facilities considered suitable for staff and workers."

The construction of the APM mill resulted in a shortage of housing. The Victorian Housing Commission built 199 houses Traralgon in 1952 and further housing was provided in estates developed by private entrepreneurs. However, despite all of this housing shortages were still experienced in Traralgon. As a result many large older houses in Traralgon were converted to boarding houses to meet demand. During this time the commercial centre of Traralgon expanded and now significant buildings were constructed.

"The expanding activities at the APM also had an impact on Tyers. From 1947 to 1958, migrants worked at the Boola Boola forestry camp nearby, cutting and splitting timber for pulpwood. With its view over the Latrobe Valley and forested mountains to the north, Tyers had a further influx of population from the 1970s as people moved on to small acreages surrounding the town."

4.2.2 Morwell Structure Plan, August 2007

The purpose of the Structure Plan is *'to provide for growth and change in a planned and managed manner over a 30-year period'.*

This document notes that Morwell has very few areas available for new urban growth due to the constraints on outward expansion posed by coal, industry and floodplains. Opportunities to achieve the redevelopment of some smaller industrial areas, and overcome infrastructure constraints in the North-West Residential Precinct are therefore important. Rejuvenation of the Morwell CBD also offers an opportunity to harness residential development.

The Structure Plan aims to achieve eight major objectives:

- *Create a vibrant and active town centre;*
- *Improve transport routes and ease of movement;*
- *Improve and protect visual amenity;*
- *Provide for high amenity housing choice;*
- *Redevelop rundown and underutilised, but well-located industrial sites for residential uses;*
- *Protect areas for future urban growth;*
- *Diversify the stock of industrial land, in particular providing for high amenity industrial uses;* and
- *Establish walkable neighbourhood centres in growth areas.*

The document notes that "*the Australian Paper Mill is located approximately 5 km to the north of the Morwell town centre, and approximately 2 km north of Morwell's town boundary. The Mill can be a major source of odour depending on atmospheric conditions. A program to upgrade the plant has been initiated and approved by regulatory authorities. The proposed works will decrease air emissions and odour and produce other environmental benefits. Whilst the upgrade will reduce the odour, it won't negate it and it will continue to impact on residential areas within Morwell and Traralgon. Due to prevailing winds and the shape of the valley, it is more likely that odour will impact more on Traralgon*

than Morwell, as has historically been the recorded case." Despite this acknowledgement, the Traralgon Structure Plan, summarised in the following section, makes no mention of the Maryvale Mill.

The Morwell Structure Plan identifies several areas suitable for urban growth. Some of these are located on the north side of Morwell, proximate to the Maryvale Mill. Area 6, is identified as future industrial, and Area 7 as future residential. Area 7 is 1.2 kilometres from the Maryvale Mill site at its closest point, and most of this area has already been rezoned, though is yet to be developed. In relation to this area, the Morwell Structure Plan notes that "*this is the only major parcel of unconstrained land potentially available for future urban growth. The parcel is unlikely to be constrained by the future Gippsland Water Factory and Australian Paper Mill, located to north of this land, based on review of EPA Works Applications the development of the Water Factory and up the upgrade of the Paper Mill*."

The Structure Plan has been incorporated into the Latrobe Planning Scheme and forms a part of Clause 21.05. The Structure Plan is included at **Figure 5** of this report.

4.2.3 Traralgon Structure Plan, August 2007

The Structure Plan is intended to, '*provide clear direction to the community, government, and the development of industry about appropriate development*'.

The document notes that whilst opening up the Traralgon-Morwell Corridor for urban development will increase land supply over the next 30 years, consideration needs to be given to urban development beyond this horizon. Given the 500 year supply of coal reserves in the Latrobe Valley, and the likely continued use of coal for energy production and other uses, it is particularly relevant that planning considers growth beyond the 30 year time frame. At present the average lot size within greenfield developments in Traralgon is 940 m². It has been established that there is insufficient land supply around Traralgon for its future development and that even with rezoning potential growth areas on the urban fringe, there is only 11 years land supply. To ensure the efficient use of this and other greenfield sites in the future, lot sizes need to be reduced to be an average of 800 m², with even higher densities around the neighbourhood activity clusters.

Traralgon has significant capacity to achieve a number of sub-regional and particularly regional outcomes. Planning outcomes should provide for future housing growth by expanding the town boundary to provide a town structure that improves amenity for residents and maximises land use relationships for industry, commerce and retail, and to provide an urban landscape that is highly mobile and accessible by all modes. In particular for Traralgon, the vision is to continue its role as the regional commercial and service centre for Gippsland.

The Structure Plan aims to achieve nine major objectives:

- *Provide for high amenity housing choice;*
- *Redevelop rundown industrial sites, which are underutilised but well located, as new residential developments;*
- *Protect areas for future urban growth;*
- *Intensify the density of residential development in new residential estates;*
- *Investigate opportunities for the expansion of the office sector;*
- *Improve and protect visual amenity;*
- *Expand Traralgon's industrial precinct;*

- *Establish walkable neighbourhood centres in growth areas;* and
- *Improve transport routes and ease of movement.*

The Traralgon Structure Plan identifies several areas suitable for urban growth proximate to the Maryvale Mill. Area 1 and Area 2 are located on the western side of the township, Area 1 being approximately 3.5 kilometres from the Maryvale Mill. Both these areas are identified as future residential and Area 1 has already been rezoned, but not yet developed.

The Structure Plan has been incorporated into the Latrobe Planning Scheme and forms a part of Clause 21.05. The Structure Plan is included at **Figure 6** of this report.

4.2.4 Latrobe City Council Residential and Rural Residential Land Assessment, 2009

The study assesses the demand and supply of residential and rural residential land in the City of Latrobe, and more specifically for 11 identified precincts which contain town centres of varying sizes (Traralgon, Morwell, Moe/Newborough, Churchill, Toongabbie, Glengarry, Tyers, Yallourn North, Yinnar, Boolarra, and Traralgon South). An assessment of the supply and demand for rural residential land has also been undertaken for the rural living precincts of Hazelwood North and Yinnar South.

This study was intended to inform the revision of the current Small Town Plans, which form part of the Latrobe Planning Scheme at Clause 21.05, and to provide input to future strategic work resulting from the review of the Latrobe Municipal Strategic Statement. It is therefore a relevant research paper informing the current Growth Areas Review (discussed below).

The report recommends that additional land is required to be identified to meet demand for residential development. It also recommends that all areas identified as future residential in the structure plans be rezoned and developed. It provides a strategic basis for the expansion of existing urban areas.

4.2.5 Economic Development Strategy for Latrobe City, February 2007

Latrobe City is Victoria's fourth largest regional municipality and one of the State's strongest regional economies. However, the challenge is to effectively utilise the assets and talents of Latrobe City to maintain its transformation and create opportunities that will continue to consolidate future growth and prosperity.

Latrobe City has an annual output of $4.7 billion with an economy similar in output to that of Bendigo. The annual value of exports of products and services is $1.9 billion with imports just under $1 billion. Energy and manufacturing are the dominant sectors. However, employment is more widespread with the service sectors being dominant.

The Economic Development Strategy lays the foundations for furthering economic prosperity by combining existing economic development initiatives with a series of externally focused marketing portfolios and focusing on competitive strengths. Economic development efforts are focused on those sectors where Latrobe City has natural competitive strengths, such as:

- *Energy;*
- *Forestry, timber and paper;*
- *Food and agribusiness;*
- *Advanced manufacturing and aviation;*

- *Services, tourism and events;* and
- *New and emerging businesses.*

The Economic Development Strategy therefore supports the maintenance and enhancement of the Maryvale Mill and associated paper and forestry industry.

4.2.6 Amendment C26, Latrobe Regional Airport & Surrounds

Amendment C26 applies to the Latrobe Regional Airport and the land within the immediate vicinity of the airport. The amendment proposes to implement planning controls in order to facilitate the ongoing operations of the Latrobe Regional Airport and to provide options for the future expansion of services. The amendments proposed to Latrobe Planning Scheme are:

- Amend Schedule 7 of the Special Use Zone (SUZ) to allow for accommodation related to aviation related use;
- Remove the Airport Environs Overlay (AEO) from the Airport land;
- Remove the Public Acquisition Overlay (PAO) from the Airport land and amend the PAO schedule;
- Apply Design and Development Overlays (DDOs) to ensure buildings and works do not adversely affect the operations of the Latrobe Regional Airport;
- Make minor changes to Clauses 21.01, 21.02, 21.04 and 21.07 to support application of these overlays and include the Latrobe Regional Airport 2009 Master Plan and Latrobe Regional Airport Development Guidelines 2009 as a reference document; and
- Amend Clause 61.03 to remove reference to the PAO and AEO maps, and include reference to the introduction of two new Schedules to the DDO.

The amendment seeks to protect and support the ongoing and future operation of the Latrobe Regional Airport. The amendment implements controls to ensure that sensitive land uses and inappropriate development under the approach and take-off flight paths do not prejudice or restrict the operation of the airport. The amendment implements the recommendations of the Latrobe Regional Airport Master Plan Report, 2009, which is summarised below.

Latrobe Regional Airport Master Plan Report – 2009

The Latrobe Regional Airport Master Plan is based on a long-term planning horizon to the year 2029. The principle objective of the master plan outlined in the report is to, '*provide a realistic representation of the future airport layout that will maximise the capacity of the site in a way which is compatible with the environment, the local community, and rational development of facilities, and yet maintain flexibility to cater to future changes in response to the dynamic aviation industry*'.

Precinct 9 and 10 of the Master Plan directly affect the Maryvale Mill through development of residential accommodation, further reducing the buffer distance between industrial and sensitive uses. Refer to **Figure 9** for detailed map of the Master Plan.

- *Precinct 9 – Future Air Chalet Development:*

  This precinct allows for the development of an Air Chalet area designed specifically to provide residential options with direct access to the runways. Air chalets are typically a hangar with a small flat or attic included, usually for use as a 'weekender'.

- *Precinct 10 – Future Air Park Development:*

  This precinct allows for the development of an Air Park designed specifically to provide residential options with direct access to the airfield and runways. The residential houses would be joined to hangars used by private owners for maintenance of their aircraft. Vehicle access shall be provided via an existing access road entering from Old Melbourne Road.

Australian Paper has recently made an objection to this amendment, specifically to the proposed facilitation of accommodation at the Airport site. The objection noted that the findings of the odour modelling confirm that it would be inappropriate to develop accommodation at the Airport site, proximate to a State significant industrial facility requiring a substantial amenity buffer.

Key comment:

Australian Paper will need to continue to monitor the progress of the Airport Master Plan and Amendment C26, providing input to the planning process as required to protect its ongoing operations. Implementation of a clear amenity buffer and separation distance in the Latrobe Planning Scheme will assist in preventing inappropriate land use planning such as this.

4.2.7 Traralgon Growth Areas Review

Latrobe City Council is currently undertaking a review of potential growth areas at Traralgon. The study area for the Growth Areas Review (refer to Appendix B), includes land proximate to the Maryvale Mill including land immediately adjoining to the south and to the east. The Growth Areas Review will identify areas for urban expansion up to 2050. Preliminary community consultation for the project is likely to begin in August 2011.

The Traralgon Growth Areas review was established to prepare a strategy for future urban development growth options (housing, retail, industrial and employment) around the Traralgon, Traralgon-Morwell Corridor, Glengarry, Tyers and their surrounding areas. The review is to ensure that there is sufficient land supply to accommodate predicted long term increases in population.

The Review highlights constraints to the urban expansion of Traralgon:

- The Princes Freeway - Traralgon Bypass to the south;
- Floodplains to the north;
- Major pipeline infrastructure to the north; and
- Coal resources to the south.

It is noted that the Growth Areas Review has been delayed due to the emerging political context particularly state government policy on growth strategy and the need to ensure consistency with other Traralgon strategic land use planning projects.

Key comment:

This project provides a significant opportunity to influence outcomes of future land use planning in the area surrounding the Maryvale Mill. It is critical that a strategy of establishing a buffer and limiting urban encroachment be developed, so as to ensure that there is adequate policy to protect existing and future Maryvale Mill operations.

Australian Paper needs to monitor the progress of this project closely and actively participate in the planning process to ensure that appropriate buffers are implemented and maintained.

4.2.8 Morwell North West Development Plan, October 2010

This development plan directly applies to the area (north-west pocket of Morwell) covered by Schedule 1 to the Development Plan Overlay (DPO) of the Latrobe Planning Scheme, introduced through Amendment C48.

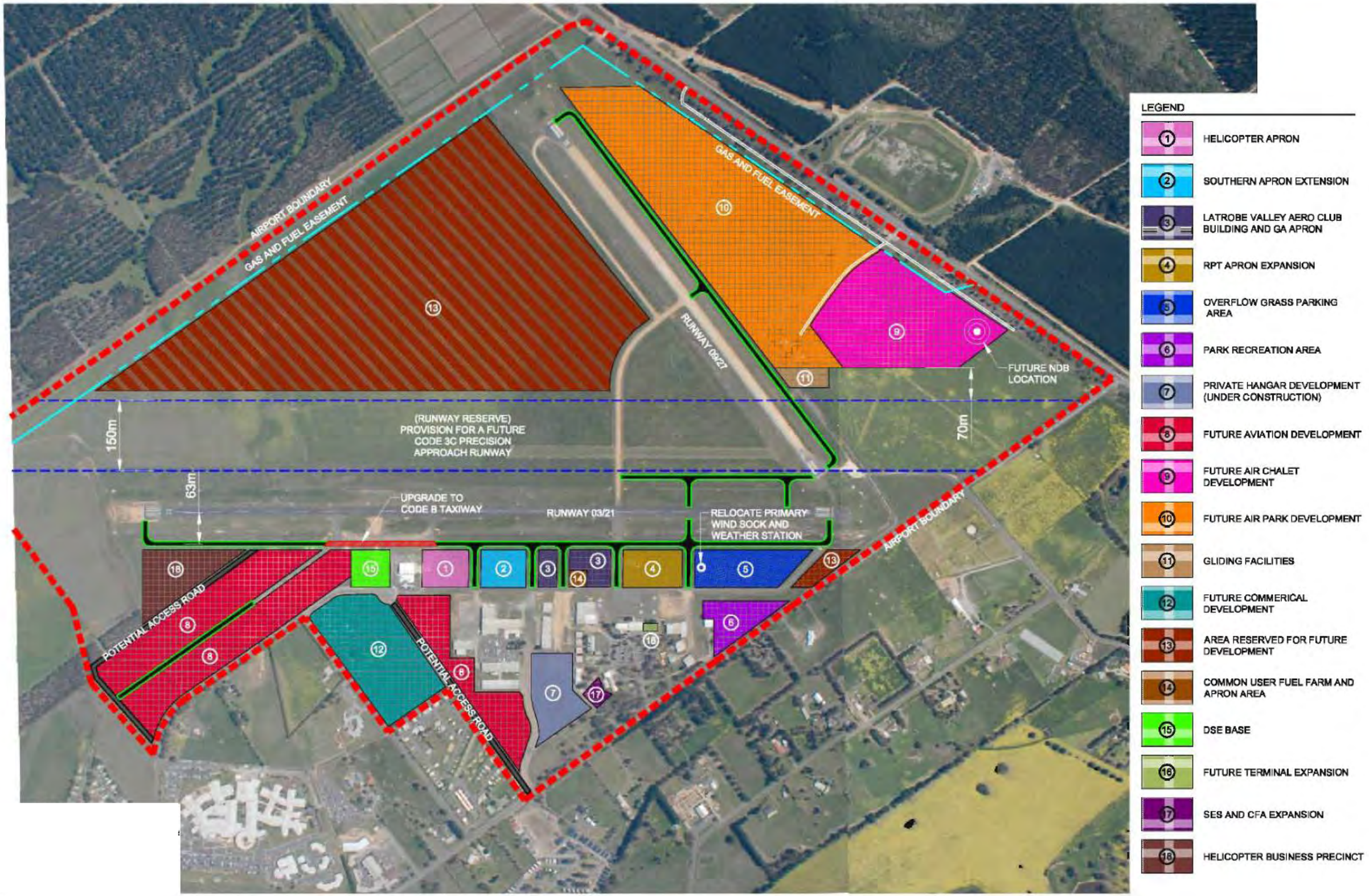
The land supply assessment undertaken by Essential Economics in 2008 established that Morwell would need 615 new dwellings to be constructed by 2018 and approximately 1,380 new dwellings to be constructed by 2023 to meet the forecast demand, accounting to approximately 60 new dwellings per year. However there is only a 5 year residential land supply in Morwell. Therefore, the City of Latrobe designated this area as an immediate growth area to fast track residential development by preparing and approving a development plan.

It is noted that whilst this Development Plan supports residential growth in the north-west corner of Morwell, further development north towards the Maryvale Mill is constrained by the alignment of the Environmental Significance Overlay which impedes any further encroachment of urban uses towards the Maryvale Mill.

4.3 EPA Recommended Buffer Distances

It is understood that the Clause 52.10 provisions of the planning scheme were originally developed based upon the EPA recommended buffer guidelines. Under the provisions of the EPA's guidelines, 'Recommended Buffer Distances for Industrial Residual Air Emissions', the recommended buffer distance for the Maryvale Mill is to be determined by the EPA on a site-specific basis. These same guidelines state that proposals to expand or intensify residential areas and uses, and other sensitive uses, that are located within the recommended buffer distance of an existing industrial activity that requires a buffer distance, should be subject to a planning permit under the planning scheme and "*such permits should not be issued without consultation with the EPA*".

These Buffer guidelines are administered by the EPA in licensing and approval of industrial premises.



Source: Latrobe Regional Masterplan Report (May 20090 Aurecon Australia Pty Ltd.

Figure 9
Airport Master Plan

31/27620/GIS/Maps/Working/Planning/Corel/Figure 9 Airport Master Plan.cdr

5. Potential Amenity Impacts

This assessment and review of planning and land use policy affecting land around the Maryvale Mill has revealed a number of opportunities and constraints for future development and operations on the site. These are broadly summarised below.

5.1 Odour

GHD conducted a study to examine the effect of local meteorology and the mode of odour release on the pattern of offsite odour impact during Maryvale Mill operations. A copy of the report is attached at Appendix C.

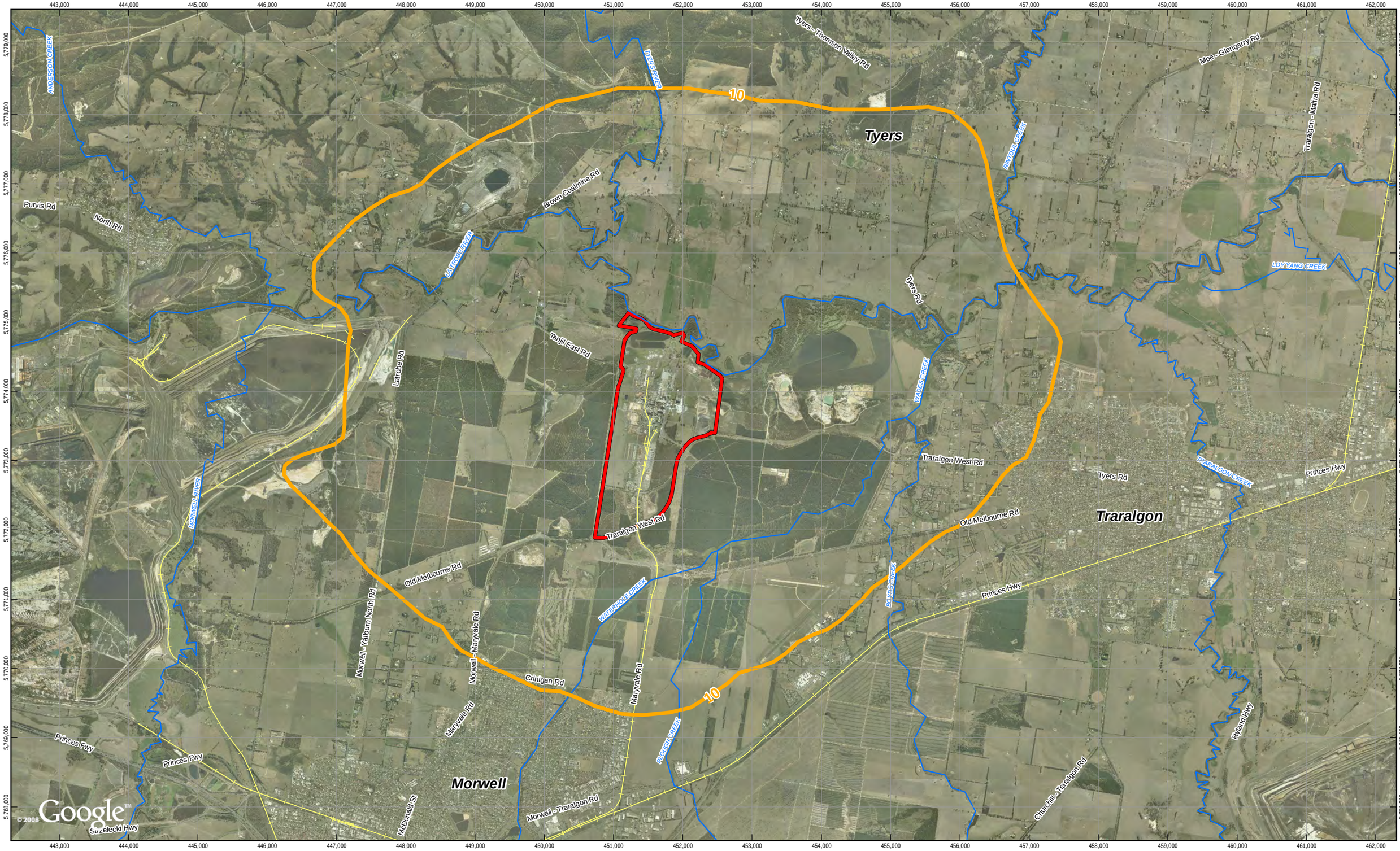
Preliminary modelling of the licenced emissions points (i.e. stacks) strongly suggests that the measured Maryvale Mill stack emissions will not generate off-site odour impact that could generate significant odour complaints. Given that it is common knowledge that the Maryvale Mill can be readily smelt at distances downwind outside the plant boundary, and that significant odour events have occurred in the past at both Traralgon and Morwell, the on-site odour sources causing the impact are likely to be (i) fugitive emissions released in the main process buildings, and (ii) ground level emissions from waste treatment lagoons, bio-solids storage etc.

To obtain an approximate measurement of the fugitive and ground level odour emissions, a campaign to directly measure ambient levels of H_2S along a crosswind transect downwind of the Maryvale Mill was undertaken. These measurements allowed the fugitive emission rates from the plant and from the waste treatment lagoons to be determined through a back calculation procedure. The off-site impact of the resultant H_2S emissions from all of the plant operations were modelled for an entire year and represented in **Figure 10**, which shows contours of predicted odour at a level of 10 OU.

The 5 OU contour level, which is used by EPA as a conservative measure of potential odour impact, was found to correspond with recent odour complaint history. However, odour complaints also extended beyond this distance, probably due to upset events at the Maryvale Mill, which result in occasional higher odour emissions. These upsets can be due to many causes such as external power outages, emergency releases dictated by the need to maintain operations within safety limits, or for highly adverse weather conditions.

The 10 OU level (refer to Figure 10), which is often taken as the level likely to result in odour impact and potential complaint, can be seen to extend to the western and northern fringes of the Traralgon and Morwell residential areas. The outlying town of Tyers is marginally included by this contour, while the town of Glengarry is well clear of this contour.

While the 5 OU contour would represent a conservative separation distance from the Maryvale Mill to minimise odour complaint, the existing intrusion of the residential areas across this contour to the south and east suggests that a compromise separation distance as defined by the 10 OU contour is a more viable option.



Scale 1: 50,000 @ A3

0 245 490 980 1,470 1,960

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Legend

- Site Boundary
- Major Watercourse
- Railway
- Amenity Buffer (10OUs)

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Australian Paper
Maryvale Pulp Mill

Job Number	31-27620
Revision	A
Date	29 Jun 2011

Proposed Amenity Buffer

Figure 10

G:\31\27620\GIS\Maps\Working\Planning\Figure 10 Proposed Amenity Buffer.mxd

Data source: Google Map Pro & VicMap 2010 with permission.. Created by:lrsmith

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5.2 Traffic

Traffic movements in relation to the Maryvale Mill are primarily truck and staff traffic. According to Australian Paper, there are approximately 300 truck movements a day, including the delivery of wood, chemicals, pulp and dispatch of finished paper products.

It is understood that the trucks access the site 24 hours a day. The majority of the trucks make the shortest route to the Princes Highway; this is typically via Alexanders Road which borders the township of Morwell to the east. The log trucks however, take a number of routes depending on where the wood is located; this can be both north and south of the Princes Highway. The freeway is currently closed at Morwell and trucks are required to bypass Morwell at present, which has the potential to cause disturbance to residential areas and contribute to some increase in congestion. The truck types are a combination of Rigid, Semitrailer, B Double and Log Trucks with folding trailers.

Approximately 990 staff work at the Maryvale Pulp Mill and with a limited choice of transportation to and from the site, the car is the most prominent mode of transport. Therefore there is the potential to have 990 vehicles that enter and exit the site per day. However it is noted that we anticipate that a large portion would car pool.

6. Opportunities to Strengthen Policy

An industrial use such as the Maryvale Mill is generally incompatible with sensitive uses such as residential dwellings due to likely amenity impacts. A number of potential impacts have been identified that could affect the future operations, namely odour, noise and traffic. Current planning for urban growth within the City of Latrobe contemplates greenfields development proximate to the Maryvale Mill, and intensification of existing development within township boundaries.

These conflicting pressures highlight the need to strengthen policy within the planning scheme, and provide clearer guidance regarding appropriate separation distances from the Maryvale Mill to sensitive uses.

6.1 Zone and Overlay Controls

The site is primarily affected by the Industrial 2 Zone. The Industrial 2 Zone provides for industrial uses that require substantial buffers and that are of State significance. This zone therefore provides an appropriate level of protection for the activities being undertaken on the land, and sufficiently highlights its economic and social importance.

Whilst the zoning is appropriate to highlight the importance of the operations, there is no clear guidance as to what an appropriate separation is. The subject site has existing use rights for the Mill. The use of the land for Mill purposes may therefore continue under the current zoning, providing that the amenity of the area is not damaged, or further damaged, by a change in the activities beyond the limited purpose of the use preserved by the existing use right. This essentially means that the Maryvale Mill can continue to operate as it currently does. However no building or works can be constructed or carried out without a permit and any application for a permit will be assessed against the provisions of the Planning Scheme including consideration of separation distances under Clause 52.10 of the Planning Scheme. There is a risk that the current surrounding zones and subsequent encroachment of urban development is being considered, therefore a buffer distance meeting EPA standards needs to be adhered to, to ensure the Maryvale Mill's future.

A buffer could be implemented via an Environmental Significance Overlay, to ensure that an appropriate separation from urban areas is maintained. The SPPF highlights the need to protect such industries from urban encroachment by the implementation of buffers and separation of incompatible uses. This policy provides clear justification for implementation of such a buffer.

According to the DPCD Guidelines, "*Using Victoria's Planning System*",

"Environmental significance is intended to be interpreted widely and may include issues such as effects from noise or industrial buffer areas, as well as issues related to the natural environment. These issues and the intended effects or outcomes of the requirements being imposed must be clearly stated within a schedule to the Environmental Significance Overlay."

This approach is the same approach as that used at the Eastern Treatment Plant in the Greater Dandenong Planning Scheme, three sites of wastewater treatment plants in the Ballarat Planning Scheme, the sewerage treatment plant in the South Gippsland Planning Scheme, the Colac water reclamation plant in the Colac Otway Planning Scheme, to name a few of the many examples.

Under the provisions of the EPA's guidelines, '*Recommended Buffer Distances for Industrial Residual Air Emissions*', the guidelines state that proposals to expand or intensify residential areas and uses, and other sensitive uses, that are located within the recommended buffer distance of an existing industrial activity that requires a buffer distance, should be subject to a planning permit under the planning scheme and "*such permits should not be issued without consultation with the EPA*".

In this instance, it is considered that potential odour and noise emissions could be managed through a combination of upgrading plant and facilities over time as new technologies become available, and application of an ESO that ensures that odour and noise impacts are addressed in new proposals for sensitive uses on surrounding land. The application of an ESO will establish a requirement for a permit and will therefore allow for the consideration of potential odour and noise impacts on new development.

The extent of land to be included in the ESO would be based upon the recommendations of the odour assessment, included as Appendix C.

6.2 Strategic Policy

The Latrobe Planning Scheme sufficiently acknowledges the significant role of the Maryvale Mill to the regional economy and community, and provides clear policy direction regarding the retention of this industry. The MSS however, could be modified to provide clearer guidance regarding separation distances or buffer areas:

The following changes to the MSS should be considered:

- Inclusion of a buffer area within the Morwell, Traralgon and Tyers Structure Plans.
- Inclusion of specific policy objectives which aim to protect the existing industry from encroachment of inappropriate development, and the need to define and maintain buffers.

Strengthening the policy framework is required to protect and maintain the existing industry which has the potential to generate adverse amenity impacts and require a significant buffer between sensitive uses.

7. Implementation of a Buffer via Council's Growth Areas Review

A number of issues and opportunities have been identified through this assessment for the Maryvale Mill. The key observations are:

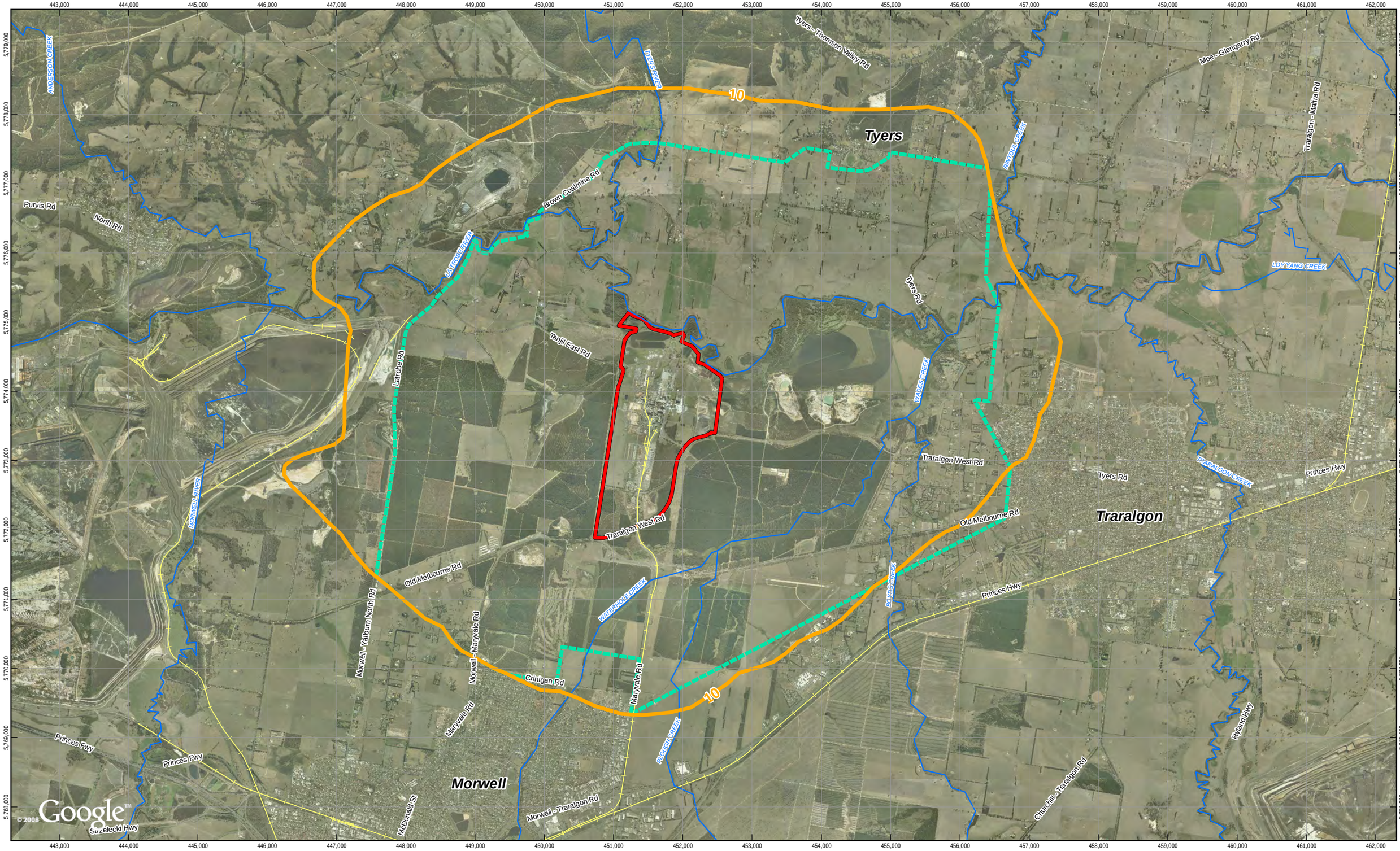
- The Australian Paper operations are essentially industrial in nature and have the potential to cause noise, odour and traffic impacts on the amenity of nearby residential areas. This issue will potentially be amplified if the surrounding land is developed for residential development, and may lead to complaints to Council and the EPA that threaten the existence of the Maryvale Mill.
- The need to plan for future urban growth must acknowledge the advantages of the facility being located in its current location and the ability to expand as necessary. The Maryvale Mill provides employment to a largely local workforce, and therefore needs to be protected for the ongoing viability of the Maryvale Mill.
- The urban areas of Morwell and Traralgon are located in close proximity to the site and are the most populated towns in the municipality. However, these towns are enveloped by a variety of constraints including coal and stone mining activities and associated buffers, land subject to inundation, industry, inter-town corridors and land that is fragmented into small rural allotments. It is noted that estimates of current residential land supply suggest that in Morwell there is only a five year supply and in Traralgon there is only a four year supply, highlighting the need for increased rezoning and development to assist in meeting the desired 10 to 15 year urban land supply target.
- Amendment C26 proposes to implement planning controls in order to facilitate the ongoing operations of the Latrobe Regional Airport and provide options for future expansion, in particular the development of accommodation and residential facilities. This development would result in sensitive uses located well within the EPA recommended buffer distance of 5 kilometres.
- The site which is currently zoned Industrial 2, is appropriate to the current land use and operations. The establishment of an additional Environmental Significance Overlay on land surrounding the site, would provide a statutory basis for Council to make decisions about residential development proposals that adequately consider the amenity issues associated with the Australian Paper operations.
- An alternative approach may include the development of a local policy that provides a strategic basis for the consideration of appropriate location for urban growth. This could be illustrated on the Morwell, Traralgon and Tyers Structure Plans.
- Both of the approaches mentioned above would need to be implemented via a Planning Scheme amendment to Latrobe's Planning Scheme.
- It is understood that Council planning officers are generally supportive of implementing a buffer to provide direction for decision making around the encroachment of urban development on Maryvale Mill operations, and associated amenity impact issues.

As outlined in this report, Council is currently undertaking a Growth Areas Review, to identify land suitable for future urban growth around Traralgon.

It is important that Australian Paper actively participate in the planning and consultation processes for the Traralgon Growth Areas Review. The Growth Areas Review will set out the preferred locations for urban expansion and once confirmed, would be difficult (if not impossible) to reverse. Land immediately adjacent to the Maryvale Mill will be considered as part of the Growth Areas Review, and it will be necessary to make submissions to the Council highlighting the unsuitability of that land for sensitive uses.

It is anticipated that the Review will result in a revised Traralgon Structure Plan, and revised local policy regarding growth and urban densification. It is recommended that Australian Paper make a submission to Latrobe City Council, requesting that a buffer be implemented via the revised Traralgon Structure Plan, and local policy strengthened regarding the buffer requirement.

Given that some of the existing urban areas of Morwell, Traralgon and Tyers are located within the recommended buffer area, an adjusted amenity buffer is suggested, shown in **Figure 11**.



Scale 1: 50,000 @ A3

0 245 490 980 1,470 1,960

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Legend

- Site Boundary
- Major Watercourse
- Railway
- Amenity Buffer (10OUs)
- Adjusted Amenity Buffer

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Australian Paper
Maryvale Pulp Mill

Job Number	31-27620
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Proposed & Adjusted Amenity Buffers

Figure 11

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8. Conclusion

It is considered that the Latrobe Planning Scheme currently goes some of the way in recognising the Australian Paper Maryvale Mill operations and its importance to the local and wider economy within local policy. In undertaking and implementing the findings of the current Growth Areas Review, Latrobe City Council could reinforce the need to protect the Maryvale Mill from encroachment of sensitive uses by depicting a buffer area on the revised Traralgon Structure Plan, and associated local policy regarding urban growth and development. Such amendments would be undertaken by Council as part of the Growth Areas Review.

This recommendation is supported by the State Planning Policy Framework, and the existing tools available within the suite of planning controls of the Victoria Planning Provisions.

It is recommended that the suggested changes to the Planning Scheme be made via Australian Paper submissions and input to the Latrobe City Council's Traralgon Growth Areas Review.

Furthermore, Australian Paper should continue to monitor and input into further growth area planning within the City of Latrobe.

9. References

Latrobe City Council Economic Development Strategy, City of Latrobe, revised 2007

Latrobe City Council Residential and Rural Residential Land Assessment, Essential Economics Pty Ltd for City of Latrobe, March 2009

Latrobe City Heritage Study, Volume 1: Thematic Environmental History, Amendment C14 (July 2010) Context Pty Ltd, prepared for Latrobe City Council

Latrobe Planning Scheme, Department of Planning and Community Development [accessed online 18 May 2011] http://planningschemes.dpcd.vic.gov.au/latrobe/home.html

Latrobe Structure Plans – Morwell (August 2007) Beca Pty Ltd, prepared for Latrobe City Council

Latrobe Structure Plans – Traralgon (August 2007) Beca Pty Ltd, prepared for Latrobe City Council

Master Plan, Latrobe Regional Airport Master Plan Report (May 2009) Aurecon Australia Pty Ltd

Planning and Environment Act 1987 [accessed online 18 May 2011] http://www.austlii.edu.au/au/legis/vic/consol_act/paea1987254/

Using Victoria's Planning System, Department of Planning and Community Development [accessed online 18 May 2011] http://www.dpcd.vic.gov.au/planning/theplanningsystem/a-guide-to-the-planning-system

Appendix A

Certificate of Title

Certificate type: titles Matter: 3127620

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 11047 FOLIO 860 Security no : 124038261002H
Produced 29/06/2011 09:52 am

LAND DESCRIPTION

Lot 2 on Plan of Subdivision 609453S.
PARENT TITLE Volume 10239 Folio 028
Created by instrument PS609453S 09/01/2008

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
PAPER AUSTRALIA PTY LTD of 307 FERNTREE GULLY ROAD MOUNT WAVERLEY VIC 3149
PS609453S 09/01/2008

ENCUMBRANCES, CAVEATS AND NOTICES

COVENANT (as to whole or part of the land) in instrument H359505

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE PS609453S FOR FURTHER DETAILS AND BOUNDARIES

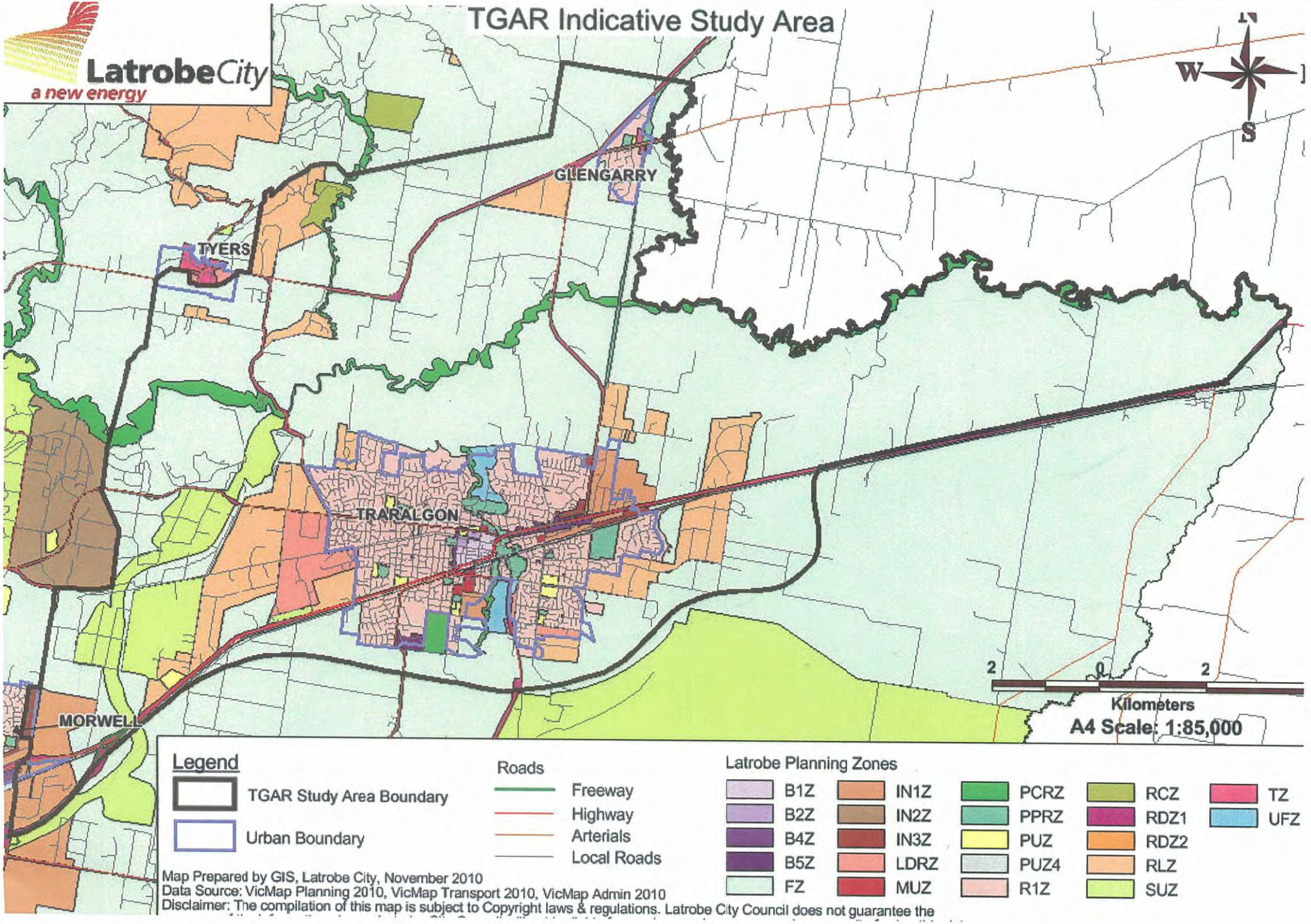
ACTIVITY IN THE LAST 125 DAYS

NIL

DOCUMENT END

Appendix B

Traralgon Growth Areas Review Study Area


TGAR Indicative Study Area
LatrobeCity
a new energy
GLENGARRY
TYERS
TRARALGON
MORWELL
N
W
S
2
0
2
Kilometers
A4 Scale: 1:85,000
Legend
TGAR Study Area Boundary
Urban Boundary
Roads
Freeway
Highway
Arterials
Local Roads
Latrobe Planning Zones
B1Z
B2Z
B4Z
B5Z
FZ
IN1Z
IN2Z
IN3Z
LDRZ
MUZ
PCRZ
PPRZ
PUZ
PUZ4
R1Z
RCZ
RDZ1
RDZ2
RLZ
SUZ
TZ
UFZ
Map Prepared by GIS, Latrobe City, November 2010
Data Source: VicMap Planning 2010, VicMap Transport 2010, VicMap Admin 2010
Disclaimer: The compilation of this map is subject to Copyright laws & regulations. Latrobe City Council does not guarantee the

Appendix C

Assessment of Odour Dispersion at on Pulp Mill Default Buffer

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Australian Paper

Report for Pulp Mill Maryvale

Assessment of Odour Dispersion on Pulp Mill Default Buffer

June 2011

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Contents

Table Index

Figure Index

Appendices

Executive Summary

GHD conducted a study to examine the effect of local meteorology and the mode of odour release during Australian Paper (Maryvale) operations. The dispersion model used to produce results for this study was the AUSPLUME 6.0 screening model. Further high level modelling was subsequently conducted with CALPUFF / CALMET thereby minimising the limitations of the screening model. The study was conducted under the limitations as outlined in Section 12.

Meteorological data from the EPA station at Traralgon for the year 2001 was used in the screening assessment. The subsequent high level CALPUFF / CALMET modelling incorporated meteorological data from Traralgon, Moe, Latrobe Valley Airport and the Latrobe Valley Air Monitoring Network station at Powerworks for 2008. Furthermore, detailed terrain and geographical information, including land use, to a resolution of 250 m was incorporated into the model. Analysis of the meteorological data and model results show prevailing west-south-west winds of low to moderate speed, combined with east-north-easterly winds that indicate a strong valley influence. Furthermore, greater than 50 per cent of atmospheric conditions are considered stable, which are known to provide the least amount of dispersion for ground based non-buoyant odour sources, usually overnight.

Preliminary modelling of the licenced emissions points, i.e. stacks, strongly suggests that the measured Mill TRS stack emissions will not generate off-site odour impact that could generate significant odour complaints. Given that it is common knowledge that the Mill can be readily smelt at distances downwind outside the plant boundary, and that significant odour events have occurred in the past at both Traralgon and Morwell, the on-site odour sources causing the impact are likely to be; (i) fugitive emissions released in the main process buildings, and (ii) ground level emissions from waste treatment lagoons, bio-solids storage etc.

To obtain an approximate measurement of the fugitive and ground level odour emissions, a campaign to directly measure ambient levels of H_2S along a crosswind transect downwind of the Mill was organised at short notice for Thursday 28 April 2011. On the day the wind was a moderate north easterly and two traverses were undertaken at a spatial resolution of 30 m or greater. These measurements allowed the fugitive emission rates from the plant and from the waste treatment lagoons to be determined through a back calculation procedure.

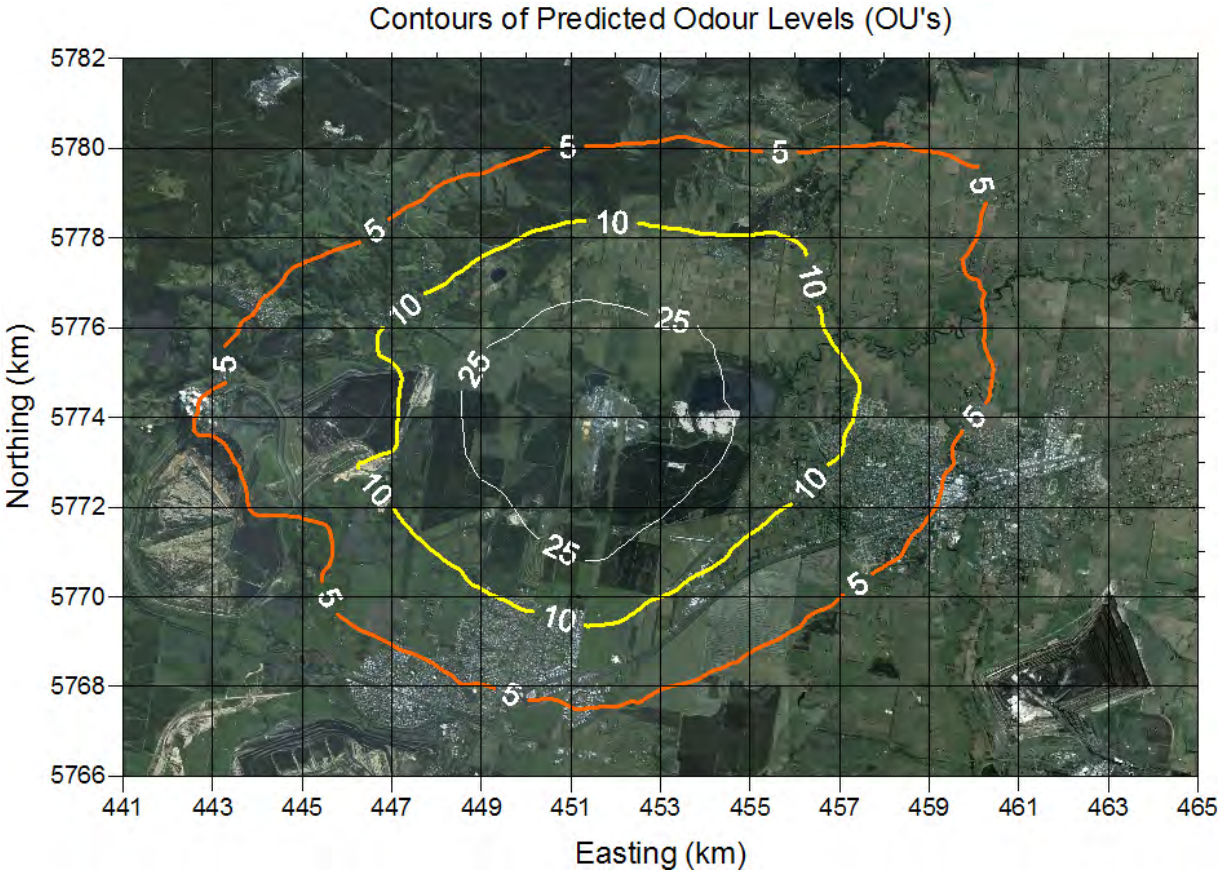
The off-site impact of the resultant H_2S emissions from all of the plant operations were modelled for an entire year using CALPUFF / CALMET, with corresponding ground level concentrations of H_2S being converted to odour units (OU's) by the relation 1.4 ppb H_2S = 1 OU, as measured at a similar paper pulp mill in Ontario Canada. The predicted pattern of odour levels is shown below.

The 5 OU contour level, shown below, which is used by EPA as a conservative measure of potential odour impact, was found to correspond with recent odour complaint history. However, odour complaints also extended beyond this distance, probably due to upset events at the Mill, which result in occasional higher odour emissions. These upsets can be due to many causes such as external power outages, emergency releases dictated by the need to maintain operations within safety limits, or for highly adverse weather conditions.

The 10 OU level, which is often taken as the level likely to result in odour impact and potential complaint, can be seen in the contour plot below to extend to the western and northern fringes of the

Traralgon and Morwell residential areas. The outlying towns of Glengarry and Tyers are however well clear of this contour.

While the 5 OU contour would represent a conservative separation distance from the Mill to minimise odour complaint, the existing intrusion of the residential areas across this contour to the south and east suggests that a compromise separation distance as defined by the 10 OU contour is a more viable option.



1. Introduction

The recommended buffer distances for various classes of industry in Victoria are given in EPAV Guidelines[1]. This document was last revised in 1990, and is flagged to be replaced by a Separation distance PEM (Protocol for Environmental management). Work on the PEM has been initiated, however even a draft for public comment is unlikely to be available any time soon.

The guideline outlines the purpose of buffers as being to reduce disamenity in the event of a process upset, malfunction or adverse weather conditions at nearby sensitive land uses. The guideline makes clear that under normal operations, the various design criteria should be met at and outside the premises boundary, so that external buffers are to be relied on for abnormal conditions only. The buffers have also been set for the potential impacts of nuisance dust and odour (noise and night lighting etc are excluded). Sensitive land uses are defined as ; *" Residential areas and zones(whether occupied or not), hospitals, schools, caravan parks and other similar uses involving presence of individual people for extended periods, except in the course of their employment of for recreation".*

The guideline generally specifies a single default buffer distance for each industry category, and seven default distances are used, namely 100, 200, 300, 500, 1000, 2000, and 5000 m. There are only two industries that attract the 5000 m buffer, namely cattle feedlots and paper/pulp mills, and for both, the default distance for a given instance is to be determined by EPAV on a site-specific basis.

The purpose of this document is to examine the effect of local meteorology and the mode of the odour release during normal and upset/malfunction operations.

Note that the dispersion models used in this document are AUSPLUME 6.0 and CALPUFF / CALMET 5, and therefore the results presented are subject to the limitations of of each of the models. This includes, for AUSPLUME, the assumption of straight line trajectories and zero skew in wind direction with height above ground. The final modelling was conducted with CALPUFF / CALMET wherein these limitations are avoided. Note that the investigation and analyses were subject to the limitations as outlined in Section 12.

[1] EPAV 1990 "Recommended Buffer Distances for Industrial Residual Air Emissions" AQ 2/86 rev. July 1990.

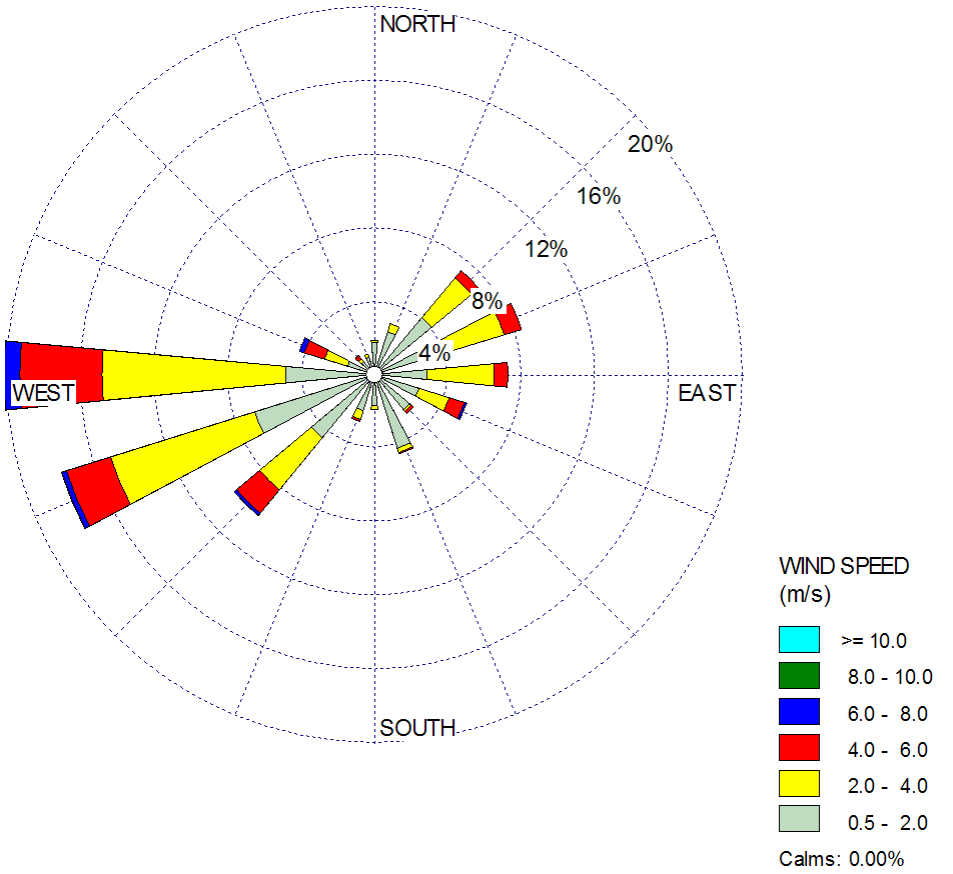
2. Local Meteorology

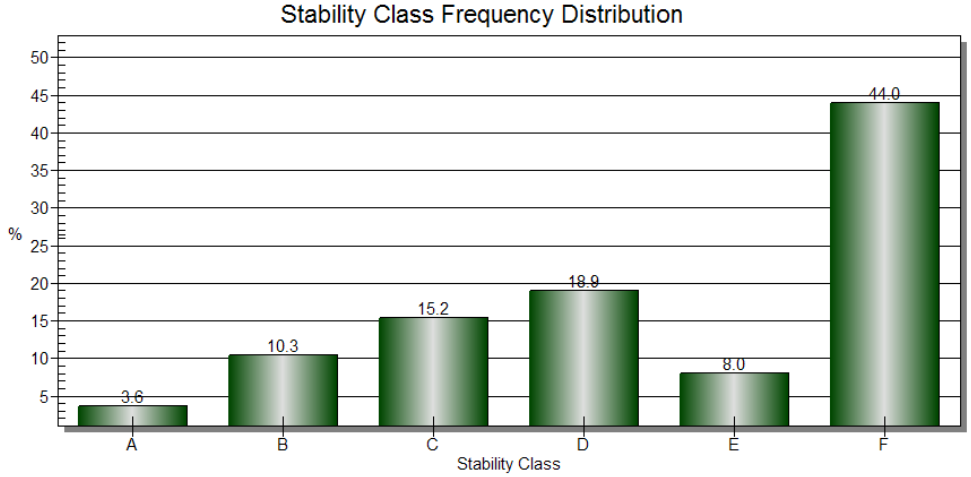
The nearest available meteorological dataset that would be representative of the AP Mill site is the LVAMN station at Traralgon and a 12 month dataset for the year 2001 was used in the screening assessment of the AUSPLUME model. This dataset was also used, along with other datasets in the valley in the broader regional modelling conducted with CALPUFF. Figure 1 below shows the annual wind rose and stability class distribution for the site, and the following features can be seen:

- Prevailing west-south-west winds of low to moderate speed;
- East-north-easterly winds which indicate strong valley influence; and
- A high proportion of wind speeds below 2 m/s.[2]
- Greater than 50 per cent of atmospheric conditions are considered stable, i.e. either Pasquill-Gifford Stability class “E” or “F”. Stable conditions occur generally at night, and the reduced turbulence levels that accompany stable flows lead to reduced mixing of emission plumes and greater downwind odour impact.

[2] Due to the requirements of the AUSPLUME modelling program, wind speeds below 0.5 m/s cannot be modelled, therefore, the minimum wind speed in the meteorological dataset was 0.5 m/s.

Figure 1 Wind rose and P-G Stability class distribution of the Traralgon 2001 meteorological dataset used for the assessment.





3. Effect of Local Wind Climate to Form a Directionally-Dependent Buffer

Generally any site-specific wind climate will display preferred directions of 'poor' dispersion, where poor dispersion is characterised (at least for ground level sources) by nocturnal light, stable winds. In the classification used by the dispersion model AUSPLUME, this equates to wind speed V = 0.5 m/s and Pasquill Gifford stability category =F (moderately stable). In the directions of poor dispersion, a given odour release will require a greater buffer distance to achieve the same degree of protection from odour impact as given by the default buffer distance. Similarly there can also be a direction of good dispersion (generally in the upslope direction from the source) where the incidence of poor dispersion is lower than the average in other directions – in this direction, the default buffer distance can be reduced while still maintaining the same degree of amenity protection.

GHD has developed a methodology[3] to determine the effect of local meteorology to stretch/contract the radial default buffer in the directions of poor and good dispersion respectively, and this method has been used to determine the directional buffer that will provide equal protection from disamenity independent of the direction from the Mill. In brief, a nominal 'upset' odour emission rate (OER) is modelled using the EPA approved dispersion model AUSPLUME, and the predicted near worst case (99.5%ile) odour contour that has the same enclosed area as the 5 km buffer km (ie the default buffer) is drawn and compared against the radial buffer.

It should be noted that the non-radial buffers presented in Figure 2 and Figure 3 for ground-level and stack releases respectively are constrained by the limitations of AUSPLUME (a straight line Gaussian model) to correctly characterise the trajectories, dispersion and potential recirculation of odour plumes released from the mill over distances up to 5 km. The shape of the non-radial buffer in these two Figures will be different to that obtained in the subsequent modelling using the advanced dispersion models CALMET and CALPUFF that are presented in Section 9. These models are capable of simulating these effects as well as the effect of terrain in 'steering' air flows along the valley axis.

3.1 Ground Level Release

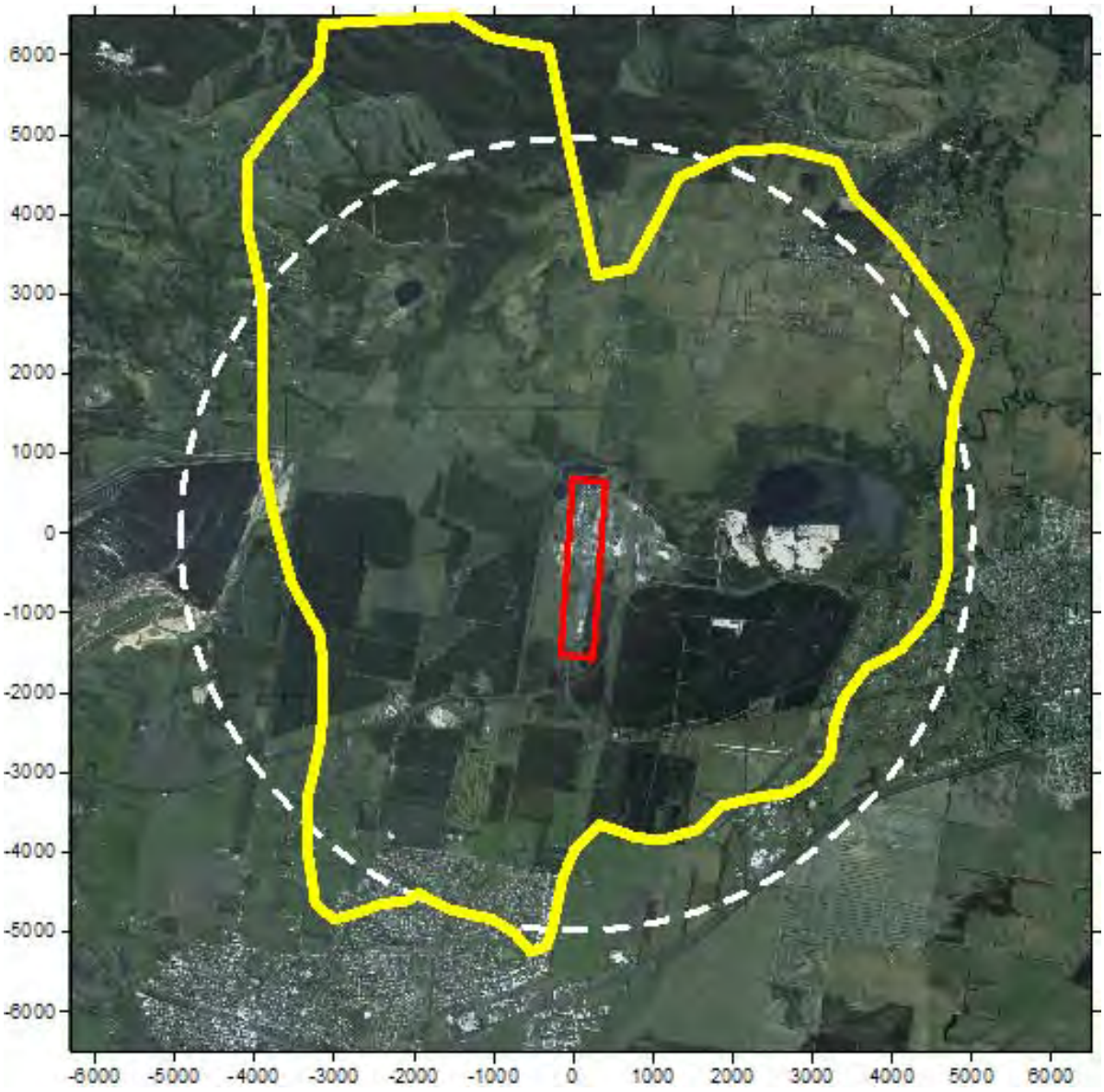
Figure 2 shows the predicted directional buffer for a ground level release (representing for example, an upset in a facultative pond when the pond could overturn and the anaerobic conditions would increase the pond OER substantially. As the position of an upset ground-level release can range from the north (aeration ponds) to the south (trade waste storage dam) on the Mill site, a rectangular envelope (~300 m x 1900 m, see Figure 2) of the potential release encompassing these potential sources was used to define the upset source.

Inspection of Figure 2 shows that the directional buffer is a maximum to the NE, generally in the down-valley direction (which at this part of the Latrobe valley is to the ENE). This is also seen in the wind rose, and reflects the direction of nocturnal cool air katabatic flows down the valley as measured at the EPAV monitoring site in Traralgon. There is also a similar lobe in the contour to the NNW, which is likely due to the slope flow off the southern valley wall, which on occasion can undercut the regional drainage flow down the valley axis.

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

The exposure of the existing residential development areas to the default radial and the directional buffer is also shown in Figure 2. The default radial buffer extends to the northern fringe of Morwell and to the western fringe of Traralgon, and the directional buffer shows a slightly increased excursion into Morwell, and a slightly reduced excursion into Traralgon.

Figure 2 Directionally Dependent Buffer using AUSPLUME – Ground Based Sources, AP Mill



3.2 Stack Release

GHD also examined the pattern of the directional buffer when the upset release of odour is from the main stacks, namely DP35, DP44 and DP45. In this case, the released odour plumes are elevated, and the meteorological conditions that lead to maximum downwind odour impact are not that for a ground level release. The meteorological conditions giving maximum downwind impact are a function of the stack height, and can often be under unstable conditions, when the enhanced dispersion acts to bring the lower edge of the plume more rapidly to ground. In addition there is a complicating factor when there is terrain between the source and receptor, as elevated terrain with respect to the stack base will yield higher GLCs as the land surface at the receptor is raised towards the stack plume.

Figure 3 shows the pattern of the directional buffer when the upset release is presumed to issue from the three main stacks in the same ratio as their EPA licence limits for TRS. The contour is shown in blue, and this time the direction of maximum extent is to the SSW – completely different to that seen in Figure 2 for a ground-level release. When the underlying terrain in Figure 3 is observed, it is clear that the lobes of maximum extent correlate almost exactly to the position of elevated terrain on the valley floor. When the aerial photo is used as a base (see Figure 3a) it can be seen that the directional buffer almost encroaches onto the NW corner of the residential fringe of Morwell, but is well clear of the western residential fringe of Traralgon.

The almost direct match seen between the terrain and buffer shape in Figure 3 can be expected to differ when CALPUFF is used to simulate the trajectory and dispersion of the AP odour plumes. CALMET will simulate the ‘steering’ of the plume to either side of the ridge of higher ground running to the SSW of the plant towards Morwell, and the shape of the lobe seen in Figure 3 to the SSW will change as a consequence.

Figure 3 Directionally Dependent Buffer using AUSPLUME – Stack Sources, AP Mill

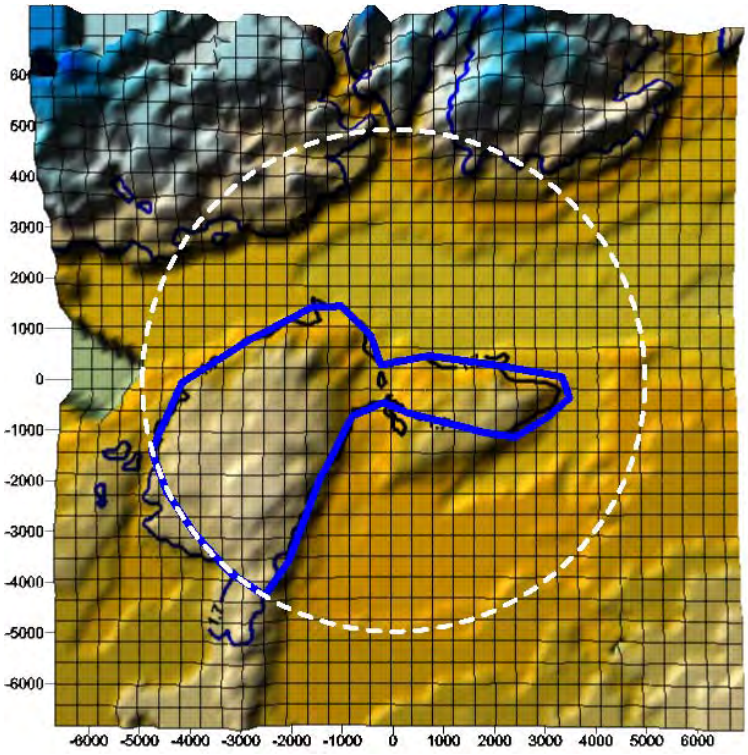
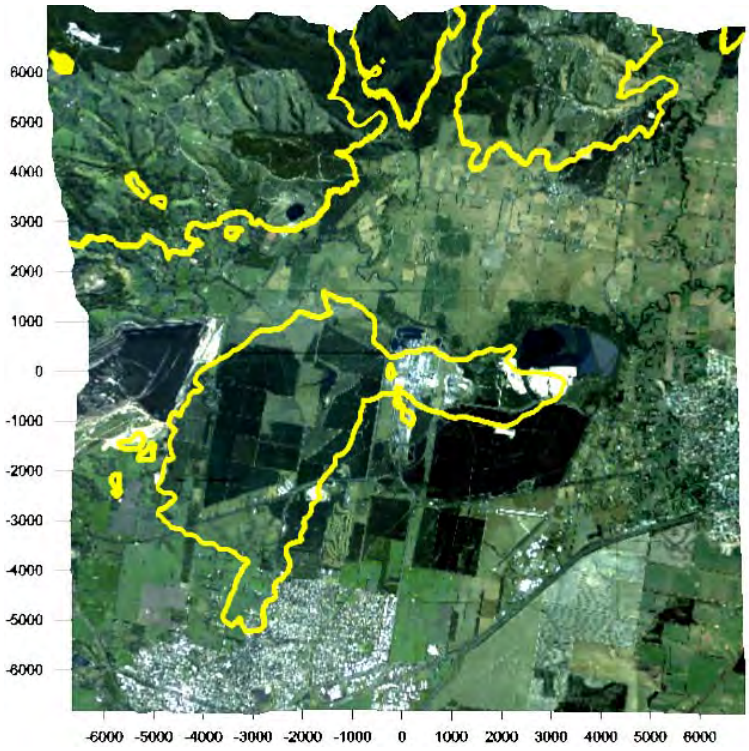


Figure 3a Directionally Dependent Buffer using AUSPLUME – Stack Sources, AP Mill



3.3 Implications for Selection of Directional Buffer for AP Mill

Clearly it is important to establish whether the measured exceedences of the licence limit on TRS for each of the three main stacks are capable of generating off-site odour impact at a frequency requiring protection from disamenity. Hourly data for a 14 month period giving the concurrent measured TRS emission rates for each of DP35, DP44 and DP45 has been provided by AP, and Figure 4a shows the cumulative frequency distributions for each stack. It can be seen that for typically 99.5% of the time, the all-stack TRS emission rate is within the EPA licence limit. That is, the Mill stack TRS emissions exceed the licence limit for just 44 hours in a year. Figure 4b shows the upper end of the cumulative frequency distribution for the three stacks combined, with the combined TRS emission rate normalised to the combined EPA licence limit. The probability is summarised in Table 1.

Table 1 Upper-end Cumulative Frequency Distribution - Plant TRS Emission Rate

Cum. Freq., %	Hours/yr	Multiple of combined EPA limit on TRS
99.5	44	1
99.9	9	2
99.95	4	3
99.99	1	3.8

Hence at all times the normalised plant TRS emission rate is < 4, while 3-fold and 2-fold increases are seen for only 4 and for 9 hours respectively in a year. Given that the duration of these events is a single hour or less, the likelihood that a given receptor would be directly downwind at those hours is very low.

Figure 4a Cumulative Frequency Distributions of Measured TRS Emissions in AP Mill Main Stacks

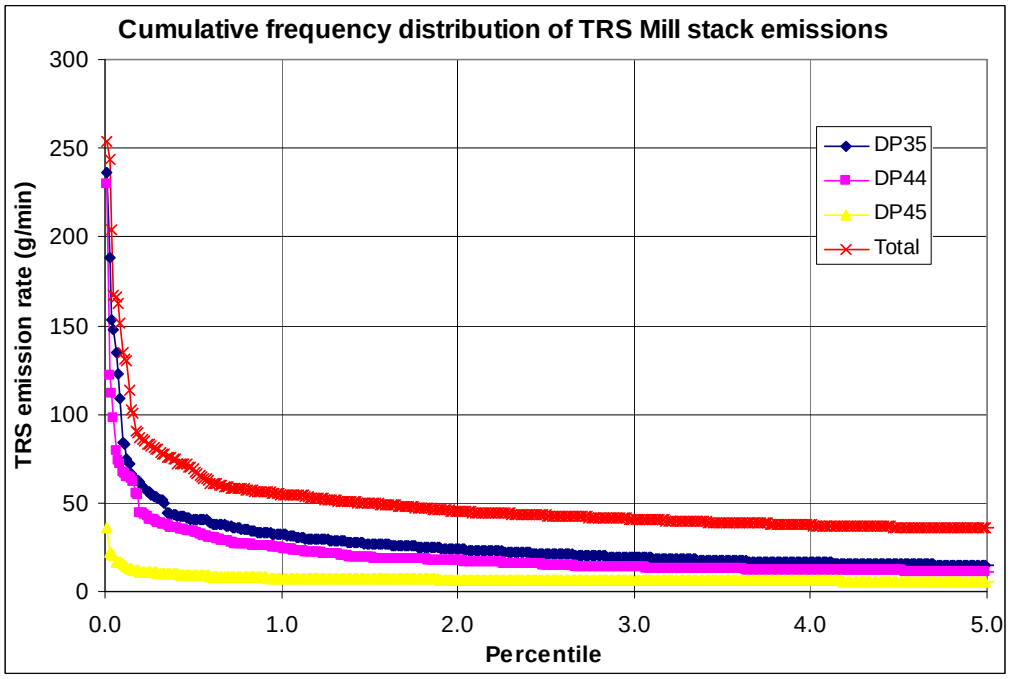
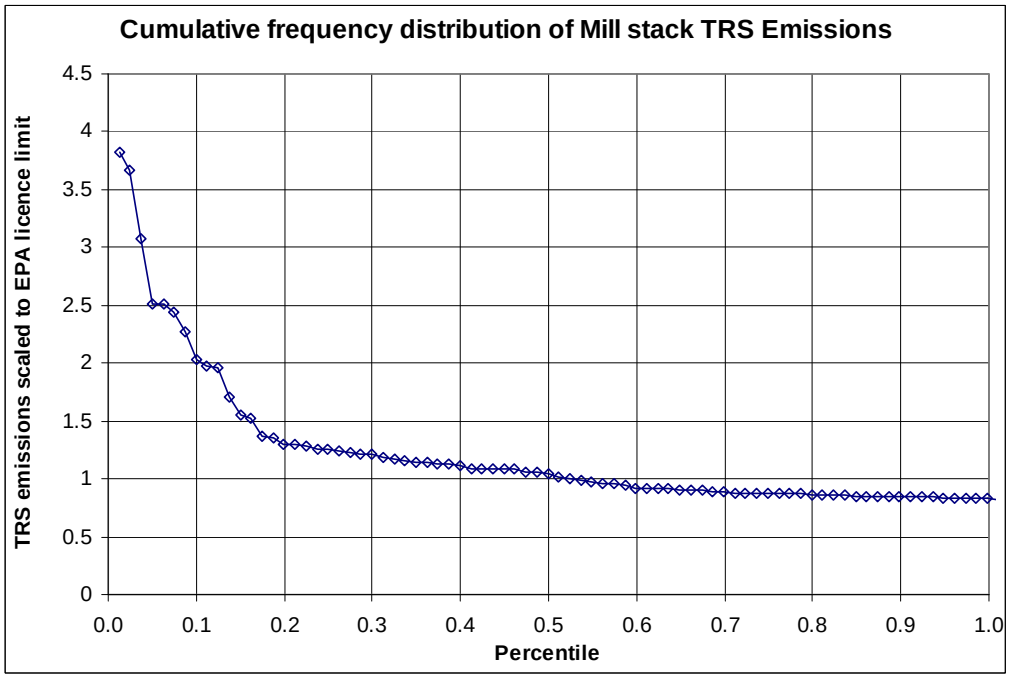


Figure 4b Upper end of the Cumulative Frequency Distribution of Measured TRS Emissions in AP Mill Main Stacks



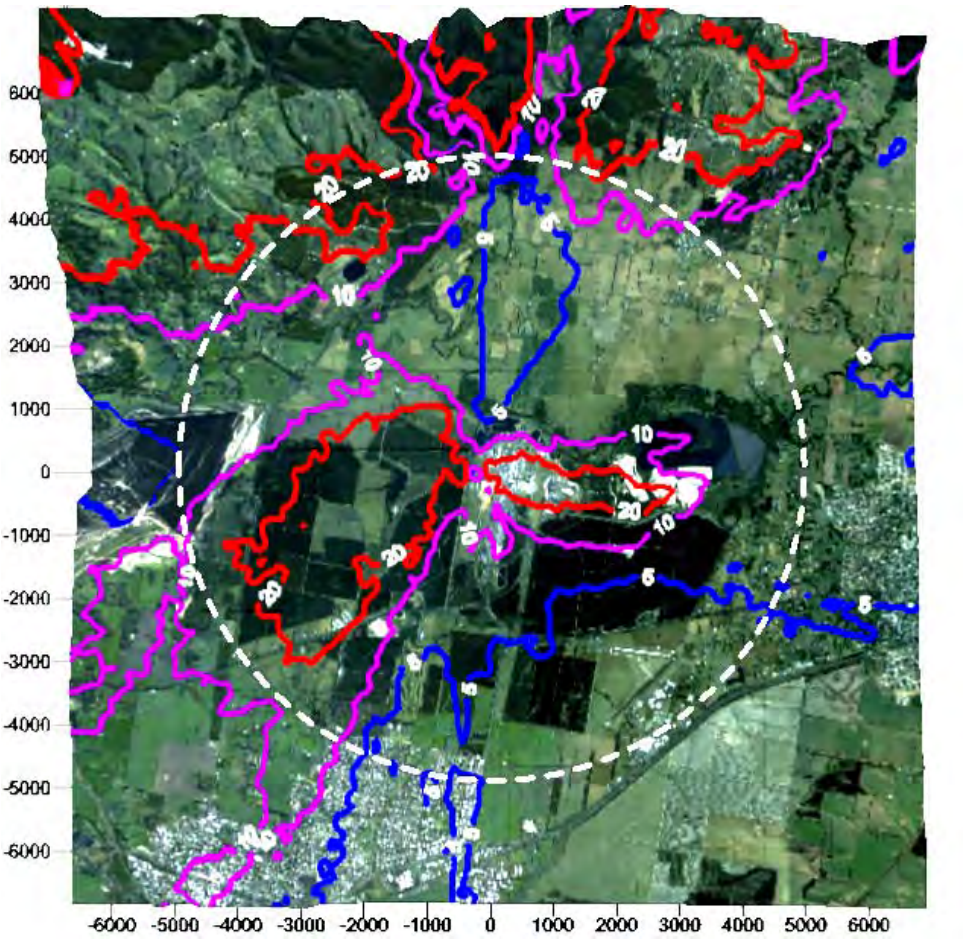
4. Predicted Odour Levels Off-Site from Stack Emissions of TRS

Although the stack TRS emissions are well characterised by direct measurement, the odour threshold for TRS has not been determined for the Maryvale Mill. Three options for this conversion are examined below, and the corresponding 99.9%ile odour level contours assuming the stacks are emitting TRS at their licence limit are presented for each option.

4.1 H_2S Threshold as defined in SEPP-AQM

Schedule A in SEPP-AQM gives the threshold concentration for H_2S at 0.1 ppb, so that a conservative link of TRS to odour level is to assume the threshold for TRS is equal to that of H_2S. The impact of the resultant stack odour emissions is shown in Figure 5 and it can be seen that both Morwell and Traralgon are exposed to odour levels > 5 OU. The 10 OU contour also extends to the south to cover sections of residential development to the north of the town centre.

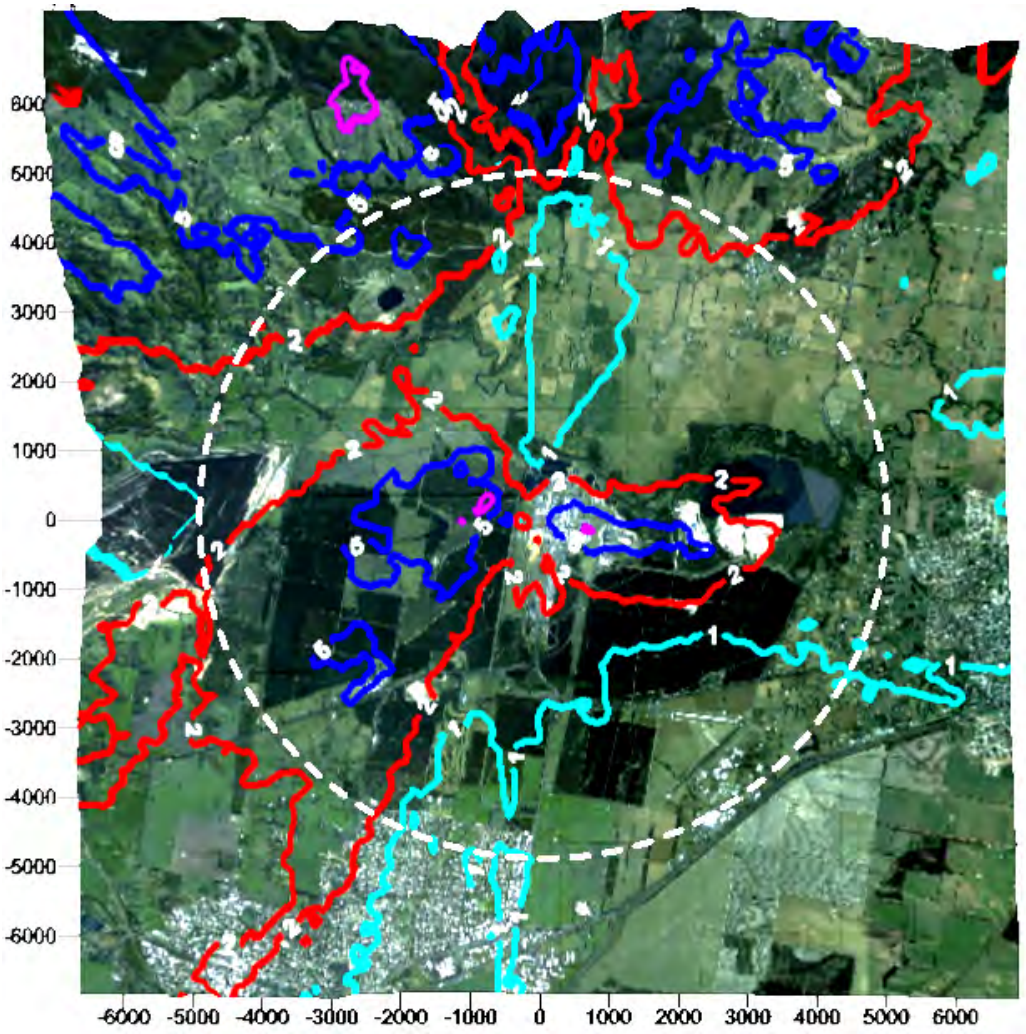
Figure 5 Predicted Peak (99.9%ile) Odour Levels from AP Mill Stack Emissions using AUSPLUME – (0.1 ppb TRS = 1 OU Conversion)



4.2 H_2S Threshold as defined by AWT

The odour threshold for H_2S has been found in practice in ring tests between odour laboratories in Australia to be significantly higher than the value used by EPAV in Schedule A. NSW EPA commissioned Australian Water Technologies (AWT) to conduct an extensive literature survey on the reported odour thresholds for H_2S. The AWT report[4] concluded that the appropriate odour threshold for H_2S is 0.69 ug/m^3, or 0.5 ppb. This threshold is five times higher than the SEPP-AQM value, and the corresponding predicted off-site odour levels reduce in the same ratio as shown in Figure 6. This figure shows that neither Traralgon nor Morwell are exposed to odour in excess of 5 OU. The 2 OU contour can be seen not to extend to Traralgon but shows a narrow excursion into the northern fringe of Morwell.

Figure 6 Predicted Peak (99.9%ile) Odour Levels from AP Mill Stack Emissions using AUSPLUME – (0.5 ppb TRS = 1 OU Conversion)

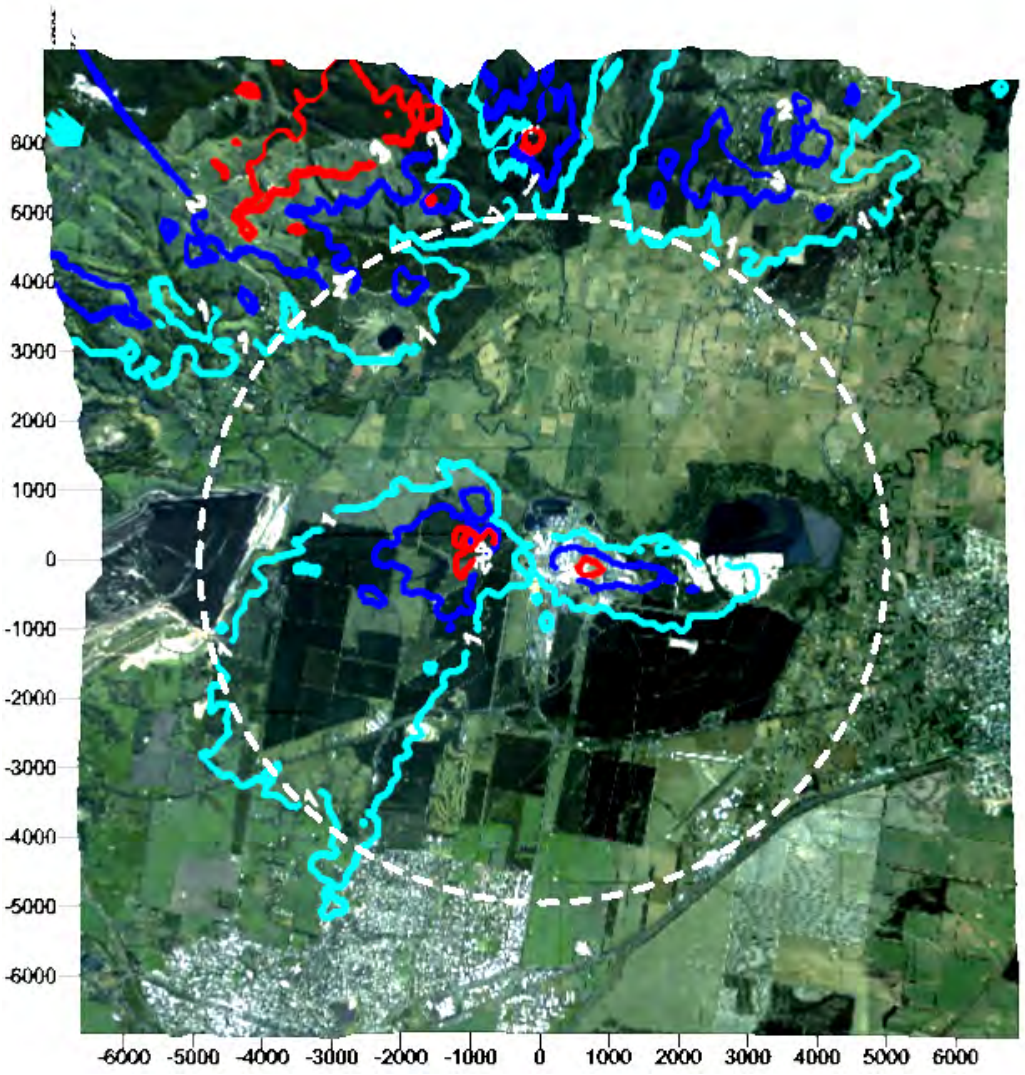


[4] AWT 2001. "Literature review – Australian and Overseas Odour threshold Data and Ambient Air Quality Criteria for Hydrogen Sulfide" report for NSW EPA, January 2001.

4.3 TRS Threshold from Ontario Pulp Mill

A TRS / odour link has been measured for a pulp mill in Ontario[5] and the odour threshold was determined to be 1 OU = 1.4 ppb TRS. The corresponding off-site impact is further reduced with odour levels reduced by a factor of 1.4/0.5 = 2.8:1. Figure 7 shows the pattern of impact, and it can be seen that the 1 OU contour is essentially confined within a 5 km radius from the mill. The 1 OU contour also does not extend to cover residential areas in either Traralgon or Morwell.

Figure 7 Predicted Peak (99.9%ile) Odour Levels from AP Mill Stack Emissions using AUSPLUME – (1.4 ppb TRS = 1 OU Conversion)



[5] 'Development of a Continuous odour Warning device based on Objective-Sensory Analysis Correlation data". Dept.Env.Chem. ,Ontario Research Foundation, CPAR Project No. 551, February 1977

4.4 Evaluation of Likely Impact from TRS Stack Emissions

Of the three TRS/odour links, the one based on measurements at a Kraft pulp Mill is to be preferred, so that the predicted peak odour impact as given in Figure 7 will represent the impact under 'worst case' meteorological conditions. Further, as the simulation has been conducted using the EPA licence limit TRS emission rates, the plant emissions will be less than that modelled for 99.5% of the time (see Table 1). Given that the incidence of plant stack emissions exceeding their combined licence limit is so small (44 hours in 12 months), the likelihood that the occurrence of events when the licence limit is exceeded will coincide with near 'worst case' meteorological conditions is very low. Indeed the return interval of such concurrence (assuming the meteorological and emission events are independent) is 44 hrs * 9/8760, or once in 22 years. Even then, the predicted odour impact in Figure 7 would at most be increased by the factor 3.8 (see Table 1), so that peak odour levels would not exceed 8 OU at 2 km range.

It is clear that on the basis of the stack measurements of TRS, the exceedences of the licence limits are not of sufficient magnitude, duration or frequency to generate off-site impact (using 5 OU as a conservative measure of the potential onset of perceived odour nuisance). This conclusion then leads to a refocussing of effort to examine and characterise fugitive odour emissions from the building envelopes and from the waste treatment lagoons.

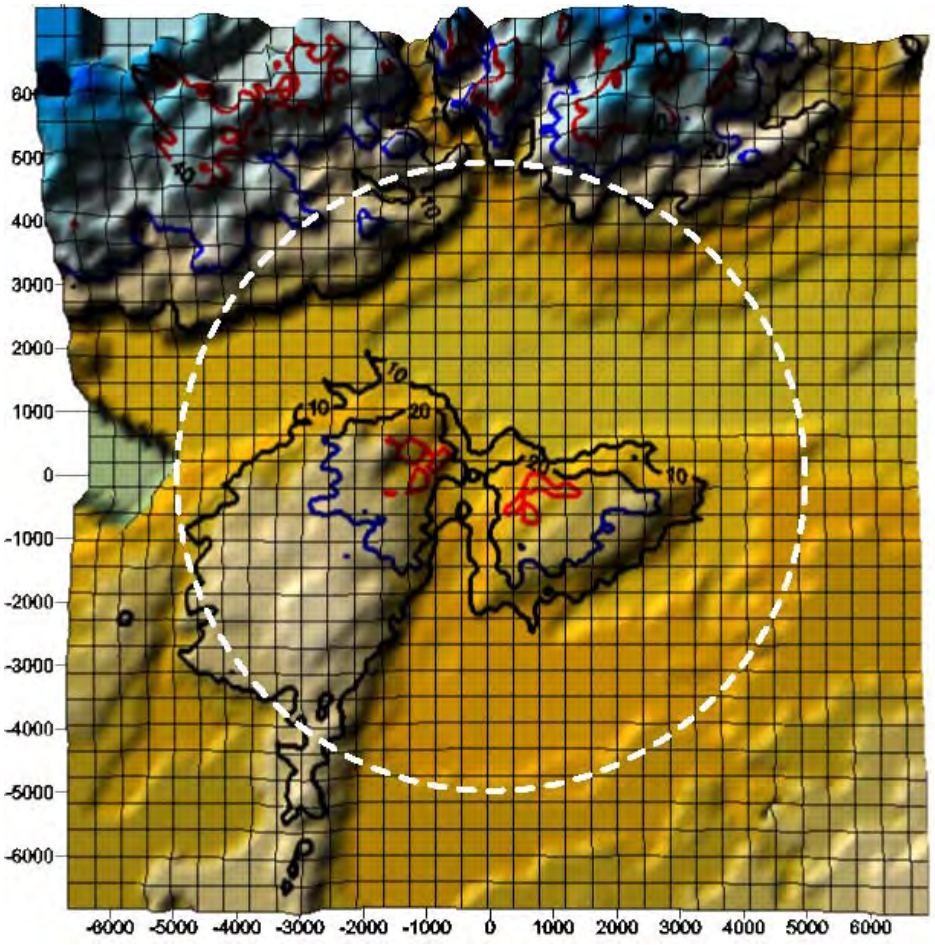
5. Compliance to Stationary Source PEM

The stationary source Protocol for Environmental Management (PEM) from EPA Victoria also sets a ground level criterion for TRS of 0.018 ppm (section 2.3.3) for Category A Wood Pulp Mills. This criterion is to be met by the 99.9%ile at a 3 minute average. Using the TRS / odour link as given in Section 4.3, the PEM criterion is equivalent to ~ 13 OU, which is a significant relaxation from the general criterion for odour of 1 OU.

Category A Mills are defined as those using a combination of NSSC (Neutral Sulphite Semi Chemical) and Kraft processes, and the Maryvale Mill fits this definition. Note that the Category B Mills (that is, NSSC processes only) are required to meet the general 1 OU criterion.

Given that Figure 7 does not show peak odour levels exceeding 5 OU, it is clear that the AP mill complies with the PEM criterion for design ground level odour concentration. In order to demonstrate the degree of compliance, the simulation generating Figure 7 was re-presented as contours normalised to the PEM criterion. Figure 8 shows that the peak odour levels barely exceed 40% of the PEM criterion, and are down to 10% at the northern outskirts of Morwell.

Figure 8 Contours of percentage of SEPP(AQM) Stationary Sources PEM for Paper Pulp facilities from AP stack TRS emissions at EPA licence limits using AUSPLUME.



6. Exceedence Expectation (ExEx) Analysis

The implications examined in Section 3.3, i.e. that the stack odour emissions are unlikely to be responsible for the odour events experienced in Morwell and Traralgon, has been further checked by using the ExEx analysis detailed below.

The ExEx analysis method[6] is used here to determine the return interval associated with predicted 99.9%ile odour levels exceeding 5 OU over the model domain. TRS stack emission rates are sampled from the time matched probability distributions of each of the three main stack sources given in Figure 4, and using the TRS/odour link given in Section 4.3.

The principle behind the requirement for this type of analysis is that an impact at a sensitive receiver resulting from emissions from the mill will only occur if a heightened emission rate is combined with meteorological conditions that will transport the plume in the direction of the receiver under such conditions that it is poorly diluted on arrival. Unless the higher emissions, the wind direction and poor dispersion conditions occur simultaneously the individual exceedence of the SEPP design concentration may not occur at that locality.

The individual dispersion model contribution for each hour is scaled from a sample of an emission rate probability distribution, and combined with the concurrent contribution from other like emitters, also scaled by sampling from their own temporally concurrent emissions inventory distribution. The combined contribution at a target receptor is then analysed for an exceedence. This process is then repeated for a year of hourly varying meteorology and emissions, and the number of exceedences (if any) summed to determine if a non-compliance has occurred (say, at the 99.9th percentile). This sampling process is then repeated for a large number of times and the probability of non-compliance in areas surrounding the plant expressed as contours of average Return Interval in years between exceedences. The simulation was conducted for stack odour emissions; using (i) the TRS/odour link of 1.4 ppb = 1 OU, and (ii) the H_2S/odour link of 0.5 ppb = 1 OU. The pattern of Return Interval and its location is shown in Figure 9 and Figure 10 respectively below.

Figure 9 shows that the likelihood of exceedence of 5 OU is remote with only two small zones located ~ 1km up and down valley from the Mill. Each area is typically 1 x 1 km area, and outside the yellow contour the likelihood of exceedence is less than a once in 50 year return interval. Note also however, that the 2, 10 and 20 year return interval contours are only marginally smaller in extent than the 50 year contour These zones are well clear of the township residential areas, so that the return interval at the urban fringes would be of order of centuries. In other words, the influence of the measured stack emissions on odour events is negligible.

Figure 10 shows the corresponding pattern of return interval when the H_2S/odour link is used to convert stack TRS emissions to OER. The extent of coverage has increased to typically 3 x 3 km, but still does not extend to the residential fringes of either Traralgon or Morwell.

[6] Hillyer, M. J., Burton, C. S., 1980. *The ExEx Methods: incorporating variability in Sulphur Dioxide Emissions into Power Plant Impact Assessment.* Systems Applications, Inc. San Raphael, CA. prepared for USEPA, contract # 68-01-3957. See also *Users Guide to the Expected Exceedances System,* SYSAPP-88/035. Prepared for USEPA Source Receptor Analysis Branch, OAQPS, EPA contract 68-02-4352 Option 1. February 1988.

Figure 9 Predicted Return Interval of Exceedence of 5 OU Stack Emissions using AUSPLUME (TRS/odour link of 1.4 ppb = 1 OU).

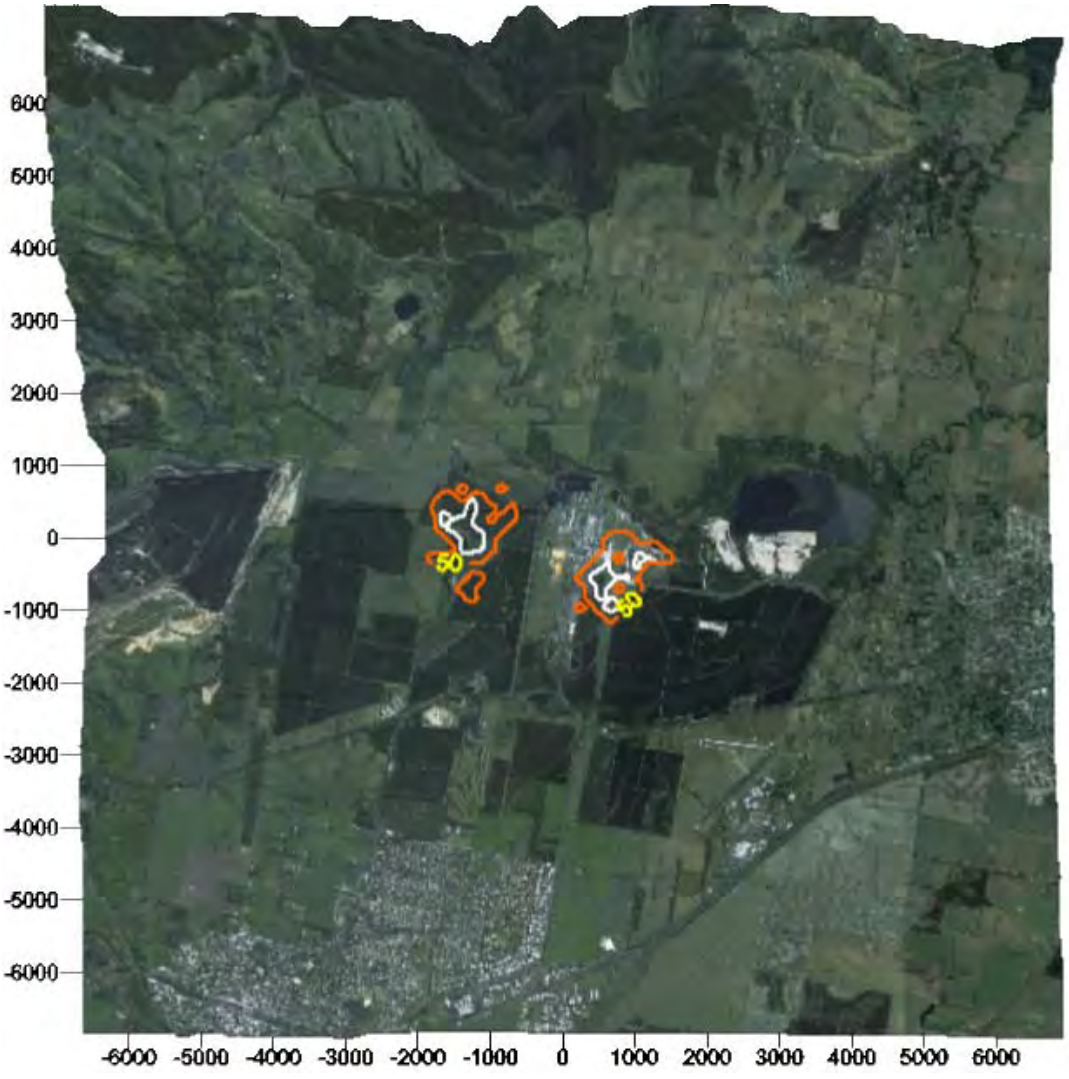
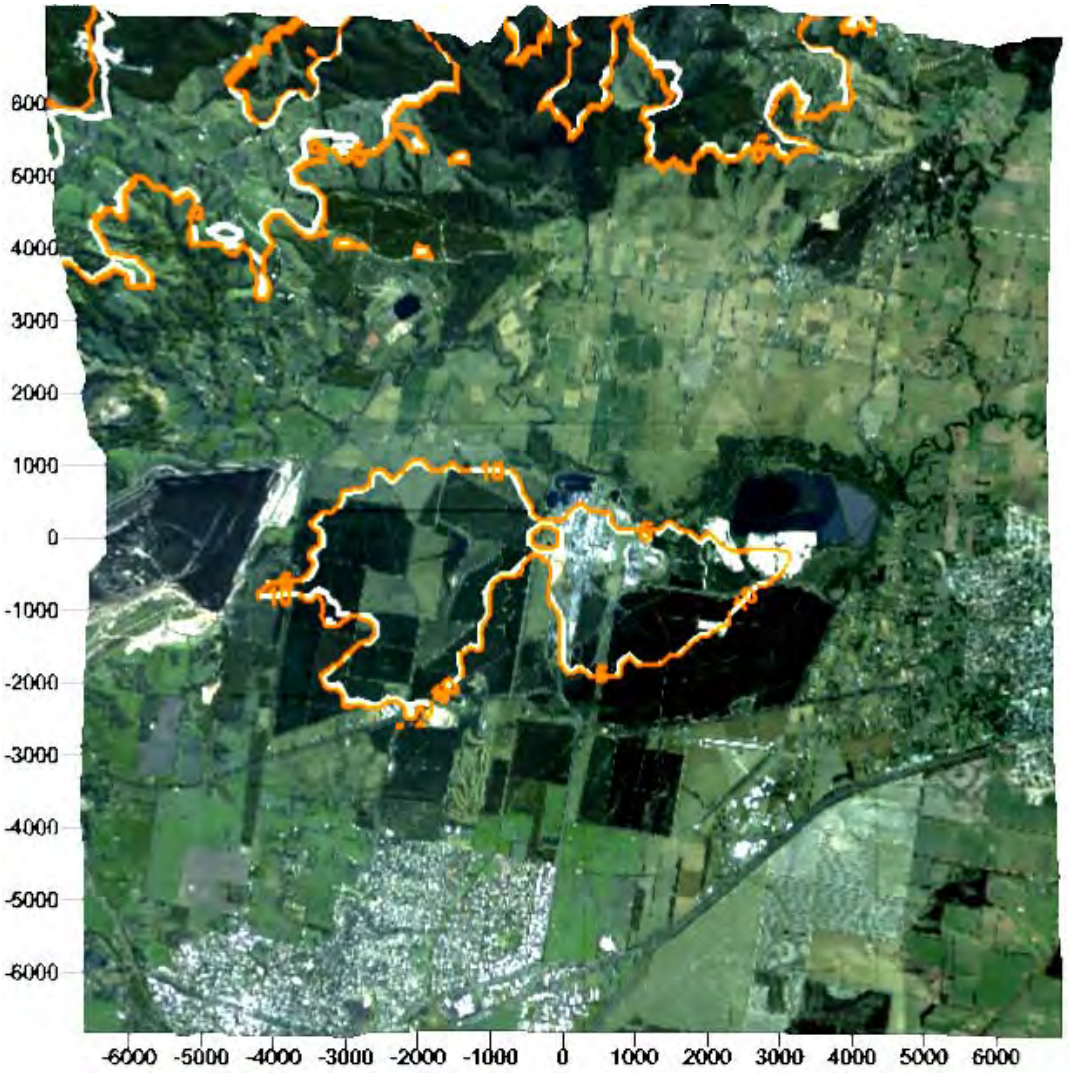


Figure 10 Predicted Return Interval of Exceedence of 5 OU Stack Emissions using AUSPLUME (H_2S/odour link of 0.5 ppb = 1 OU).



7. Measurement of Fugitive Emissions

The unexpected result of the above modelling strongly suggests that the Mill TRS stack emissions will not generate off-site odour impact that could lead to complaint, even when the measured emissions exceed the licence limits. Given that it is common knowledge that the Mill can be readily smelt at distances downwind outside the plant boundary, and that significant odour events have occurred in the past at both Traralgon and Morwell, the on-site odour sources causing the impact are likely to be; (i) fugitive emissions released in the main process buildings and issuing into the building wake, and (ii) emissions from waste treatment lagoons, bio-solids storage etc. These sources are effectively at or near ground level, so that the buffer shape shown in Figure 2 will give equal protection from odour disamenity independent of the direction of the sensitive land use from the Mill.

7.1 Monitoring of Downwind Plant Plumes

To obtain an approximate measurement of the fugitive and ground level odour emissions, a campaign to directly measure ambient levels of H_2S along a crosswind transect downwind of the Mill was organised at short notice for Thursday 28 April 2011. The Instrument used to measure ambient H_2S was a Jerome, Model 631-X manufactured by Arizona Instruments. This instrument can measure down to 1 ppb and relies on drawing in an air sample over a set period of from 30 to 60 seconds (longer sample times are required for low concentrations).

On the day the wind was a moderate north easterly, and Figure 11 shows the recorded wind speed and direction taken from the Traralgon BoM station. After an initial check on the downwind traverse (on the west boundary road at a traverse length of ~ 2.4 km - see Figure 12) to check that the H_2S plume could be detected, two traverses were conducted, each from the north to south as shown in Figure 12.

The first traverse was conducted from a vehicle using the trip odometer to set measuring stations along the traverse at intervals of 100m (or multiples thereof). The second traverse was conducted on foot using a pedometer to mark out stations – typically at 30 pace intervals so as to obtain a finer profile of the Mill plumes. Table 4 to Table 6 (placed in Appendix A) gives the recorded H_2S levels at each station and the station distance along the traverse for each traverse. Data in the Table shows three distinct zones of elevated H_2S – corresponding to plumes from separate sources in the Mill.

Figure 11 Latrobe Valley BoM Winds – 28 April 2011

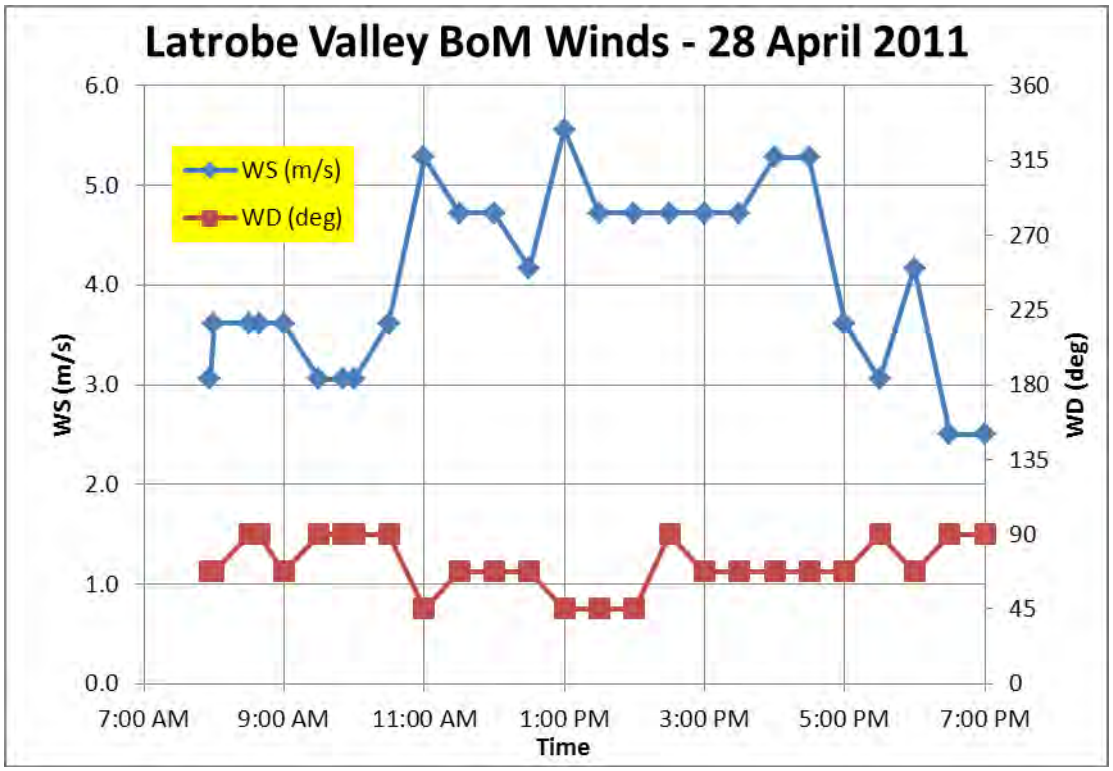
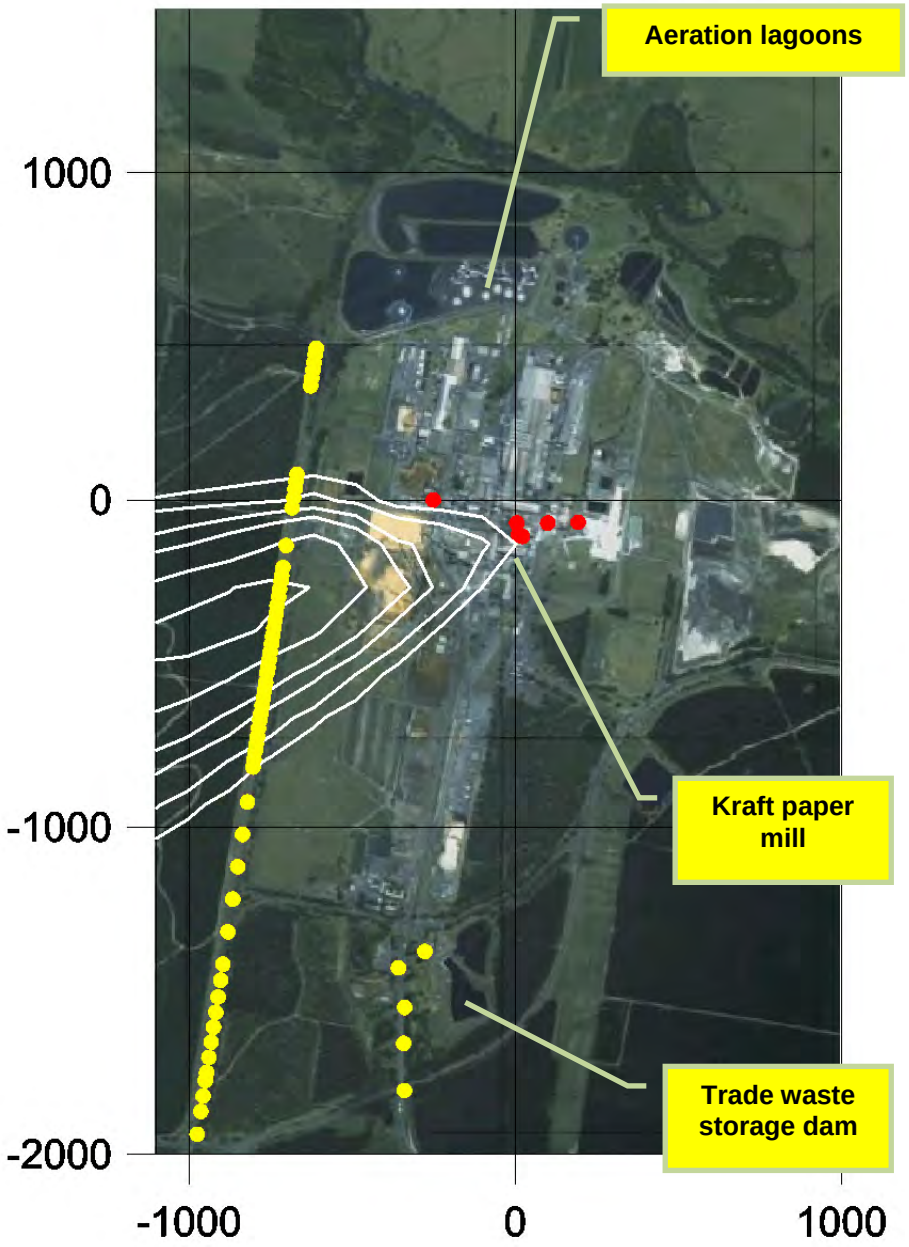


Figure 12 **Transect on Western Boundary of AP Mill used to measure H_2S downwind of the Mill. Measurement locations shown by yellow dots.**



7.2 Plant Plumes – Fugitive or Stack?

These zones are seen at about the same position on each traverse, as shown in Figure 13, and are identified as:

- A plume at the northern (start end) of the traverse that was emitting from the wastewater aeration lagoons (see Figure 12. This plume gave a centreline peak H_2S level of 6 ppb in the first traverse , and a peak of 10 ppb in the second;
- A narrow plume at ~ 700m from the start at ~ 140 m width. The peak H_2S level was ~ 7 ppb on the first traverse and 38 ppb on the second. This plume was shown by upwind trajectory to emanate from the Kraft Mills, and
- A broad plume seen in the last 400m of the traverse. At the time the source of this plume was unknown to GHD, however AP suggested the likely source was the trade waste holding dam, and subsequent monitoring at ~ 100 m downwind of the dam confirmed it was the source (readings of up to 27 ppb were measured on the rail track (see Figure 12).

The data from the second traverse is plotted in Figure 14 (where the concentration units have been changed from ppb to µg/m^3 (1 ppb = 1.4 µg/m^3 at NTP)), and the three plumes can be seen against a lower H_2S level of ~ 1 to 4 µg/m^3. Only downwind of the eucalypt wood stockpiles did the background reach zero. The narrowness of the Kraft Mill plume suggested that it might have been sourced to the main stacks (i.e. elevated point sources rather than more diffuse emissions from the Mill envelope). This was checked by directly modelling the TRS emissions from DP35, 44 and 45 assuming emission rates at their licence limit, and with the prevailing meteorological conditions at the time of the second traverse (V = 4.5 m/s , Θ = 60 degrees and P/G stability = D (see Figure 11)).

The predicted profile of H_2S (assuming all TRS is H_2S) along the traverse is shown in Figure 14, and it is clear that, if AUSPLUME is correctly simulating the behaviour of the stack plumes, then the stacks make only a minor contribution to the measured H_2S levels. A more detailed comparison of the predicted plume profile to the measured H_2S profile is given in Figure 15, where different scales are used. It can be seen that the predicted stacks plume width is ~ 700 m, whereas the measured plume width is ~ 140 m width. The mis-match needs more investigation as, if anything, one would expect that the fugitive emissions would be more widely spread than a stack (point source) plume. To check this, the AUSPLUME simulation was re-run but with the potential for plume/building wake interaction removed (i.e. BPIP turned OFF). This showed that the effect of the building wake was not significant in increasing the predicted plume width at the transect, so instead, a composite of the two traverses was formed , with however the very high values at the centreline of Test 2 in the Kraft plume removed.

Figure 13 Measured H_2S Transect Profile 28 April 2011

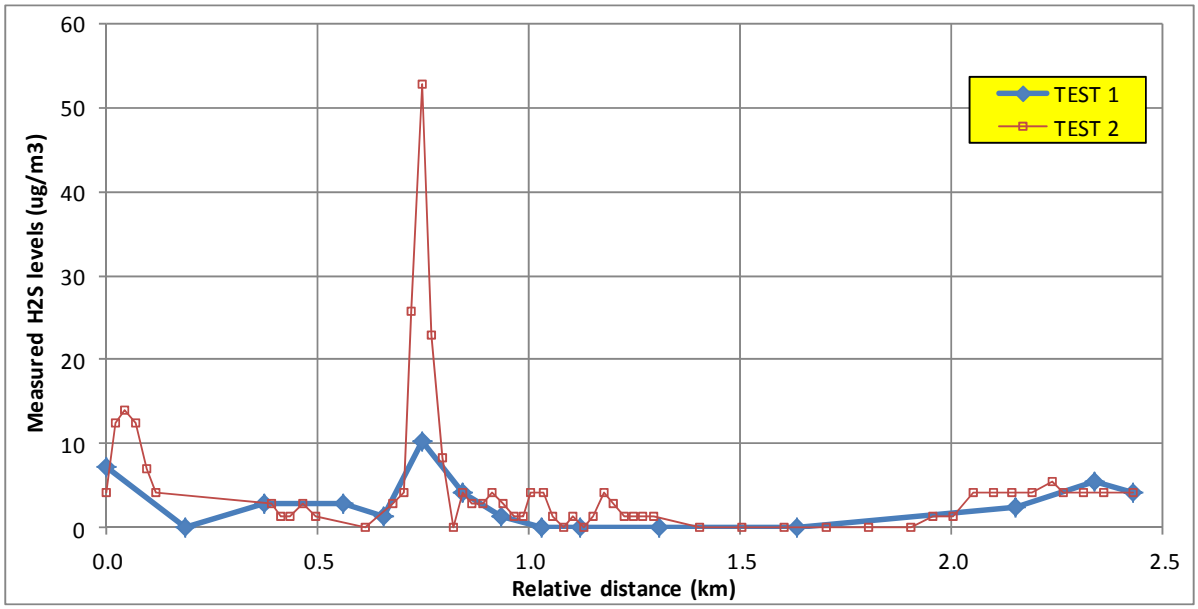


Figure 14 Measured H_2S Transect Profile

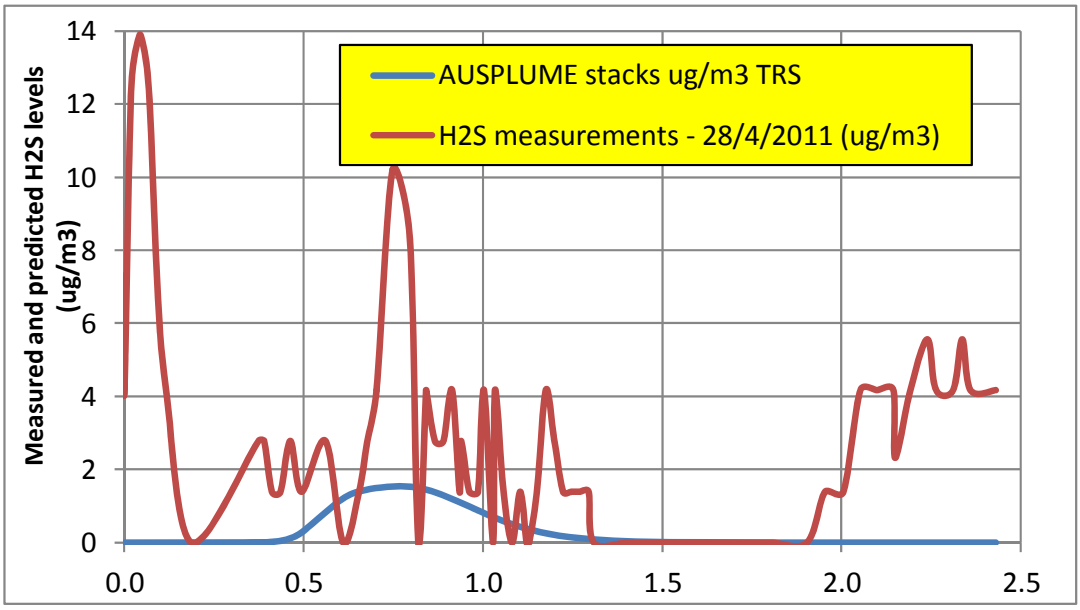
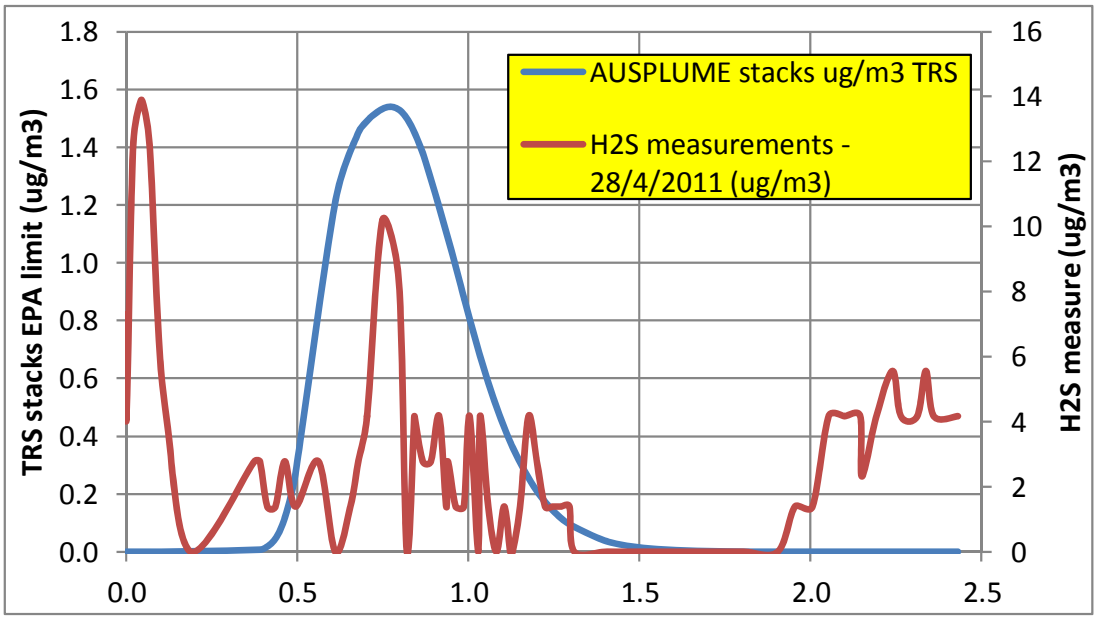


Figure 15 Predicted Plume Profile to the Measured H_2S Profile



8. Review of Odour Complaint History

AP provided the record of validated odour complaints since the Mill upgrade in 2008 to GHD (see Appendix C for a tabled summary), and these were analysed to determine; (i) the approximate position of complainants for each identified plant upset, and (ii) those upset events that were unavoidable in that the release was mandatory from a plant safety viewpoint.

The complaint data was examined and two events were identified where; (i) the upset emission was from a main stack (10 April 2010), and (ii) the upset emission was a fugitive release from either ground level or from a building envelope. Table 2 shows the emission rates from the stacks at the time of each event.

The approximate position of the complainant sites for each event are shown in Figure 16, and it can be seen that complaints from the fugitive release are distributed throughout Traralgon, while complaints from the upset stack release extend to Morwell.

Table 2 Odour complaint details for 16 October 2009 and 10 April 2010

Odour complaint date	**16 October 20009**	**10 April 2010**
Number of complaints	7	3
Complaints locations	Traralgon	Morwell
Identified source	Non-licenced emission point (fugitive)	Licenced emission point (stacks)
Atmospheric conditions	8^{o}C, WNW to W moderate winds	13^{o}C, calm to light easterly winds
Reason	External power supply failure resulting in a total mill crash shut down.	No clearly defined reason.
Peak stack TRS emissions (g/min)	DP35 = 24.7 DP44 = 0.0 DP45 = 6.3 DP54 = 3.0	DP35 = 334 DP44 = 13.0 DP45 = 3.0 DP54 = 4.8
EPA licence limits (g/min)	DP35 = 20 (12hr avg) DP44 = 25 (12hr avg) DP45 = 15 (12hr avg) DP54 = 1.25 (30min avg)	DP35 = 20 (12hr avg) DP44 = 25 (12hr avg) DP45 = 15 (12hr avg) DP54 = 1.25 (30min avg)

8.1 Upset from Stack DP 35 – 10 April 2010 Event

The data in Table 2 for the stack upset release from DP35 on 10 April 2010 shows a 17 fold increase above the EPA licence limit for peak TRS for this stack, and resulting peak in the all-stack TRS emission rate increasing some 6 fold over the combined EPA licence limit for all stacks. Referring to Figure 7, this increase would result in the 6 OU contour extending into Morwell township, and it is clear that when the stack upset is of this magnitude, then odour impact from stack releases is predicted to result in odour levels that could result in complaint.

8.2 Upset from Fugitive release – 16 October 2009

The recorded wind direction during this event given in Table 2 ensured that the low-level odour plume would pass over Traralgon, and the complaints registered as shown in Figure 16 provide evidence that the increase in fugitive odour emission rate was sufficient to cause impact throughout the town. Of course there was no direct measurement of the fugitive emissions during the event, although it should be noted that the transect method used by GHD and described in Section 7 could be used during such an event to gain an estimate of the Mill fugitive emission rate provided the Jerome H_2S instrument was available on-site.

Figure 16 Approximate Position of the Complaint Sites - 16 October 2009 and 10 April 2010 Events

9. CALPUFF / CALMET modelling

Given the identified shortcomings of the AUSPLUME screening model, it was recognised that there was a need to adopt the use of a 3D tool to characterise transport and dispersion of emissions to air in a representative manner within this complex terrain setting which is associated with the Latrobe Valley air shed.

The advanced dispersion model CALPUFF was used to complement the air quality assessment previously modelled with the approved regulatory model AUSPLUME. The NSW Approved Methods for dispersion modelling, for example, specifically nominate this type of geophysical locality as a 'complex terrain' situation where a standard regulatory Gaussian dispersion modelling, such as AUSPLUME, is not applicable. The combined modelling method available within the CALMET meteorological model and the CALPUFF unsteady-state Eulerian dispersion model best define the terrain guided transport and dispersion of the site emissions to air in this complex terrain setting.

CALMET is a diagnostic meteorological model consisting of a wind field module and micro-meteorological modules for over-water and over-land boundary layers. CALMET provides the spatially varying windfield as input to CALPUFF. CALPUFF is a multi-layer, multi-species non-steady-state puff dispersion model, which can simulate the effects of time and space, varying meteorological conditions on pollutant transport. CALPUFF is a Regulatory Guideline model, recommended by the US EPA, NSW DECCW and others, for a wide variety of applications including long-range transport, and on a case-by-case basis, for near-field applications involving complex flowErrors and non-steady-state situations, such as in coastal applications, calm wind dispersion, stagnation, fumigation, complex terrain and recirculation situations (e.g. land-sea breezes). Initial development of the model was partially funded by EPAV during the 1990's. The model is suitable for source-receptor distances ranging from fence-line applications (tens of metres) to several hundred kilometres.

Meteorological data from the EPA station at Traralgon for the year 2001 was used in the AUSPLUME screening assessment. The subsequent high level CALPUFF / CALMET modelling incorporated meteorological data from Traralgon, Moe, Latrobe Valley Airport and the Latrobe Valley Air Monitoring Network station at Powerworks for 2008. Furthermore, detailed terrain and geographical information, including land use, to a resolution of 250 m was incorporated into the model. Analysis of the meteorological data and model results were consistent with those detailed in section 2.

Further details of the CALPUFF / CALMET model applied for the odour dispersion are available in Appendix B.

9.1 Back-calculation using CALPUFF to Determine Mill Fugitive Emission Rates

The composite transect measurements are shown in Figure 17 and the predicted H_2S concentration profile was formed by selecting a source emission rate for each of the three identified fugitive sources so as to give a 'best match' to the corresponding measured plume profile. The match was made using CALPUFF to show the predicted H_2S levels on the transect for the meteorological conditions at the time of the measurements. The resultant H_2S emissions from all of the plant operations were modelled for an entire year, with corresponding ground level concentrations of H_2S being correlated to odour units (OU's) as 1.4 ppb H_2S = 1 OU, as measured at a similar paper pulp mill in Ontario Canada.

Figure 17 shows the match obtained, and Table 3 shows the source H_2S emission rates determined for each of the fugitive sources, as calibrated using the CALPUFF model.

Figure 17 Predicted (CALPUFF) vs Measured H_2S concentrations on eastern transect

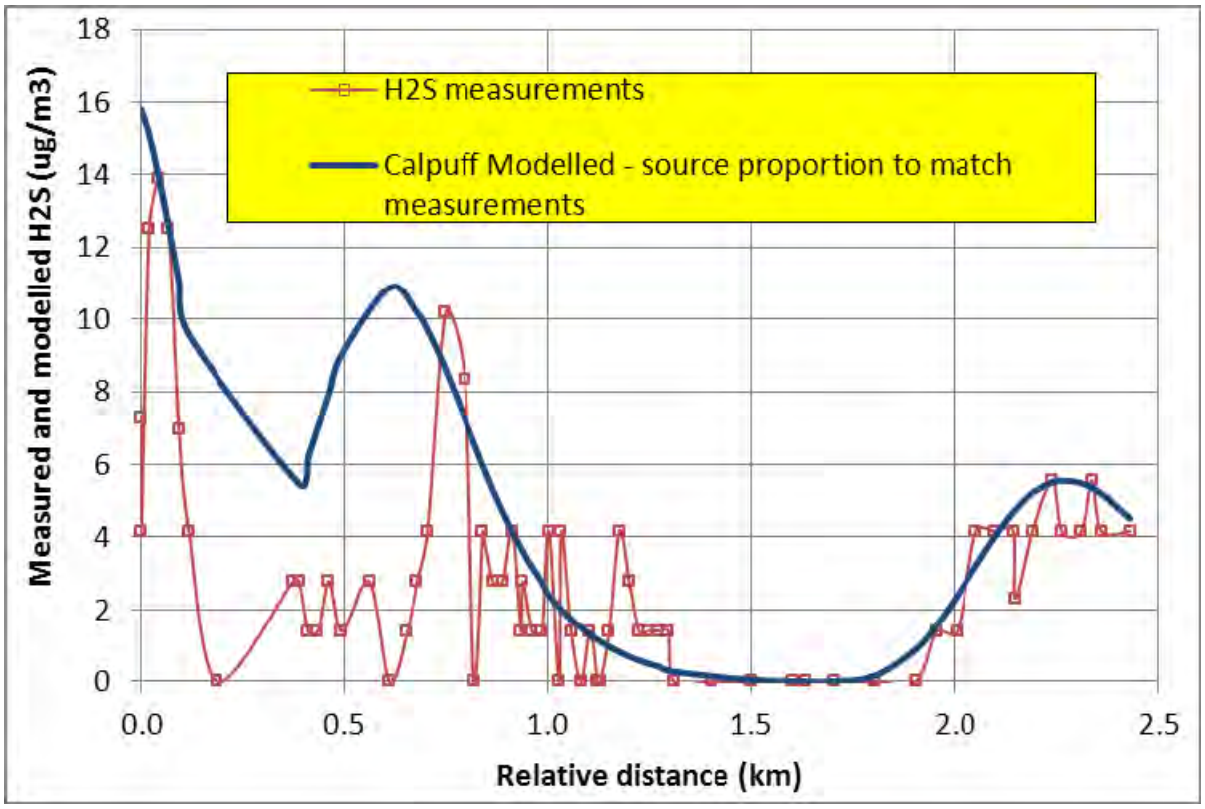


Table 3 Source H2S emission rates for each fugitive source as calibrated in CALPUFF

Source	Constant emission rate (as H_2S)	Units	Wind speed category	1	2	3	4	5	6
			Nominal wind speed (m/s)	1.0	2.3	4.1	6.7	9.5	10.8
				Variable emission rate (as H_2S) (g/min)					
Stack – DP30A	4.2	g/min		–	–	–	–	–	–
Stack – DP35	20	g/min		–	–	–	–	–	–
Stack – DP44	25	g/min		–	–	–	–	–	–
Stack – DP45	15	g/min		–	–	–	–	–	–
Stack – DP46	1	g/min		–	–	–	–	–	–
Stack – DP54	1.25	g/min		–	–	–	–	–	–
North aerator pond	0.00362	g/min/m^2		0.0008	0.0018	0.0032	0.0052	0.0073	0.0083
South waste pond	0.0103	g/min/m^2		0.0022	0.0050	0.0089	0.0146	0.0207	0.0235
General mill fugitives	171	g/min		–	–	–	–	–	–

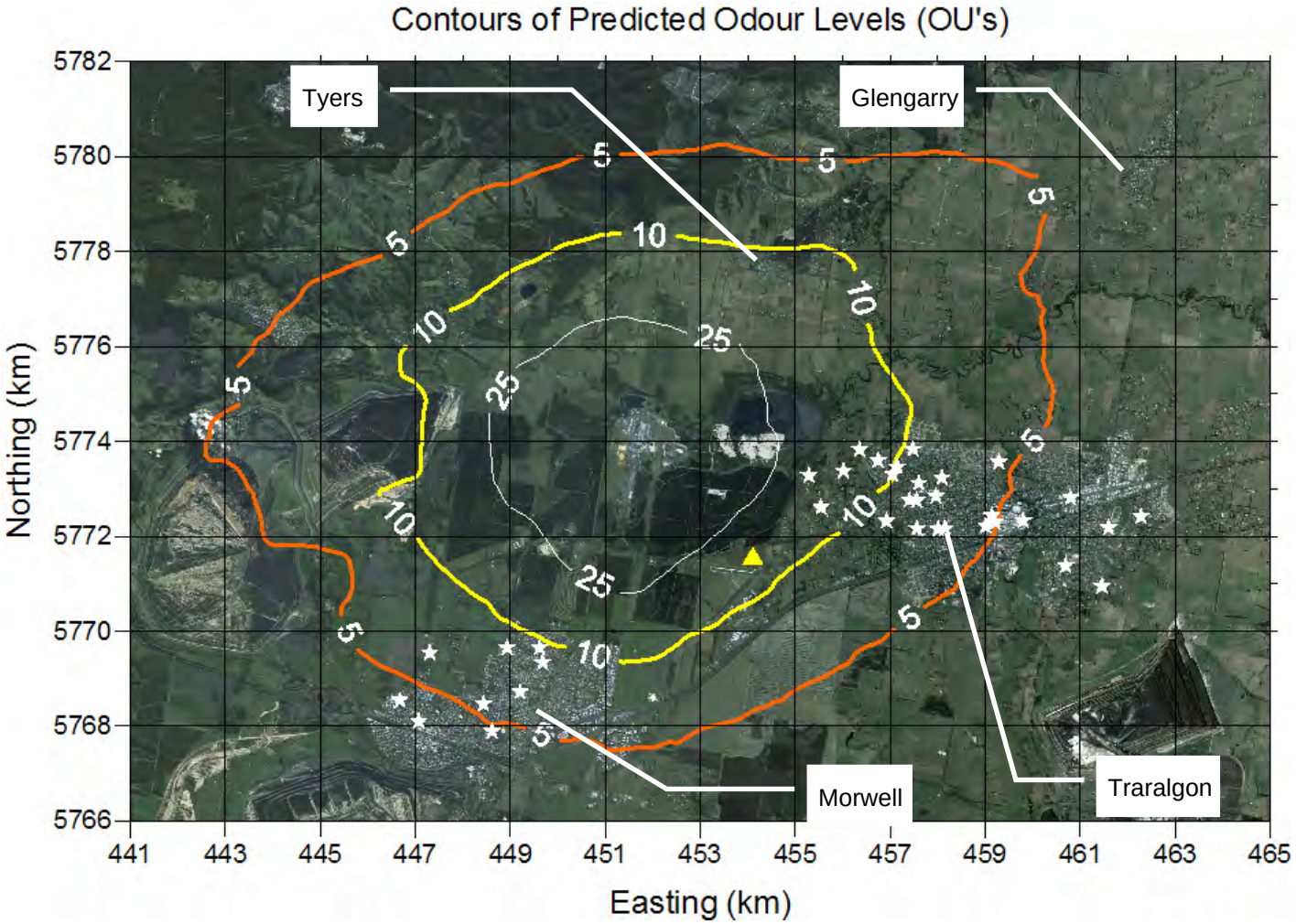
9.2 Extent of Impact of Fugitive Mill Odour Sources

The resultant H_2S emissions from all of the plant operations were modelled for an entire year, with corresponding ground level concentrations of H_2S being correlated to odour units (OU's) as 1.4 ppb H_2S = 1 OU, as measured at a similar paper pulp mill in Ontario Canada.

A contour plot of the 99.5th percentile OU levels is shown in Figure 18. The 5 OU contour level (used by EPA as a conservative measure of potential odour impact) can be seen to correspond with recent odour complaint history, (shown by white stars in Figure 18), and illustrates how odour complaints can also extend beyond this distance due to upset events at the Mill, that result in occasional higher odour emissions, which can be the result of many causes such as external power outages, maintaining operations within safety requirements, or for highly adverse weather conditions.

The 10 OU level (often taken as the level likely to result in odour impact and potential complaint) can be seen to extend to the western and northern fringes of the Traralgon and Morwell residential areas. It also covers the site of the proposed Chalet.

Figure 18 **Estimated 99.5th percentile odour level contours (OU's) using a CALPUFF 2008 model and calibrated source strengths from Australian Paper during normal operations and EPA licence limit stack emissions. Chalet location (yellow triangle) and recent odour complaints (white stars) shown.**



10. Implications for AP Mill Buffer

The contours shown in Figure 18 give the shape of the buffer that will give equal protection from odour disamenity independent of the residence's orientation relative to the mill. If the situation was a greenfields site then the 5 OU contour would be preferred as giving a low risk of experiencing odour from the mill, however the existing expansion of both Traralgon and Morwell shows that that degree of protection is not possible. Were such a buffer to be applied, then infill residential development would be prohibited. The 10 OU contour (the likely onset of odour complaint) however is less compromised, and could serve as a delineation of a Mill buffer to the east and south directions. In effect it would serve to constrain further residential development in the direction of the Mill.

As for future satellite residential developments north of the Mill, it would be open to the planning authority to revert to the 5 OU contour if the aim to minimise odour disamenity was a priority. Alternately it would be simpler and more consistent if the 10 OU contour was also used to define the buffer to the north of the Mill.

In the end it will be the task of the planning authority to balance the competing claims on land use in the region into the future. From the perspective of the Mill operator it will be essential to embed an acceptable buffer into the planning scheme so that the proposed future investment in Mill upgrades will not be put in jeopardy by the inappropriate siting of future sensitive land uses in proximity to the Mill.

11. Conclusions

The analyses presented above lead to the following conclusions in relation to an appropriate buffer for the Maryvale Mill.

- Measurements of H_2S profiles downwind of the plant suggest that fugitive releases of odour from the Mill are the main source of odour impact off-site.
- The recent odour complaint history demonstrates that a substantially larger buffer than the default circular 5000 m buffer in the EPA guideline is required for the Maryvale Mill.
- The site-specific buffer for the mill needs to be directional so as to give an equal degree of protection from the odour disamenity in the event of a process upset.
- The modelling of the fugitive sources as determined by back-calculation shows that the extent of verified complaints can be accounted for by this class of Mill source alone.
- The directional buffer that is consistent with the verified odour complaints since October has been modelled using CALPUFF, and the 5 OU contour (see Figure 18) would provide an acceptable buffer to minimise the risk of odour complaint.
- The current residential expansion across the 5 OU contour from Traralgon in the east and from Morwell in the south means that a compromise to the 10 OU contour is a more realistic option as a site-specific buffer to apply to future land development in the vicinity of the Mill. 10 OU represents a likely threshold for the onset of odour complaints.
- Such a buffer is essential in order to give some certainty to the Mill operator that investment in future upgrades to the Mill will not be put in jeopardy by inappropriate siting of sensitive land uses.

12. Limitations

This report presents the results of an odour impact and buffer assessment prepared for the purpose of this commission. The data and advice provided herein relate only to the project and structures described herein and must be reviewed by a competent engineer / scientist before being used for any other purpose. GHD Pty Ltd (GHD) accepts no responsibility for other use of the data.

An understanding of site's environmental impact depends on the integration of many pieces of information, some regional, some site specific, some structure specific and some experience based. Hence this report should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by GHD. GHD accepts no responsibility for any circumstances, which arise from the issue of a report that has been modified in any way as outlined above.

This report also relies on provisional information from third parties and makes a number of assumptions which are listed below:

- Stack source emission rate data is based on current Australian Paper EPA Victoria licence limits.
- Odour complaint data have been provided by Australian Paper.
- The link from H_2S/TRS to odour is a major assumption, and is detailed in sections 4.1, 4.2, 4.3 and in section 7.2.
- The directional buffer given in Figure 18 is based on the limitations of the CALMET / CALPUFF model, which implies a number of limitations to the derived buffers, including the validity and accuracy of the EPA Victoria, BoM, Latrobe Valley Air Monitoring Network (LVAMN) and MM5 upper air supplied data. GHD has taken all reasonable steps to ensure the data validity and its representativeness of the regional weather patterns.
- The configuration of CALMET and CALPUFF was as advised by EPA as part of the approval process required for modelling when using models other than AUSPLUME.
- The results are based on meteorological observations from the year 2008.
- The estimate of fugitive H_2S emissions from the Mill are based on one afternoon of downwind transect measurements. Further transect measurements would be required to determine whether the ones presented are typical of fugitive emissions from the site.

Appendix A

H_2S Transect Results – 28 April 2011

Table 4 H_2S Measurement at Australian Paper Western Boundary Test 1 – 28 April 2011
Meteorology conditions from Latrobe Valley Airport BoM

				H_2S (ppb)					H_2S (ug/m^3)			
Distance (km)	Time	Easting (m)	Northing (m)	A	B	C	D	Avg	Avg	WS (m/s)	WD (deg)	Temp (^oC)
0.0	13:50	451072	5774342	6	7	6	2	5.3	7.3	4.6	45	18.5
0.2	13:56	451044	5774157	0				0.0	0.0	4.6	45	18.5
0.4	13:58	451016	5773972	2				2.0	2.8	4.6	45	18.5
0.6	14:00	450988	5773787	2				2.0	2.8	4.6	45	18.9
0.7	14:02	450974	5773695	2	0			1.0	1.4	4.6	47	18.9
0.7	14:05	450960	5773603	6	9	7		7.3	10.2	4.6	54	19.1
0.8	14:07	450946	5773510	3	3			3.0	4.2	4.6	58	19.2
0.9	14:09	450932	5773418	1				1.0	1.4	4.6	62	19.2
1.0	14:10	450918	5773325	0				0.0	0.0	4.6	64	19.3
1.1	14:12	450904	5773233	0				0.0	0.0	4.6	69	19.4
1.3	14:14	450875	5773048	0				0.0	0.0	4.6	73	19.5
1.6	14:15	450826	5772725	0				0.0	0.0	4.6	75	19.5
2.2	14:17	450749	5772216	2	1	2		1.7	2.3	4.6	79	19.6
2.3	14:21	450721	5772031	4				4.0	5.6	4.6	88	19.8
2.4	14:23	450707	5771939	3				3.0	4.2	4.6	90	19.8

Table 5 H_2S Measurement at Australian Paper Western Boundary Test 2 – 28 April 2011
Meteorology conditions from Latrobe Valley Airport BoM

				H_2S (ppb)				H_2S (ug/m^3)			
Distance (km)	Time	Easting (m)	Northing (m)	A	B	C	Avg	Avg	WS (m/s)	WD (deg)	Temp (°C)
0.000	14:27	451072	5774342	3	3		3.0	4.2	4.6	90	19.8
0.019	14:30	451069	5774323	9			9.0	12.5	4.6	90	19.8
0.043	14:31	451065	5774299	10			10.0	13.9	4.6	89	19.8
0.067	14:32	451062	5774275	9			9.0	12.5	4.6	88	19.8
0.092	14:33	451058	5774251	6	4		5.0	7.0	4.6	88	19.8
0.116	14:39	451055	5774227	3	3	3	3.0	4.2	4.6	82	19.8
0.390	14:44	451013	5773957	2			2.0	2.8	4.6	76	19.8
0.411	14:45	451010	5773935	1			1.0	1.4	4.6	75	19.8
0.435	14:47	451007	5773912	1			1.0	1.4	4.6	73	19.8
0.463	14:48	451003	5773885	2			2.0	2.8	4.6	72	19.8
0.494	14:49	450998	5773854	1			1.0	1.4	4.6	71	19.8
0.610	14:52	450980	5773739	0			0.0	0.0	4.6	68	19.8
0.677	14:53	450970	5773672	2			2.0	2.8	4.6	68	19.8
0.703	14:55	450966	5773647	3			3.0	4.2	4.6	68	19.8
0.720	14:56	450964	5773630	18	19		18.5	25.7	4.6	68	19.8
0.745	14:58	450960	5773606	37	39		38.0	52.8	4.6	68	19.8
0.769	15:00	450957	5773582	24	9		16.5	22.9	4.6	68	19.8
0.796	15:02	450952	5773555	6			6.0	8.3	4.6	68	19.8
0.819	15:03	450949	5773532	0			0.0	0.0	4.6	68	19.7
0.842	15:04	450946	5773510	3			3.0	4.2	4.6	68	19.7
0.866	15:05	450942	5773486	2			2.0	2.8	4.6	68	19.7
0.890	15:06	450938	5773462	2			2.0	2.8	4.6	68	19.6
0.914	15:07	450935	5773438	3			3.0	4.2	4.6	68	19.6
0.939	15:08	450931	5773414	2			2.0	2.8	4.6	68	19.6
0.962	15:09	450928	5773391	1			1.0	1.4	4.6	68	19.5
0.986	15:10	450924	5773367	1			1.0	1.4	4.6	68	19.5
1.003	15:11	450921	5773350	3			3.0	4.2	4.6	68	19.5
1.033	15:12	450917	5773320	3			3.0	4.2	4.6	68	19.4
1.058	15:14	450913	5773296	1			1.0	1.4	4.6	68	19.4
1.082	15:16	450910	5773273	0			0.0	0.0	4.6	68	19.3
1.104	15:18	450906	5773250	1			1.0	1.4	4.6	68	19.2
1.129	15:19	450902	5773226	0			0.0	0.0	4.6	68	19.2

				H_2S (ppb)				H_2S (ug/m^3)			
Distance (km)	**Time**	**Easting (m)**	**Northing (m)**	**A**	**B**	**C**	**Avg**	**Avg**	**WS (m/s)**	**WD (deg)**	**Temp (^oC)**
1.151	15:20	450899	5773205	1			1.0	1.4	4.6	68	19.2
1.175	15:21	450895	5773180	3			3.0	4.2	4.6	68	19.1
1.199	15:22	450892	5773156	2			2.0	2.8	4.6	68	19.1
1.223	15:23	450888	5773132	1			1.0	1.4	4.6	68	19.1
1.246	15:23	450885	5773110	1			1.0	1.4	4.6	68	19.1
1.270	15:24	450881	5773086	1			1.0	1.4	4.6	68	19.1
1.295	15:25	450878	5773062	1			1.0	1.4	4.6	68	19.1
1.403	15:26	450861	5772955	0			0.0	0.0	4.6	68	19.1
1.503	15:27	450846	5772856	0			0.0	0.0	4.6	68	19.1
1.604	15:28	450831	5772757	0			0.0	0.0	4.6	68	19.1
1.704	15:29	450816	5772658	0			0.0	0.0	4.6	68	19.1
1.804	15:30	450801	5772558	0			0.0	0.0	4.6	68	19.1
1.904	15:31	450786	5772459	0			0.0	0.0	4.6	68	19.1
1.954	15:32	450779	5772410	1			1.0	1.4	4.7	68	19.1
2.006	15:33	450771	5772359	1			1.0	1.4	4.7	68	19.1
2.053	15:36	450764	5772312	3	3		3.0	4.2	4.8	68	19.1
2.099	15:38	450757	5772267	3			3.0	4.2	4.8	68	19.0
2.145	15:39	450750	5772221	3			3.0	4.2	4.8	68	19.0
2.192	15:40	450743	5772174	3			3.0	4.2	4.9	68	19.0
2.240	15:41	450736	5772128	4			4.0	5.6	4.9	68	19.0
2.264	15:43	450732	5772104	3			3.0	4.2	4.9	68	19.0
2.312	15:44	450725	5772056	3			3.0	4.2	4.9	68	19.0
2.360	15:45	450718	5772009	3			3.0	4.2	5.0	68	19.0
2.431	15:47	450707	5771939	3			3.0	4.2	5.0	68	18.9

Table 6 H_2S Measurement at Australian Paper Western Boundary Test 2 – 28 April 2011 Comparison with AUSPLUME stack modelling at Current EPA licence emissions conditions

Distance (km)	Easting (m)	Northing (m)	H_2S measurements ($\mu g/m^3$)	AUSPLUME stack modelling ($\mu g/m^3$)
0.000	451072	5774342	4.2	0.0
0.019	451069	5774323	12.5	0.0
0.043	451065	5774299	13.9	0.0
0.067	451062	5774275	12.5	0.0
0.092	451058	5774251	7.0	0.0
0.116	451055	5774227	4.2	0.0
0.390	451013	5773957	2.8	0.0
0.411	451010	5773935	1.4	0.0
0.435	451007	5773912	1.4	0.0
0.463	451003	5773885	2.8	0.1
0.494	450998	5773854	1.4	0.3
0.610	450980	5773739	0.0	1.2
0.677	450970	5773672	2.8	1.5
0.703	450966	5773647	4.2	1.5
0.720	450964	5773630	25.7	1.5
0.745	450960	5773606	52.8	1.5
0.769	450957	5773582	22.9	1.5
0.796	450952	5773555	8.3	1.5
0.819	450949	5773532	0.0	1.5
0.842	450946	5773510	4.2	1.5
0.866	450942	5773486	2.8	1.4
0.890	450938	5773462	2.8	1.3
0.914	450935	5773438	4.2	1.2
0.939	450931	5773414	2.8	1.1
0.962	450928	5773391	1.4	1.0
0.986	450924	5773367	1.4	0.9
1.003	450921	5773350	4.2	0.8
1.033	450917	5773320	4.2	0.7
1.058	450913	5773296	1.4	0.6
1.082	450910	5773273	0.0	0.5
1.104	450906	5773250	1.4	0.4
1.129	450902	5773226	0.0	0.4
1.151	450899	5773205	1.4	0.3
1.175	450895	5773180	4.2	0.3
1.199	450892	5773156	2.8	0.2
1.223	450888	5773132	1.4	0.2

Distance (km)	Easting (m)	Northing (m)	H_2S measurements ($\mu g/m^3$)	AUSPLUME stack modelling ($\mu g/m^3$)
1.246	450885	5773110	1.4	0.1
1.270	450881	5773086	1.4	0.1
1.295	450878	5773062	1.4	0.1
1.403	450861	5772955	0.0	0.0
1.503	450846	5772856	0.0	0.0
1.604	450831	5772757	0.0	0.0
1.704	450816	5772658	0.0	0.0
1.804	450801	5772558	0.0	0.0
1.904	450786	5772459	0.0	0.0
1.954	450779	5772410	1.4	0.0
2.006	450771	5772359	1.4	0.0
2.053	450764	5772312	4.2	0.0
2.099	450757	5772267	4.2	0.0
2.145	450750	5772221	4.2	0.0
2.192	450743	5772174	4.2	0.0
2.240	450736	5772128	5.6	0.0
2.264	450732	5772104	4.2	0.0
2.312	450725	5772056	4.2	0.0
2.360	450718	5772009	4.2	0.0
2.431	450707	5771939	4.2	0.0

Appendix B

CALPUFF / CALMET Modelling Methodology and Meteorological Inputs

The advanced dispersion model CALPUFF was used for an odour dispersion assessment. The NSW Approved Methods for dispersion modelling, for example, specifically nominate this type of geophysical locality as a 'complex terrain' situation where a standard regulatory Gaussian dispersion modelling, such as AUSPLUME, is not applicable. The combined modelling method available within the CALMET meteorological model and the CALPUFF unsteady-state Eularian dispersion model was used to best define the terrain guided transport and dispersion of the site emissions to air in this complex terrain setting.

CALMET is a diagnostic meteorological model consisting of a wind field module and micro-meteorological modules for over-water and over-land boundary layers. CALMET provides the spatially varying windfield as input to CALPUFF. CALPUFF is a multi-layer, multi-species non-steady-state puff dispersion model, which can simulate the effects of time and space, varying meteorological conditions on pollutant transport.. CALPUFF is a Regulatory Guideline model, recommended by the US EPA, NSW DECCW and others, for a wide variety of applications including long-range transport, and on a case-by-case basis, for near-field applications involving complex flows and non-steady-state situations, such as in coastal applications, calm wind dispersion, stagnation, fumigation, complex terrain and recirculation situations (e.g., land-sea breezes). Initial development of the model was partially funded by EPA Victoria (EPAV) during the 1990's. The model is suitable for source-receptor distances ranging from fence-line applications (tens of metres) to several hundred kilometres.

CALMET was configured to a geographical grid wide enough to resolve the wind patterns associated with the dispersion of AP's emissions to air in the Latrobe Valley. The CALMET domain is shown in Figure 19 by the white rectangle. The terrain was resolved to 250 m. This allowed the meteorological characteristics of the region to be modelled to a 250 m horizontal spatial resolution. This is considered adequate for the calculation of the flow field on the Valley floor and over the elevated terrain to the north of the site. The proposed grid size is 120 x 140 @ 250 m resolution. This corresponds to a total domain size of 30 km north x 35 km east and encompasses sensitive receivers in and around Traralgon and Morwell, the EPAV and Latrobe Valley Air Monitoring Network (LVAMN) monitoring sites and significant terrain features which influence flow variations of the region.

The LVAMN was used to inform the diagnostic wind field model, with surface wind condition data from Moe, Traralgon and the BoM Latrobe Valley airport AWS ambient air quality and meteorological data, as available, incorporated into the model. All available data from Moe and Traralgon was used, while only temperature, relative humidity, pressure and cloud cover data from the Latrobe Valley airport AWS was applied. Wind speed and direction was not used from the Latrobe Valley airport AWS as this data, appropriately averaged, is not available. Ceiliometer data from the Latrobe Valley airport Bureau of Meteorology AWS was used. Data from the LVAMN acoustic sounder in the Latrobe Valley at Morwell was used to inform the dispersion model with regards to upper air wind speed and direction.

EPAV provided this LVAMN meteorological data to GHD, as hourly average data for 2008.

Two MM5 data tiles, sourced from TRC[7], for eastern Australia (Tile 231 and Tile 232) were used as appropriate as an initial guess field weighted to inform the model of vertical potential temperature, relative humidity and pressure profiles, when this type of data from the acoustic sounder measurements was not available. This prognostic model data was used to inform the CALMET micrometeorological model and the development of the overland boundary layer height. Emphasis in the final wind field model was on observational wind measurements.

[7] TRC Solutions. http://www.src.com/

The geographic information input to CALMET, i.e. the GEO file, was compiled from AUSLIG data that is comparable with data available in TAPM[8]. Matching land use data was extracted from TAPM for categorisation within CALMET, and corrected through inspection with recent aerial photographs.

All other CALMET model parameters were set to appropriate values that enable the model to best characterise the flow fields in this geophysical environment (valley terrain with structured upper air), based on GHD's significant experience within this modelling tool.

With regards to CALPUFF modelling parameters, the default settings were predominantly applied. The CALPUFF dispersion modelling used the entire CALMET meteorological model domain. The receptor grid was a subset of this domain, with a nesting factor of two to provide a receptor resolution of 125 m, over a 192 x 160 grid size, extending 24 km west-east x 20 km south-north. Note Figure 19. The model receptors encompassed sensitive receivers in and around Traralgon and Morwell, the EPAV\LVAMN monitoring sites and significant terrain features which influence flow variations of the region, in particular, the nearby hills to the north of the Australian Paper site. This dispersion grid size was considered adequate to capture peak predicted GLCs associated with emissions from AP's medium sized stacks and ground level sources.

Building wake algorithms were applied using the US EPA ISC Schulman-Scire geometry scheme to inform the building wake algorithm. This is not consistent with the previous AUSPLUME modelling of the site undertaken for the previous modelling in the 2006 Works Approval Application (WAA), however, the PRIME BPIP algorithm would not function in CALPUFF 5 for the building/stack geometry of this model. This is not considered to make a significant difference in the results for this application.

Sigma-u, sigma-v (horizontal turbulence intensity) and sigma-w (vertical turbulence intensity) were modelled using the calculated values from CALMET's micro-meteorological model.

Data from the year 2008 was used for all analysis.

Specific detail for the modelling configuration is summarised below:

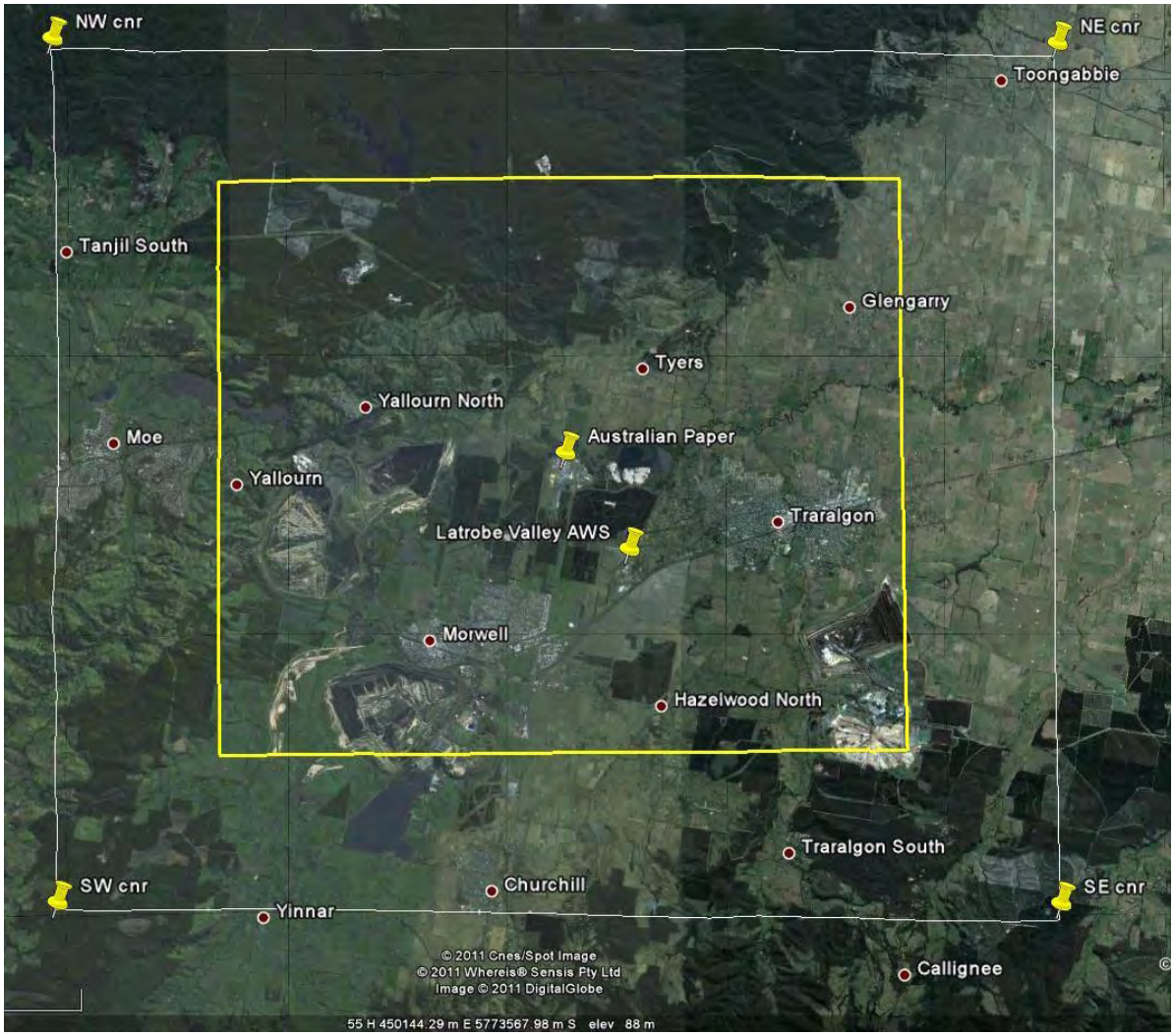
- 35 x 30 km meteorological domain at 250 m spatial resolution, with ten layers trending from finer resolution at surface to coarser with height.
- 20 x 24 km dispersion domain with a 125 m spatial resolution – nesting factor of 2.
- 250 m terrain and land use data. Geophysical data extracted from TAPM related databases - Auslig 9 second resolution Digital Elevation Model geodata and US geological survey land use and soil type data corrected manually via inspection with aerial photographs from Google Pro.
- Hourly meteorological data for the year of 2008.
- Meteorological field initialisation using MM5 data tiles for 2008 to inform upper air temperature, moisture and pressure profiles.[9]
- Available surface meteorological parameters, particularly, wind speed and direction from Moe and Traralgon EPA AWS sites.

[8] TAPM ver 4 – The Air Pollution Model, developed by CSIRO.

[9] Provided that this data can be made available from EPA's nominated supplier (TRC) in the U.S. in a reasonably timely manner

- Surface parameters of temperature, relative humidity, pressure and cloud cover data from BoM Latrobe Valley airport AWS – no wind speed and direction on the basis of unsuitably averaged data.
- Upper air data from LVAMN acoustic sounder to inform wind speed and wind direction.
- Building wakes to be included via BPIP geometry algorithm and the Schulman-Scire building wake algorithm representative of site as modelled for the 2006 WAA.
- Dispersion to be defined from internally calculated variables derived from micrometeorological data.

Figure 19 –CALMET (white) and CALPUFF (yellow) model regions. Source: Google Earth Pro.



Appendix C

Odour Complaint Data - October 2009 – April 2011

Odour Complaints History Summary.

Date	Time	Location		Log No.	WD	WS	Rec.5	Rec.6	LK	FGI	Total	NOTES
16/10/2009	900	Traralgon	None	2428	WNW, W	light	1.48	0	0.38	0.18	1.63	
16/10/2009	900	Traralgon	Liddiard Rd	2432	WNW, W	light	1.48	0	0.38	0.18	1.63	
16/10/2009	900	Traralgon	Stuart St	2430	WNW, W	light	1.48	0	0.38	0.18	1.63	
16/10/2009	900	Traralgon	Garibaldi St	2433	WNW, W	light	1.48	0	0.38	0.18	1.63	
16/10/2009	900	Traralgon	Ibis Ct	2431	WNW, W	light	1.48	0	0.38	0.18	1.63	
16/10/2009	900	Traralgon	Field Ct	2429	WNW, W	light	1.48	0	0.38	0.18	1.63	
16/10/2009	900	Traralgon	Merinda Ct	2427	WNW, W	light	1.48	0	0.38	0.18	1.63	
17/10/2009	100	Traralgon	unknown	2426	WNW, W	light	1.48	0	0.38	0.18	1.63	
14/11/2009	900	Traralgon	Princes Hwy & Seymour St	2440	W	light	1.47	1.65	0.34	0.14	2.48	
4/10/2009	0	Traralgon	West End	2442	WNW, W	light	1.58	1.69	6.9	0.03	2.37	
1/03/2010	1300	Traralgon	unknown	2446	calm	calm	0.56	0	0.02	0.08	0.66	
3/03/2010	700	Traralgon	Hedges Rd	2447	S	light	0.53	0	0.19	0.08	0.75	
9/03/2010	1019	Traralgon	Sundale Rd	2450	W	fresh to strong	0.65	0.57	0.19	0.08	1.3	
22/03/2010	630	Traralgon	Grey St	2451	W	light	1.08	0.64	0.22	0.09	2	
10/04/2010	850	Morwell	Madden St	2455	E	light	20.07	0.78	0.18	0.29	20.61	

Date	Time	Location		Log No.	WD	WS	Rec.5	Rec.6	LK	FGI	Total	NOTES
10/04/2010	913	Morwell	Comans Rd	2457	E	light	20.07	0.78	0.18	0.29	20.61	
10/04/2010	931	Morwell	Latrobe Rd	2458	E	light	20.07	0.78	0.18	0.29	20.61	
25/04/2010	1730	Traralgon	Ellavale Dr	2460	W	light	0.51	0	0.34	0.11	0.89	
2/05/2010	200	Traralgon	Seymour St	2461	calm	calm	1.67	0.54	0.26	0.11	2.19	
4/05/2010	945	Morwell	Donald St	2462	calm	calm	1.75	0.59	0.27	0.11	2.31	
7/05/2010	1645	Traralgon	Cross's Rd	2464	WNW, W	moderate	0.51	1.99	0.22	0.1	2.58	
10/05/2010	1215	Morwell	unknown	2465	calm	calm	0.67	2.29	0.41	0.11	3.36	
10/05/2010	1340	Morwell	Dunbar Ave	2467	NE	light	0.67	2.29	0.41	0.11	3.36	
13/05/2010	2020	Traralgon	McNairn Rd	2468	W	light	0.44	1.57	0.17	0.1	2.22	
13/05/2010	2125	Traralgon	Scrubby Lane	2469	W	light	0.45	4.41	0.17	0.1	4.04	
18/05/2010	1621	Traralgon	Trent Ct	2471	WNW, W	light	0.43	3.94	0.29	0.12	4.57	
24/06/2010	940	Traralgon	Princes Hwy	2472	S	light	1.6	1.56	0.62	0.25	2.82	EPA cannot prove this claim.
25/06/2010	635	Traralgon	Tyers Rd	2473	calm	calm	2.08	0.83	0.32	0.32	2.89	
2/07/2010	1130	Moe	Roberts St	2475	SW	light	2.02	1.23	0.42	0.11	2.68	
2/07/2010	1854	Traralgon	Gilmore St	2476	WNW, W	light	3.16	0.47	0.27	0.13	3.7	
3/07/2010	1900	Traralgon	Princes Hwy & Park Ln	2477	WNW, W	moderate	0.44	1.95	1.09	0.11	1.49	
10/07/2010	930	Morwell	Roberts St	2479	W	moderate	2.04	0.68	0.64	0.15	2.85	EPA cannot prove this claim.
11/07/2010	1549	Morwell	Maryvale Rd	2478	WNW, W	moderate	1.66	0.45	0.45	0.16	2.58	

Date	Time	Location		Log No.	WD	WS	Rec.5	Rec.6	LK	FGI	Total	NOTES
12/07/2010	950	Hazelwood Nth	Malcolm Way	2480	calm	calm	2.04	0.68	0.35	0.15	2.53	
15/07/2010	830	Traralgon	Seymour St	2481	W	moderate	0.02	1.53	0.36	0.21	0.73	
16/07/2010	1554	Traralgon	Paysley St	2482	all	light	1.95	1.53	2	0.23	5.05	No specific date or time.
23/07/2010	1710	Traralgon	Seymour St	2483	W	light	0.55	0.63	0.45	0.19	1.52	
31/08/2010	130	Moe	unknown	2485	calm	calm	0.71	0.68	0.31	0.11	1.41	
31/08/2010	400	Moe	Old Coalville Rd	2487	calm	calm	0.75	0.43	0.33	0.11	1.53	
31/08/2010	1600	Moe	Old Coalville Rd	2487	E	light	0.78	0.73	0.34	0.11	1.65	
5/09/2010	2350	Traralgon	Traralgon West Rd	2490	W	moderate	0.58	0.49	0.43	0.11	1.38	
31/10/2010	2210	Traralgon	Grubb Ave	2496	W, WSW	light	0.62	0.44	0.4	0.15	1.53	
17/01/2011	1040	Traralgon	Seymour St	2503	W	moderate	0.6	1.53	0.96	1.24	2.98	
27/01/2011	900	Traralgon	Sundale Rd	2505	W	light	0.57	0.47	0.25	0.13	1.38	
8/02/2011	700	Traralgon	Grey St	2508	W, WNW	light	3.88	1.38	0.47	0.08	4.52	
9/03/2011	1000	Morwell	O'Grady St	2511	calm	calm	0.25	5	0.18	0.12	4.78	
15/03/2011	1308	Morwell	Roberts St	2512	calm	calm	1.28	3.86	0.64	0.13	4.05	
25/03/2011	2100	Traralgon	Seymour St	2514	W, WSW	moderate	0.31	0.46	0.39	0.12	1.21	
28/03/2011	1231	Traralgon	Washington St	2515	W	light	1.79	1.46	0.65	0.14	1.87	
9/04/2011	1600	Traralgon	Larnach Rd	2521	N	moderate	0.48	0.48	0.53	0.11	1.62	
11/04/2011	2040	Traralgon	Larnach Rd	2519	W, S	light	1.58	2.25	0.44	0.12	2.67	
11/04/2011	2147	Traralgon	Wirilda Cres	2522	W	moderate	1.58	2.25	0.44	0.12	2.67	
13/04/2011	1800	Traralgon	Larnach Rd	2523	W, WNW	moderate	0	0.69	0.38	0.01	1	

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