Noor Syuhada Shamsul
Strategic Planning Manager
Victorian Planning Authority
via email: BannockburnSE@vpa.vic.gov.au

13 June 2025

Dear Noor

Bannockburn South-East Precinct Structure Plan – Amendment C107gpla

Tract Consultants acts on behalf of Netherby Nominees (**Netherby**) in this matter.

Netherby is the owner of land identified as 430 Burnside Road, Bannockburn.

Netherby is pleased to provide the following submission to draft Amendment C107gpla (**the Amendment**) to the Golden Plains Planning Scheme.

Amendment C107gpla

As described in the exhibited Explanatory Report, the Amendment proposes the implementation of the Bannockburn South-East Precinct Structure Plan (**PSP**), and the Bannockburn South-East Development Contributions Plan (**DCP**).

The PSP will enable the development of approximately 4,685 new homes and around 750 new jobs.

The Amendment proposes to incorporate the PSP and the DCP into the Golden Plains Planning Scheme (**the Scheme**) and rezone the land to Urban Growth Zone (**UGZ**). A new Schedule 1 to the UGZ (**UGZ1**) will be applied to facilitate development of the precinct generally in accordance with the PSP.

The Amendment proposes to apply the Public Acquisition Overlay (**PAO**) to reserve land along the Bruce Creek corridor. Additional changes to overlays, particular provisions, general provisions and operational provisions of the Scheme are also proposed to facilitate the implementation of the PSP.

This Amendment has been prepared by the Victorian Planning Authority (**the VPA**) on behalf of the Minister for Planning (**the Minister**).

Netherby Landholding

Netherby is the owner of land known as 430 Burnside Road, Bannockburn (the Site).

The Site is approximately 85ha in size and is located in the south-west corner of the land subject to the Amendment. Please refer to Figure 1.

The Site is identified as Property 16 in the PSP and DCP.

The Site is currently used for the grazing of animals.

A small cluster of agricultural sheds and a dilapidated cottage is located in the south-east corner of the Site, adjacent to Burnside Road.

The Site is largely devoid of any vegetation of significance.

The Site generally falls to the west towards Bruce Creek.

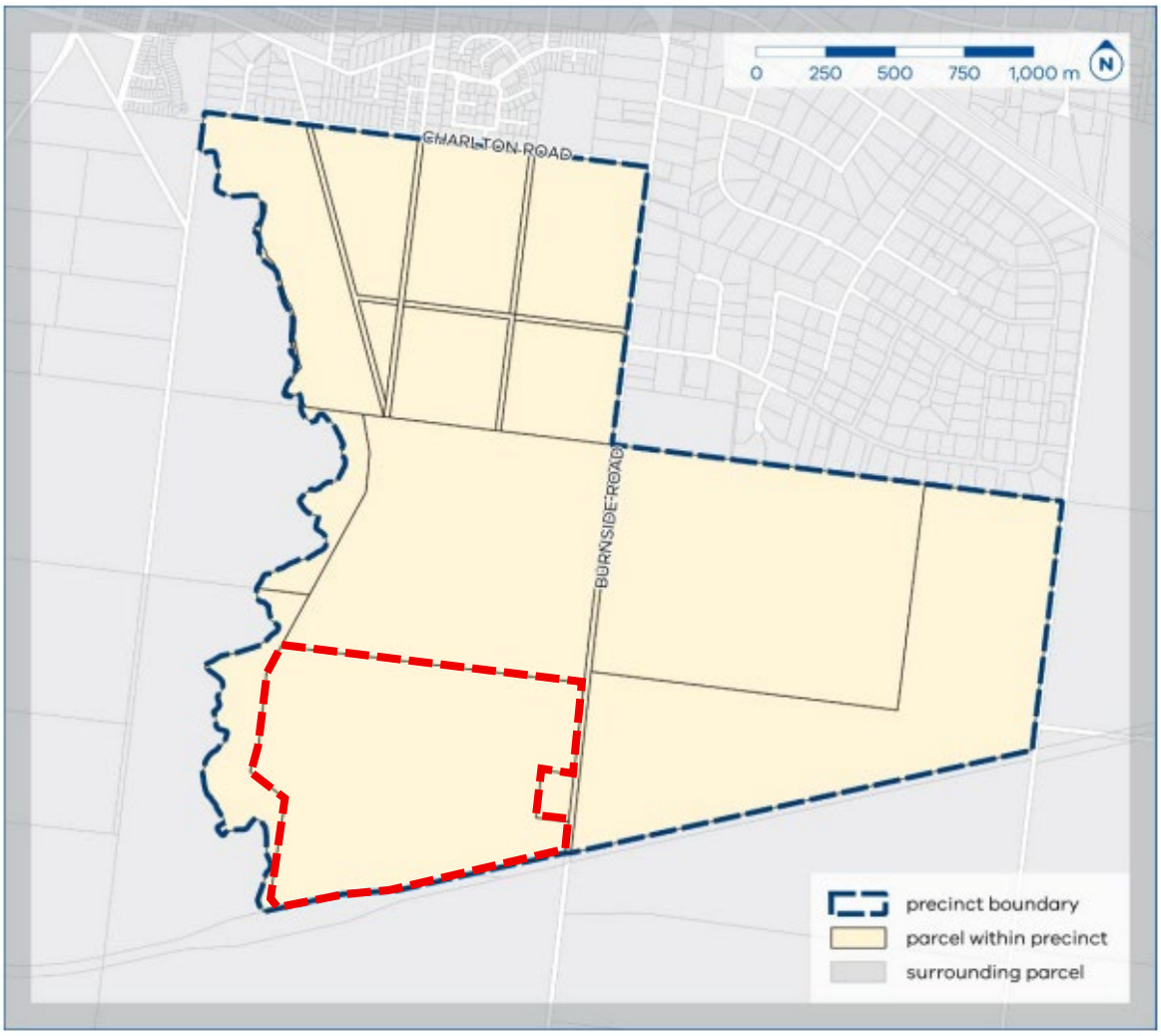

Figure 1 – Netherby Landholding (red dashed line)

Submissions

Netherby is generally supportive of the broad intent of the Amendment, subject to changes.

However, Netherby is deeply concerned with the low net developable area and the corresponding high development infrastructure level.

It is apparent to all major landowners that the Amendment as exhibited is not financially viable for the foreseeable future and that it will result in landowners failing to act on the redevelopment of their land. This is a critical issue and ought not be ignored as part of exhibition of the Amendment. It is imperative that these concerns be resolved to ensure that the PSP outcomes and aspirations can be achieved, both in the short and long term.

Whilst we have not been provided with a copy of it, we understand that the VPA has engaged Urbis to undertake a feasibility analysis of the PSP and DCP and that they have confirmed the above. This document ought be released as part of the exhibition process, noting our client will seek this document either via FOI or as part of any Panel or Committee process, if it is not produced earlier.

The DCP requires substantial revision. Minor revisions will not be sufficient. Again, this is a threshold issue for the success of the PSP and ought not be ignored or left unresolved as part of the exhibition process.

Prepared in conjunction with the other major landowners (Josco and Ramsey Property Group), Netherby has enclosed a detailed table setting out our concerns, comments and queries on the various matters.

It is noted that Netherby, Josco and Ramsey Property Group are aligned on all of the matters raised in the enclosed table. The table also identifies which matters are of direct relevance to each landowner, beyond those which are agreed, which each landowner specifically seeks to raise.

We have not attempted to replicate all of the matters raised in the enclosed table. Rather, the matters of key importance to Netherby have been addressed below to provide further detail.

1.1 Culturally and/or Environmentally Sensitive Area

We refer to Plan 2 – Placed Based Plan of the PSP which identifies a 'culturally and./or environmentally sensitive area'. This area is referred in a number of other locations within the PSP as well.

Netherby submits that the proposed approach to the designation and governance of the 'culturally and/or environmentally sensitive areas' is flawed.

The PSP implies that the land subject to cultural heritage sensitivity (i.e. within 200m of Bruce Creek) should be assumed to be undevelopable, unless proven otherwise.

This is at odds with the intent to apply the General Residential Zone to this area and with the separate legislative framework which governs areas of potential and registered aboriginal cultural heritage sensitivity.

In replacing the identified 'culturally and/or environmentally sensitive area', the 'development line' identified as a result of prior consultation (including a site visit) between the landholders, the VPA, the CCMA and the Council should be adopted. Mapping was prepared by the landowners that illustrated a 'development line' based upon a number of different site factors (slope, minimum setback to creek etc.).

This 'development line' should be adopted as the boundary between the 'Bruce Creek uncredited open space' and 'residential' areas.

Any risk associated with future cultural and/or environmental constraints within this area should be borne by the landholders.

1.2 Affordable Housing

We refer to Objective 3, Guidelines 2-4 and Table 5 of the PSP.

Any affordable housing contribution is entirely voluntary, and the PSP should make this abundantly clear so as to avoid future confusion.

As outlined above, the Amendment as exhibited is not financially viable. An affordable housing contribution is simply another cost to developers that worsens the viability of the precinct. Any affordable housing contribution should be balanced with need to ensure that projects can be delivered.

Regarding the proposed 6.5% contribution, this number has not been sufficiently justified.

The 6.5% contribution has been worded in a manner that assumes the delivery of dwellings, rather than simply the delivery of land. An approach similar to what was pursued in Jetty Road Stage 2 should be considered.

Table 5 within the PSP is far too prescriptive and should be removed in its entirety.

Due to the fact that the PSP will be delivered over an extended timeframe, flexibility in relation to the staging of contributions should be clearly articulated (i.e. some stages won't suit a full contribution).

In the absence of engaging with registered housing providers to determine whether there is a willingness to invest in the precinct, along with understanding their various requirements, it is premature to provide any level of specification in the PSP.

1.3 Drainage

The total cost of all drainage projects within the DCP is approximately $100m, or 33% of the total levy.

Many of the proposed drainage assets appear to have been inappropriately sized and designed, resulting in significant development costs and land requirements. Specifically, the location, number and size of drainage basins should be amended to reflect the final drainage concept prepared by Creo, based on the alternative SWMS layout prepared by Neil Craigie (14 May 2025).

We understand that this advice has been provided by Ramsey Property Group to the VPA.

We also note that drainage assets have been excluded from the Bruce Creek corridor and adjacent 'culturally and/or environmentally sensitive areas' – this is despite the extensive prior engagement referred to above.

By allowing drainage to be sited closer towards Bruce Creek, it would likely result in greater design efficiencies and an improvement in developable land.

1.4 Bruce Creek Bridge (BR_01)

BR-01 is an east-west bridge over Bruce Creek.

The DCP seeks to fund for the interim construction arrangements and the purchase of land for the ultimate arrangements. The DCP allows for a 50%.

This bridge connects the Bannockburn South-East precinct with the potential future growth areas to the west.

Netherby submits that no evidence has been provided that confirms that the project will be delivered within the lifespan of the DCP (being a maximum of 25 years). There is also a lack of evidence that demonstrates a need a nexus of this project to the Bannockburn South-East precinct. As such, the project should be removed from the DCP.

If evidence is subsequently provided that confirms that the project will be delivered within the lifespan of the DCP, then the 50% apportionment should be substantially reduced to reflect the reality that very few trips from the Bannockburn South-East precinct will head west (rather than north, south, or east).

1.5 Community Facilities

Netherby submits that the three proposed community facilities exceed the level of demand likely to be generated by the precinct. We note that the Community Infrastructure Assessment prepared by ASR (2024) was based on a population of15,452, as opposed to the population of 13,820 currently anticipated.

Netherby submits that one facility should be removed from the precinct.

1.6 Active Open Space

Netherby submits that in reviewing the concept designs contained within the DCP, there appears to be substantial inefficiencies in their layout and unoccupied space which could be reduced. It is apparent that all components of the three active open space reserves could be retained and delivered in much smaller land areas.

Further, SR-03 should be relocated further west adjacent to the Bruce Creek corridor to better utilise the land currently identified as being a 'culturally and/or environmentally sensitive area'.

A reduction to the land areas required for these three sporting reserves will increase the developable area and reduce the construction and land costs for each project.

We also note that one of the reserves is planned to accommodate an athletics track that will likely be used by residents outside of the precinct. An appropriate reapportionment of costs should occur.

1.7 Development Infrastructure Levy

The DCP seeks to fund approximately $300m of projects across the precinct, which has a developable area of approximately 310ha. The resulting levy is $974,156 per net developable hectare (NDHa).

As outlined above, the DCP is unfeasible in its current form and substantial changes are required. Without these changes, there is limited prospect of any development occurring in this area in the short or long term.

In order to seek an overall reduction in the levy, the DCP has been reviewed in detail by the collective landowner group in the context of the principles of need, nexus and apportionment.

Insight Planning, on behalf of Josco, has identified that substantial cost reductions can be made to all project categories in the DCP, as well as a significant increase in developable area.

Netherby supports and adopts the work undertaken by Josco.

The below summary table has been prepared that illustrates the recommended changes.

Category	Project Type	Exhibited DIL p NDHa (309.42)	Proposed DIL p NDHa (390.77)
Road	Land	$6,492	$5,140
	Construction	$38,543	$30,519
Intersection	Land	$9,820	$7,776
	Construction	$70,279	$37,768
Bridge	Land	$0	$0
	Construction	$131,056	$1,341
Community Facilities	Land	$20,159	$11,561
	Construction	$118,842	$53,282
Active Recreation	Land	$104,874	$41,521
	Construction	$153,285	$85,066
Drainage	Land	$106,253	$35,827
	Construction	$214,556	$56,064
TOTAL		$974,158	$365,862.81

Exhibited NDA	309.42
Proposed NDA	390.77

We collectively look forward to working closely with the VPA to achieve the substantial changes required to ensure the PSP and DCP and feasible and can be acted upon in the foreseeable future.

Enclosures

To assist the VPA in its review of this submission, we are pleased to enclose the following documents:

- Combined Submissions Table; and

- Odour Impact Assessment, Peter J Ramsey & Associates, May 2025.

We trust that the content of this submission is clear and concise. However, should you wish to discuss or clarify any matter, please contact the undersigned on (03) 5221 0105.

We wish to thank the VPA for the work completed to-date. We look forward to continuing to work productively together to resolve the final form and content of the Amendment.

Yours sincerely

Nick Clements
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Tract
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Appendix A Combined Submissions Table

Bannockburn South-East Precinct– Draft Amendment C107gpla

The following table outlines the recommended changes to the exhibited documents associated with Amendment C107gpla, as agreed to by all major landowners: Josco, Ramsey Property Group, and Netherby.

Whilst all matters are agreed, the table identifies the matters of direct relevance to each relevant landowner.

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
Precinct Structure Plan					
Section 1.4	Precinct Features				
	Chicken Hatchery and breeder farm.	Disagree.	Remove everything beyond first sentence.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
	Amphitheatre.	Disagree.	Amend to remove reference to holding significant cultural value.	Whilst this could be proven in the future, it will only be known following the preparation of a CHMP. At a minimum, the words "may hold" should be used, along with an acknowledgement that this will need to be confirmed following the preparation of a CHMP.	Netherby & RPG
Plan 1	Precinct Features				
	Historical homestead and drystone wall.	Disagree.	Amend to remove reference to historical homestead.	The VPA has been previously provided with a heritage report that confirmed that there are no structures of historical significance that are worthy of retention within 430 Burnside Road. The drystone wall was also not identified as being significant enough so that it cannot be rebuilt.	Netherby
	Artefact Scatter	Disagree	Delete.	Unless it can be demonstrated that the identification of the 'artefact scatter' adjacent to the Bruce Creek corridor is based on on-site investigation, this should be deleted from Plan 1. Any artefacts found as part of a CHMP will need to be managed through this process and the relevant legislation.	Josco
	Golden sun moth / tussock skink habitat – Levy Road reserve	Disagree	Amend to 'potential golden sun moth / tussock skink habitat'	The presence of golden sun moth or tussock skink was not confirmed within the existing Levy Road reserve as part of the targeted surveys undertaken. As such, this land would be more appropriately identified as potential habitat.	Josco
	High value trees	Disagree	Delete the two Monterey Cypress from Josco land (Trees 683 and 684) from identification as 'high value trees' on Plan 1	The identification of these two trees as high value in the arboricultural assessment is in direct conflict with the arboricultural assessment and the VPA's Background Ground, which both state that all Monterey Cypress trees, even those currently in moderate/good health, are not recommended for protection as the area is infected with Cypress Canker which is untreatable and will inevitably lead to the death of all the trees.	Josco
	Moderate retention value trees	Disagree	Delete all 'moderate retention value trees' from the plan	As per the arboricultural assessment, the low and moderate retention value trees are predominantly weed species and therefore should not be retained.	Josco, Netherby & RPG
Section 2.2	PSP Purpose				

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	"Place Wadawurrung cultural values at the centre of the precinct by recognising and protecting areas of cultural significance."	Disagree.	Delete.	In light of the fact that CHMP's have not been prepared, the cultural values of the precinct are therefore not known in their entirety.	Netherby & RPG
Plan 2	Place Based Plan				
	"Culturally and/or environmentally sensitive area".	Disagree.	Delete the 'culturally and/or environmentally sensitive area' adjacent to the Bruce Creek corridor and replace with "residential".	Extensive consultation previously occurred between the landholders, the VPA, the CCMA and the Council – including a site visit. Mapping was prepared that set a 'development line' based upon a number of different site factors (slope, minimum setback to creek etc.). This 'development line' should be adopted as the boundary between the 'Bruce Creek uncredited open space' and 'residential' areas. Any risk associated with future cultural and/or environmental constraints within this area should be borne by the landholders. The removal of the 'culturally and/or environmentally sensitive area' will substantially increase the NDA of the precinct and lower the DCP rate per NDHA. A number of changes to various plans and text throughout the PSP and DCP would be required to respond to the proposed revision.	Josco. Netherby & RPG
	Bruce Creek uncredited open space	Query	Ensure this reflects agreed upon 'development line'.	As above, extensive consultation previously occurred to determine a 'development line', which should be utilised as the boundary for the Bruce Creek uncredited open space. Make sure this boundary is consistent with development line /survey work previously agreed on.	Josco. Netherby & RPG
	Conservation Area	Disagree	Delete or amend conservation area along existing Levy Road reserve.	Deletion of all or part of the conservation area identified along the existing Levy Road reserve, would allow part of this existing road reserve to be utilised/upgraded, rather than seeking a completely new alignment of Levy Road through the Josco land.	Josco
	Government Primary Schools	Disagree (Query)	Delete one government primary school.	We query whether, due to the higher population estimated by the ASR report, there is sufficient for a total of three primary schools in the precinct. Suggest deleting one government primary school.	Josco. Netherby & RPG
	Local Community Facilities	Disagree	Delete one level-1 community facility	We query whether, due to the higher population estimated by the ASR report, there is an over provision of community facilities within the precinct. Based on the demand identified, it appears that the total number of community facilities could be reduced to one level-1 facility and one level-2 facility.	Josco, Netherby
	Sports Reserves	Agree with change	Reduce area of all three Sports Reserves.	The concept designs for all three of the sporting reserves show inefficiencies and surplus open space land that is not required for the facilities proposed. The size of these sports reserves should be reduced as much as possible to reduce overall land costs, as well as making more efficient use of land within the Bruce Creek corridor or transmission easement, where possible.	Josco. Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	Hatchery and Breeder Buffer	Disagree	Delete buffer	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
	Drainage & Basins	Disagree	Update Drainage reserves to reduce land take.	Functional designs appear to be inefficient and non-responsive to topographical conditions.	Josco. Netherby & RPG
Section 3	Implementation				
	Objective 2.	Disagree.	Delete.	On the basis that the "culturally and/or environmentally sensitive area" is requested to be deleted from the PSP, this objective is no longer required.	Josco, Netherby & RPG
	Objective 4.	Disagree.	Delete.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
	Requirement 1	Agree (with changes)	Subdivision for residential development must ~~be generally in accordance with~~ "respond to the density targets in" Plan 3 Housing, and Table 3 Housing density and diversity, to the satisfaction of the responsible authority.	The density target of 17dw/ha may not be immediately achievable, however, will likely be achieved over time. Wording should be revised to reflect this.	Josco, Netherby & RPG
	Requirement 3.	Agree (with changes).	Amend to replace "active frontages" with "passive surveillance" or alike.	The use of "active frontages" implies a customer land use. The use of "passive surveillance" will allow a variety of residential outcomes to occur that still achieves the design intent.	Netherby & RPG
	Requirement 4.	Disagree.	Delete.	On the basis that the "culturally and/or environmentally sensitive area" is requested to be deleted from the PSP, this requirement is no longer required. If the designation of this land being deleted is not supported, then R4 should be amended to include more flexible wording (applying the requirements 'as relevant' or similar), or be made into a guideline.	Josco, Netherby & RPG
	Requirement 6.	Disagree.	Delete.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
	Guideline 2.	Agree (with changes).	If Table 5 is to remain within the PSP, amend guideline to make reference to it as guidance only.	In light of the affordable housing contribution being voluntary, the inclusion of Table 5 is an unusual level of detail. However, if the VPA believes that it must remain, then this guideline provides an opportunity to refer to it and confirm that it provides guidance only.	Josco, Netherby & RPG
	Guideline 5.	Disagree.	Delete.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
	Table 3 | Amenity Area | Target Density	Agree (with changes)	Average of 17 dwellings or more per net developable hectare (NDHa) ", where appropriate, should be targeted over time".	More flexible wording should be utilised here to unsure that it is clear that this is to provide guidance only, and should be targeted over time. It may not be immediately achievable to deliver these densities.	Josco, Netherby & RPG
Plan 3	Housing				

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	Amenity Areas	Disagree	Delete amenity areas adjacent to Levy Road conservation area (requested to be deleted)	We do not support the identification of the conservation area along the existing Levy Road reserve. As such, we do not consider it appropriate to identify this land as an 'amenity area'. If the conservation area is retained, having higher densities along this area could also have maintenance and bushfire implications.	Josco
			Delete amenity area adjacent to the proposed Boulevard Connector (realigned Levy Road) except adjacent to approved bus stops.	While the Boulevard Connector is proposed to be bus-capable, the entirety of this road will not provide sufficient amenity to justify higher residential densities. Extent of 'amenity areas' adjacent to the Boulevard Connector should be reduced to around approved bus stops.	Josco
			Reduce amenity area to a 50m radius from the town centre and delete amenity area surrounding drainage basins	We support a reduced amenity area with a 50m radius from the proposed town centre and support amenity area surrounding sport reserve only. Drainage reserves should not be treated as 'amenity areas'.	
			Delete amenity area along the Arterial Road.	Higher amenity is not appropriate to provide along an arterial road which is serving through traffic function.	
	Open Space	Agree (with changes)	Remove open space label from the transmission easement and rename to 'utilities easement' consistent with Plan 2	We don't support the labelling of the transmission easement as open space. This easement should be able to be utilised for other purposes, as appropriate.	Josco & RPG
	Buffers	Disagree	Remove Hatchery and Breeder Farm buffer	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
Section 3.2	Safe, accessible and well-connected				
	Requirement 7.	Agree (with changes).	Amend to specify who the 'relevant authority' is.	To avoid any ambiguity over the responsibility of the arterial, this requirement should be amended to identify who the 'relevant authority' is (potentially in both an interim and ultimate scenario).	Josco, Netherby & RPG
	Guidelines 6.	Agree (with changes).	Reduce percentage of canopy coverage from 30% to 25%.	The achievement of 30% canopy coverage in streetscapes is incredibly hard to achieve when all competing constraints are factored in. As such, this should be reduced to reflect a 25% canopy coverage target.	Josco, Netherby & RPG
Plan 4	Movement Network				
	East-West Link (RD-01)	Agree (with changes)	Delete section of East-West link to the west of Levy Road and to the east of the current signalised T-intersection (IN-03) from contributing to the DCP.	The extent of this road to the west of Levy Road and to the east of this t-intersection will not be utilised in any short or medium term as there is no connection beyond the precinct. This is therefore likely to fall outside a reasonable time horizon for the PSP and DCP and should be deleted.	Josco, Netherby & RPG
	Signalised T-Intersection (IN-03)	Disagree	Intersection should be downgraded to a roundabout	The road to the east of this intersection will not be utilised in any short or medium term as there is no connection to the east.	Josco, Netherby & RPG
	Signalised Intersection (IN-01 - Levy Road and East-West link)	Disagree	Intersection should be revised to a signalised T-intersection	The road to the west of this intersection will not be utilised in any short or medium term as there is no connection to the east.	Josco, Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
Section 3.3	Connect people to jobs, higher order services and thriving local economies				
	Requirement 15.	Agree (with changes).	Amend the requirement as follows: Prior to subdivision “which will create 3 or more lots”...	These revisions will allow 2-lot subdivision to occur (ie. Creation of a superlot for the town centre). This will ensure that development can occur around the activity centre prior to the activity centre being delivered.	Josco, Netherby & RPG
	Requirement 17.	Agree (with changes)	Amend to a Guideline	The use of ‘should’ in this requirement is not appropriate, it would be more appropriately converted to a guideline.	Netherby & RPG
Section 3.4	High quality public realm				
	Requirement 18.	Disagree	Amend to remove reference to Plan 1	Plan 6 already shows areas of confirmed golden sun moth / tussock skink habitat and high/critical trees, including the Melbourne Yellow Gums, therefore this does not need to include a reference to Plan 1.	Josco
	Requirement 20.	Agree (with changes).	The Bruce Creek corridor should more clearly defined. Convert this requirement to a guideline and amend the word ‘must’ to ‘should’	On the basis that the “culturally and/or environmentally sensitive area” is deleted from the PSP as requested, then the extent of the Bruce Creek corridor (as referenced in this requirement) will be clearly defined. Further, this requirement would be more appropriately included as a guideline, as there could be potential conflicts with the bushfire requirements.	Josco, Netherby & RPG
	Requirement 21.	Agree (with changes).	Replace reference to “Habitat Design Plan” with “Conservation Management Plan”.	The UGZ1 requires the preparation of a Growling Grass Frog Conservation Management Plan, but not a “Habitat Design Plan”. As such, this requirement should be amended to reflect the correct document reference. Making this change will avoid any ambiguity on what is required.	Josco, Netherby & RPG
	Requirement 22.	Agree (with changes).	Delete “may not be limited to”.	As this is a requirement, it should be clear that nothing further is required.	Josco, Netherby & RPG
	Requirement 23.	Disagree.	Convert this requirement to a guideline.	Preventing light spill and glare within the Bruce Creek corridor is not realistically entirely achievable. More appropriately included as a guideline.	Josco, Netherby & RPG
	Requirement 25.	Agree (with changes).	Add wording “unless otherwise agreed with the Responsible Authority”	The eastern buffer should be able to be removed when /if the Future Investigation East Area is rezoned and development.	& RPG
	Requirement 26 & 27.	Agree (query)	NA	These requirements directly contradict Guideline 6 which seek roads to have 30% canopy coverage. Perimeter Roads located in bushfire designated areas will not be able to meet the 30% canopy cover and the requirements of 27.	Josco, Netherby & RPG
	Requirement 29.	Disagree.	Amend to delete reference to areas being dedicated to biodiversity or native vegetation conservation being excluded.	It is not clear why these areas should not count towards canopy coverage targets in the public realm. This requirement may be more appropriately included as a guideline.	Josco, Netherby & RPG
	Requirement 32.	Agree (with changes).	Amend as follows: ‘The integrated water management plan (IWMP) should be prepared with consideration to the	This requirement is too broad. No issue with the preparation of an IWMP to the satisfaction of BW, CCMA & the RA being a requirement. Doesn’t need to explicitly state the guidelines that it needs to refer to or respond to, as not all of them are relevant. This requirement may be more appropriately included as a guideline.	Josco, Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
			following: [insert above list of incorporated docs].'		
	Requirement 34.	Agree (with changes).	Remove reference to being in accordance with Plan 7.	Even if the "culturally and/or environmentally sensitive area" is to remain, other revisions to the overall drainage strategy may result in assets being delivered in alternative locations to those shown in Plan 7.	Josco, Netherby & RPG
			Remove final dot point of this requirement. Include "unless otherwise approved by the Responsible Authority"	The final dot point is a duplicate for Requirement R35. Also, include more flexible wording as things maybe need to be amended from time to time.	Josco, Netherby
	Requirement 36 & 37	Disagree	Convert these requirements to guidelines	Drainage assets should be located within the culturally and/or environmentally sensitive area (if retained adjacent to the Bruce Creek corridor), if it is appropriate to do so, to maximise NDA within the precinct. Add 'if applicable' to the first dot point and 'where applicable' to all the other dot points.	Josco, Netherby & RPG
	Requirement 38.	Agree (with changes).	Add 'unless otherwise agreed with the responsible authority' after the word Staging.	Some temporary downstream drainage may be required to be constructed earlier to accommodate stage 1 development.	Josco & RPG
	Requirement 41.	Disagree	Delete	The PSP should not restrict potential alternative uses in the transmission easement in the future. Alternatively, amend to add the words 'unless otherwise agreed by the Responsible Authority' to allow for flexibility in the future. It would still then be at Councils discretion.	& RPG
	Requirement 42.	Agree (queried though).	NA	The word "should' is not reasonable to use within a requirement. These parts of the requirement should be deleted and either introduced as a separate guideline, or combined with one of the existing guidelines (like G30).	Josco, Netherby & RPG
	Guideline 13.	Agree (with changes).	Remove the word 'must' and replace with 'should aim to achieve'	The 30% tree canopy coverage is difficult to achieve and greater flexibility should be included.	Josco, Netherby & RPG
	Guidelines 15.	Agree (queried though).	NA	We query how, at subdivision stage, it can be demonstrated that there is "provision of a static water supply of 2,500 litres for personal firefighting where practical".	Josco, Netherby & RPG
	Guidelines 17.	Agree (queried though).	NA	It should be made clear that front setbacks within private allotments should be permitted to be used for bushfire setbacks. For example, if a 19.5m setback is required from the Bruce Creek corridor, this setback should be able to consist of both a perimeter road and the front setback of lots (which would be appropriately managed).	Josco, Netherby & RPG
	Guideline 24.	Disagree	Delete	As per the arboricultural assessment, the low and moderate retention value trees are predominantly weed species, and therefore should not be encouraged to be retained.	Josco, Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	Guidelines 25.	Agree (queried though).	NA	The wording of this guideline (ie “should state”) is unclear and should be revised.	Josco, Netherby & RPG
	Guideline 28.	Agree (with changes).	Revise guideline to include the words ‘where assets are adjacent to Bruce Creek’	It is not necessary to design all of the other drainage basins in collaboration with the Wadawurrung and ultimately, we need to design basins that will be approved by engineering.	Josco, Netherby & RPG
	Guideline 30.	Agree (queried though).	NA	We query what this guideline means and how will it be expected to be practically achieved? If no explanation can be offered, then we suggest deleting this guideline.	Josco, Netherby & RPG
	Guideline 32.	Disagree.	Delete.	Place naming occurs outside of the planning process, and therefore there is no relevance to the PSP and this guideline should be deleted.	Josco, Netherby & RPG
	Guideline 34.	Agree (queried though).	NA	We query whether this guideline should reference ‘development’, ‘subdivision’ or both.	Josco, Netherby & RPG
Plan 6	Public Realm				
	High retention value trees	Disagree	Delete the two Monterey Cypress from Josco land (Trees 683 and 684) from identification as ‘high value trees’ on Plan 6	The identification of these two trees as high value in the arboricultural assessment is in direct conflict with the arboricultural assessment and the VPA’s Background Ground, which both state that all Monterey Cypress trees, even those currently in moderate/good health, are not recommended for protection as the area is infected with Cypress Canker which is untreatable and will inevitably lead to the death of all the trees.	Josco
	Sports Reserves	Agree with changes	Reduce the size of all three proposed sports reserves (SR-01, SR-02 & SR-03)	The concept designs for all three of the sporting reserves show inefficiencies and surplus open space land that is not required for the facilities proposed. The size of these sports reserves should be reduced as much as possible to reduce overall land costs, as well as making more efficient use of land within the Bruce Creek corridor or transmission easement, where possible.	Josco, Netherby & RPG
	SR-03	Disagree	Relocate SR-03	SR-03 should be relocated adjacent the Bruce Creek corridor (into the ‘culturally & environmentally sensitive area’, unless this land use designation is deleted as requested)	Josco, Netherby & RPG
Plan 7	Water				
	Sewer Pump Stations	Disagree.	Amend plan to identify SPS’s in accordance with Barwon Water’s current position.	The locations of SPS’s are inconsistent with Barwon Water’s latest advice to landowners.	Josco, Netherby & RPG
	Open Space Legend	Disagree.	Remove wording ‘modified kerbing, stormwater harvesting, recycled water’ and replace with ‘open space’	It has been incorporated into the Guidelines and isn’t necessary to include there as it is confusing.	RPG
Plan 8	Bushfire				

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	Identifies a 19m setback from “grassland” (i.e. Bruce Creek Corridor).	Agree (queried though).	NA	Unless private land can be used within the bushfire setback, this will result in a 19m local road abutting the Bruce Creek corridor. This outcome will worsen the ability for activation and passive surveillance over the public open space corridor.	Josco, Netherby & RPG
				The ‘culturally & environmentally sensitive area’ adjacent the Bruce Creek is also identified on Plan 8 as ‘grassland vegetation’. This should be amended, even if the designation of this area is retained.	Josco, Netherby & RPG
Plan 9	Community Infrastructure				
	Local Community Facilities	Disagree	Delete one level-1 community facility	Based on the ASR report, there appears to be an over provision of community facilities within the precinct. Based on the demand identified, it appears that the total number of community facilities should be reduced to one level-1 facility and one level-2 facility.	Josco, Netherby & RPG
Section 3.6	Infrastructure Coordination				
	Requirement 47.	Disagree.	Delete.	These matters are dealt with post-permit, therefore the requirement should be deleted.	Josco, Netherby & RPG
	Requirement 48.	Agree (with changes).	Revise the requirement to add the words ‘where practical’	This is difficult to implement in some circumstances. Stating that services need to be bundled isn’t overly correct either, as some services cannot be placed in common trenches (ie. electricity & water).	Josco, Netherby & RPG
	Requirement 50.	Agree (with changes)	Convert this requirement to a guideline and add the words ‘where practical’	It may not be practical for every single house to have rooftop solar and battery storage. There should be flexibility incorporated into the wording, and this is more appropriately included as a guideline.	Josco, Netherby & RPG
	Guideline 47.	Agree (with changes).	Revise the guideline to add the words ‘where practical’	This may be difficult to achieve in all circumstances, and as such flexibility should be incorporated into the guideline for the delivery of the ESD opportunities.	Josco, Netherby & RPG
Plan 10	Infrastructure and Development Staging				
	Staging reflects superseded position of Barwon Water.	Agree (with changes).	Amend plan reflect Barwon Water’s current position.	Staging reflects superseded position of Barwon Water.	Netherby
Plan 11 / Table 19	Precinct Infrastructure				
	IN-01	Agree (with changes).	Downgrade from a signalised intersection to either an unsignalized intersection (roundabout) or signalised T-intersection.	Given that there is no development front anticipated to the west within the time horizon of the PSP and DCP, the western-leg of this intersection is not required.	Josco, Netherby & RPG
	IN-03	Agree (with changes).	Downgrade from signalised T Intersection to unsignalized intersection.	Given that there is no development front east of this intersection within the time horizon of the PSP and DCP, there is no requirement for this to be a signalised intersection.	Netherby & RPG
	BR-01	Disagree	Delete	No evidence has been provided that confirms that BR-01 will be delivered within the time horizon of the DCP (20-25 years), therefore this project should be deleted	Josco, Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
				from the PSP/DCP and if required in the future (following development of the adjacent growth area west of Bruce Creek), funded via alternative mechanisms.	
	Local Community Facilities	Disagree	Delete one level-1 community facility	Based on the ASR report, there appears to be an over provision of community facilities within the precinct. Based on the demand identified, it appears that the total number of community facilities should be reduced, to one level-1 facility and one level-2 facility.	Josco, Netherby & RPG
	Retarding Basins	Disagree	Update basin design as per final drainage concept.	The location, number and size of drainage basins should be amended to reflect the final drainage concept prepared by Creo, based on the alternative SWMS layout prepared by Neil Craigie (14 May 2025).[1]	Josco, Netherby & RPG
Development Contributions Plan					
Chapter 2	Timeframe				
	The DCP does not include a time horizon.	NA	A new subsection to Chapter 2 should be included that specifies a timeframe for the DCP.	The DCP Guidelines state: A.DCP.must.include.a.time.horizon¡..This.time.horizon.should.not.exceed.86.to.8❶ years¡..If.the.time.horizon.is.not.reasonable?new.development.in.the.early.years. will.be.paying.for.infrastructure.that.will.not.be.delivered.until.many.years.later¡.. This.is.inequitable.and.unreasonable¡	Josco, Netherby & RPG
Plan 3 / Section 3.3	Transport Items				
	BR-01 – Bruce Creek Bridge.	Disagree.	Delete from the DCP.	No evidence has been provided that confirm that BR-01 will be delivered within the timeframe of the DCP (a maximum period of 25 years).	Josco, Netherby & RPG
	BR-01 – Bruce Creek Bridge.	Disagree.	Reduce 50% apportionment.	Should evidence be provided that confirms that BR-01 will in fact be delivered within the timeframe of the DCP, there is no evidence that supports the 50% apportionment. If the arterial is to provide a genuine bypass function, then it will benefit the broader township. Very few trips from the precinct will head west. Rather, the majority of trips will head north or east.	Josco, Netherby & RPG
	BR-01 – Bruce Creek Bridge.	Disagree.	Reduce the overall cost of BR-01 by adopted a simpler design.	Should evidence be provided that confirms that BR-01 will in fact be delivered within the timeframe of the DCP, the approximate $80m cost of the project should be reduced. Work undertaken by Jacobs demonstrates that a simpler and significantly more cost-effective design could replace the current proposal. Any urban design benefits of the current proposal must be weighed against the exuberantly high cost of the single DCP item/project.	Josco, Netherby & RPG

[1] Josco agrees subject to the removal of the waterway shown in the design between Charleton Road and the transmission easement, as agreed to by the VPA.

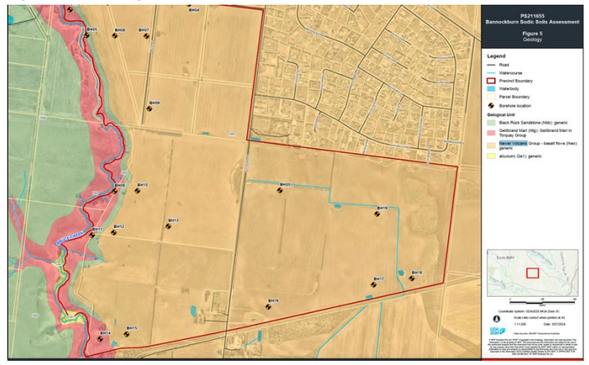
		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	RD-01 – Arterial Road.	Disagree.	The western and eastern-most portions of RD-01 should be removed from the DCP as they will not be required within the timeframe of the DCP.	As BR-01 and the continuation of the arterial to the east of the precinct will not occur within the timeframe of the DCP, there will be no need to deliver the western and eastern-most portions of RD-01, being west of IN-01 and east of IN-03.	Josco, Netherby & RPG
	IN-01 – Levy Road / Future EW Link Road Intersection	Disagree	Amend to 3-way non signalised intersection - Delete western leg	As BR-01 is proposed to be deleted, the western leg of this intersection should also be deleted.	Josco, Netherby & RPG
	IN-03 – Three-way Intersection.	Disagree.	If not deleted entirely (converted to non-signalised intersection), amend the project costs of IN-03 to reflect the fact that it is a three-way intersection. Should be downgraded to a two-way intersection.	Primary position to delete project costs associated with IN-03 and convert this to a non-signalised intersection. If retained, the project costs of IN-03 should be reviewed and reduced as despite IN-01 and IN-02 being four-way intersection and IN-03 being a three-way intersection, they have the same cost in the DCP.	Josco, Netherby & RPG
	RD-02 – Railway Crossing.	Agree (seeking information).	NA	We request additional information in relation to the examples referred to within Section 9.1.2 of the DCP to justify a $2M construction cost. Further, it must be made clear that despite any future assessment of this crossing, as required by the UGZ1, and recommendations for upgrade works, no additional cost will be included in the DCP on top of the $2M specified.	Josco, Netherby & RPG
Plan 4 / Section 3.4	Community & Recreation Items				
	Local Community Facilities.	Disagree (query).	Delete one level-1 community facility.	Based on the ASR report, there appears to be an over provision of community facilities within the precinct. Based on the demand identified, it appears that the total number of community facilities should be reduced to one level-1 facility and one level-2 facility. We also understand that the Council is concerned about the potential ongoing cost implications of the DCP. In light of this, we query whether the Council does in fact wish to own and operate three separate community facilities within the precinct.	Josco, Netherby
	Active Open Space Reserves (all)	Disagree (query).	Delete one active open space reserve.	We understand that the Council is concerned about the potential ongoing cost implications of the DCP. In light of this, we query whether the Council does in fact wish to own and operate three separate active open space reserves.	Josco, Netherby
	SR-01	Disagree (query).	Amend concept design	We consider that there may be opportunities to review the concept design layout to maximise the area within the transmission easement and reduce the overall size of this reserve, which would result in both reduced land cost and increased NDA.	Josco, Netherby & RPG
	SR-02	Disagree (query).	Increase external apportionment of this reserve. Amend concept design	SR-02 is planned to accommodate an athletics track. It is highly likely that the athletics track will be used by residents of the existing township beyond the bounds of the precinct. As such, an apportionment of cost for SR-02 should be excluded from the DCP.	Josco, Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
				Further, the design concept results in an efficient use of space. It is considered that the area of this reserve could be reduced substantially, which would result in both reduced land costs and increased NDA.	
	SR-03	Disagree (query).	Amend location and concept design	SR-03 concept design provides for inefficient use of space and is larger than what is required for the facilities proposed. SR-03 should be relocated further west adjacent to the Bruce Creek Corridor, into the 'culturally & environmentally sensitive area' (if designation not deleted). This would result in both reduced land costs and increased NDA	Josco, Netherby & RPG
Plan 5 / Section 3.5	Drainage Items				
	Drainage Infrastructure	Disagree	Update basin design as per final drainage concept.	The location, number and size of drainage basins should be amended to reflect the final drainage concept prepared by Creo, based on the alternative SWMS layout prepared by Neil Craigie (14 May 2025).[2]	Josco, Netherby & RPG
General	Conservative Costings				
	P90 – Costings.	Disagree.	Revise scope and costs of all construction projects in accordance with the VPA Benchmark Cost Estimates	Utilising the P90 Benchmark Costs Estimates could result in significant reduction to overall project construction costs and DIL (as well as reduce the shortfall from the CIL). Use of P50 estimates would result in further reductions.	Josco, Netherby & RPG
			Remove contingencies on top of what are already meant to be conservative P90 costing.	In a number of circumstances, the DCP has utilised P90 costings ahead of less conservative options. However, on top of this, the DCP has in a number of circumstances also allowed for contingencies on top of the P90 costings. This approach results in a 'double-dip'. If contingencies are to remain, then P90 costings should not be used.	Josco, Netherby & RPG
Planning Controls					
UGZ1 – 1.0	Plan 1				
	Update Plan 1	Disagree.	Update Plan 1 in accordance with the requested changes to Plan 2 Place Based Plan of the PSP, as outlined above.	Update Plan 1 in the UGZ1 to reflect changes requested to Plan 2 Place Based Plan of the PSP.	Josco, Netherby & RPG
UGZ1 – 2.2	Applied Zone				
	Table 1 – identifies 'all other land' as General Residential Zone.	Agree (seeking confirmation).	NA	We seek confirmation that the 'culturally and/or environmentally sensitive area' as shown in Plan 1 is classified as 'all other land'.	Josco, Netherby & RPG
UGZ1 – 2.3	Specific Provisions – Use of Land				
	Table 2 – identifies 'accommodation' and 'informal outdoor recreation' as a Section 2 land use if located within the	Disagree.	Delete.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby

[2] Josco agrees subject to the removal of the waterway shown in the design between Charleton Road and the transmission easement, as agreed to by the VPA.

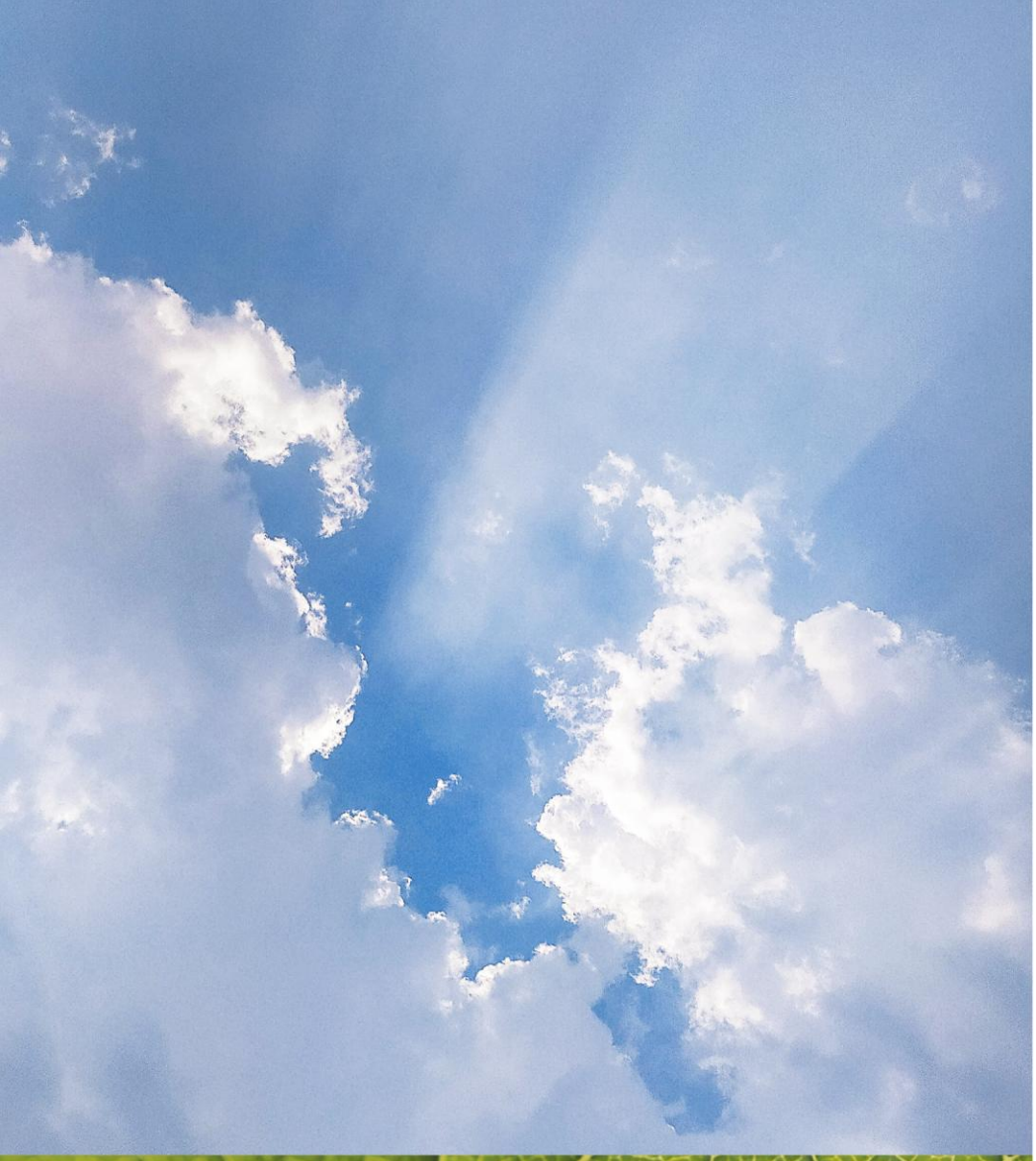
		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	500m hatchery buffer or the 399m breeder farm buffer as shown in Plan 1.				
	Chicken Hatchery & Breeder Farm – requires the provision of a level 3 odour impact assessment.	Disagree.	Delete.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
UGZ1 – 2.4	Specific Provisions – Subdivision				
	Chicken Hatchery & Breeder Farm – requires the provision of a level 3 odour impact assessment.	Disagree.	Delete.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
	Bruce Creek Conservation Area Growling Grass Frog CMP – requires the CMP for the entire length of Bruce Creek prior to the subdivision of land within the 'uncredited open space' or the 'culturally and/or environmentally sensitive area'.	Agree (with changes).	Amend to allow CMP to be prepared in stages.	The differing landownership arrangements abutting Bruce Creek make it implausible for the CMP to be completed in one stage. The requirement for CMP should be for land in one ownership, not the whole precinct. Requirement for CMP to apply to entire precinct is inconsistent with what would otherwise be required by Part 7 of the EPBC Act referral process, which allows the CMP to be prepared in stages.	Josco, Netherby & RPG
			Delete reference to 'culturally and/or environmentally sensitive area'; OR Amend wording to say "A permit must not be granted to subdivide land within the "Bruce Creek uncredited open space' or 'culturally and/or environmentally sensitive area where the area is adjacent to Bruce Creek'	As per request to delete the culturally and/or environmentally sensitive area from adjacent the Bruce Creek corridor, this wording should be revised to reflect this.	Josco, Netherby & RPG
UGZ1 – 3.0	Application Requirements				
	Residential Subdivision – Subdivision and Housing Design Guidelines	Disagree	Delete from general residential.subdivision application requirements	Can form permit conditions, should not have to be provided as part of a permit application	Josco, Netherby & RPG
	Residential Subdivision - A lot size diversity plan including a colour-coded lot size plan	Agree with changes	Amend wording as follows: A lot size diversity plan including a colour-coded lot size plan, ~~reflecting~~ "aiming to achieve" the lot size categories outlined in Table "3" - Housing Density and Diversity in the incorporated PSP, "where appropriate"	Compliance with the 3 different lot types as per Table 3 is not achievable in all instances. As such, this requirement should be amended to provide more flexible wording, which aims for compliance instead of requiring it.	Josco, Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	Residential Subdivision – Risk assessment of the Burnside Road railway crossing	Disagree	Delete from general residential.subdivision application requirements	VPA should undertake further analysis prior to finalisation of the Amendment to determine what upgrade works, if any, are required to the existing Burnside Road rail crossing and at what point in time these are required (ie. Lot cap?), rather than this being required by individual landowners. It should be made clear that regardless of the outcome or recommendations of the assessment, that no further costs are to be funded via the DCP on top of the $2M already specified.	Josco, Netherby & RPG
	Residential Subdivision – Arboricultural Report & Tree Retention Plan	Agree, with changes	Add to both dot points, "where the proposed subdivision incorporates trees that have been identified as 'critical/high retention value tree' on Plan 6 – Public Realm."	These requirements should not be required elsewhere in the precinct, as it is considered irrelevant and overly burdensome for landowners.	Josco, Netherby & RPG
	Residential Subdivision – Proposed bus routes and bus stop locations	Disagree	Delete from general residential.subdivision application requirements	Unreasonable for this consultation with Transport for Victoria to occur prior to lodgement of a permit application. This could be incorporated into permit conditions if required.	Josco, Netherby & RPG
	Residential Subdivision - Hydrogeological Report	Disagree (query)		We query whether this is required to be provided with an application or whether it can be conditioned as part of a permit, if necessary.	& RPG
	Bushfire Management Plan	Agree with changes and move to a condition	Amend to add the words: "where the 'future investigation area east' has been rezoned, this requirement does not apply to the satisfaction of the Responsible Authority"	We query whether this is practical for the drainage basins. It is already referred to in section 4, this should be a condition of the permit.	RPG
	Public Infrastructure Plan	Agree with changes	Move to Section 4	This should be moved to permit condition rather than requiring this to be provided with an application. This will likely require Council input and discussion in its preparation.	Josco, Netherby & RPG
	Sodic and dispersive soils management plan	Disagree	Amend, after the words an application to subdivide, add "within the sensitive area adjacent to Bruces Creek"	This is only relevant to high risk areas adjacent the Bruce Creek corridor. The below comments are from the WSP Report, this shouldn't be a requirement across the whole site. The report only recommends the management plan in the high risk and the sandstone area, see attached. "It is further recommended that intrusive (physical) soil investigations be required where constructions are deemed medium to high risk (e.g. along the escarpment, steep slopes, or where infrastructure is likely to be placed within the Sandringham Sandstone) to confirm soil conditions and erosion risk and allow for site specific recommendations to be made While there is variability in the level of sodicity in the surface soils, at a precinct scale, the erosion risk is considered to be predominantly driven by the slope, being consistently low to medium risk across the flatter area of the precinct, but	Josco, Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
				high risk along the escarpment to Bruce Creek." 	
	Chicken Hatchery & Breeder Farm – requires the provision of a level 3 odour impact assessment.	Disagree.	Delete.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
	Victorian Grassland Earless Dragon - requires an 'impact assessment' for the VGED	Disagree	Amend reference to an 'impact assessment' to 'habitat assessment'.	We seek clarification as to the impact assessment requirement, given this deviates from the wording utilised by the VPA in the specified process of dealing with VGED outside MSA areas (as outlined in their statement, dated Nov 2024). Alternatively, a VGED Habitat Assessment could narrow down on the areas that may require further assessment (targeted surveys). This approach was taken by Council in the recently exhibited Marshall PSP.	Josco & RPG
UGZ1 – 4.0	Conditions and requirements for permits				
	Conditions and requirements for permits	Agree with changes	Clarify that the conditions and requirements under Section 4 are only for permits creating 3 or more lots.	The conditions and requirements in section 4 should only apply to subdivision applications for 3 or more lots. These will largely be irrelevant for 2 lot subdivisions, like in the example of creating a lot for Barwon Water's pump station etc.	Josco, Netherby & RPG
	Conditions - Road network	Agree with changes	Amend to add the words: "Where appropriate, to the satisfaction of the responsible authority"	This condition won't necessarily be required in every permit.	Josco, Netherby & RPG
	Requirement – Victorian Grassland Earless Dragon impact assessment – requires compliance with impact assessment.	Disagree.	Amend reference of an 'impact assessment' to 'habitat assessment'.	Amend wording of this requirement accordingly based on changes to above application requirement.	Josco & RPG
	Requirement – Odour Environmental Assessment	Disagree.	Delete subject to PRSA being completed	This is not required if the EPA approve a PRSA report.	Netherby & RPG
	Requirement – Burnside Road Railway Crossing – requires recommendations of a risk	Disagree (Query)	Delete	Based on above changes to the application requirement for the risk assessment, we query whether this requirement could be deleted	Josco, Netherby & RPG

		Agree/Disagree	Recommended Change(s)	Rationale	Relevant To
	assessment report to be implemented				
	Requirement – Sodic and dispersive soil site management	Agree with changes.	As above, "where appropriate."	As above, wording should be amended to reflect only the high risk areas adjacent the Bruce Creek corridor.	Josco, Netherby & RPG
UGZ1 – 6.0	Decision Guidelines				
	Hatchery Buffer – consideration of odour emissions.	Disagree.	Delete.	In light of the conclusions of the PJRA Odour Impact Assessment, there is no constraint on the ability to develop land within the precinct for sensitive land uses.	Netherby & RPG
DCPO1 – 3.0	Land or development excluded from development contribution plan				
	Add dot point	NA	Social and Affordable Housing	Land provided for or on behalf of Housing provider for social housing shouldn't attract DCP contributions. Ministerial Direction exempts "housing provided by or on behalf of the Chief Executive Officer of Homes Victoria"	Josco, Netherby & RPG
Technical Reports					
Valuation Report, Charter Keck Cramer	Land Valuation				
	Table 10.6 – Valuation (Scenario 2) – Site Specific Assessment.	Disagree (Query)		It is unclear why a different per hectare land valuation has been specified for proposed local sports reserves across the precinct. Further clarification is sought.	Josco, Netherby & RPG

Appendix B Odour Impact Assessment



Report

NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD

ODOUR IMPACT AND RISK ASSESSMENT IN RELATION TO THE HATCHERY AT 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA

Bannockburn, Victoria

21 May 2025

Environment, Health & Safety, and Sustainability Consultants

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Distribution Record

Recipient	Report Status	Revision Number	Date Issued
Netherby Nominees Pty Ltd and Ramsey Property Group Pty Ltd	Rev.00 (Final)	21 May 2025	1 (electronic)
Peter J Ramsay & Associates Internal Copy	Rev.00 (Final)	21 May 2025	1 (electronic)

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USE OF REPORT

The preparation of the report has been undertaken for the purpose of providing the results of an odour assessment in relation to the hatchery and associated breeder farms at 449 Burnside Road, Bannockburn, Victoria, 3331, and the report cannot be used for any other purpose. The report has been prepared solely for the benefit of Netherby Nominees Pty Ltd and Ramsey Property Group Pty Ltd. The report is provided on the condition that it is not made available to any other party except with the prior written consent of Peter J Ramsay & Associates Pty Ltd (which consent may or may not be given at its discretion). Peter J Ramsay & Associates Pty Ltd consents to Netherby Nominees Pty Ltd and Ramsey Property Group Pty Ltd making the report available to other parties for the purpose of showing the scope of, and the recommendations provided in, the report, however those third parties cannot rely on the contents of the report.

DISCLAIMER

This report is provided on the condition that Peter J Ramsay & Associates Pty Ltd disclaims all liability to any person other than Netherby Nominees Pty Ltd and Ramsey Property Group Pty Ltd in respect of the actions, errors, or omissions of any such person in reliance, whether in whole or in part, upon the contents of this report.

EXECUTIVE SUMMARY

An odour assessment was undertaken by Peter J Ramsay & Associates Pty Ltd, on behalf of Netherby Nominees Pty Ltd and Ramsey Property Group Pty Ltd, of the Turosi Foods hatchery and breeder farms, which are located at 449 Burnside Road, Bannockburn, Victoria.

Level 1, Level 2, and Level 3 odour assessments were undertaken in accordance with Environment Protection Authority Victoria (EPA) Publication 1883 *Guidance for Assessing Odour.* The Level 3 assessment included the use of odour dispersion modelling in accordance with relevant EPA guidelines.

Based on the results of the Level 3 odour assessment, the potential odour impact from the Turosi Foods site on the land at 430 and 431 Burnside Road, Bannockburn, within the Bannockburn South East Precinct Structure Plan, is considered low and acceptable. Therefore, odorous emissions from Turosi Foods' operations do not preclude the development of sensitive land uses, including residential housing, at these locations within the previously proposed PSP buffer.

LIST OF ABBREVIATIONS

AERMOD: American Meteorological Society and U.S. Environmental Protection Agency Regulatory Model

AHD: Australian Height Datum

AV: Agriculture Victoria

BOM: Bureau of Meteorology

CRC: Cooperative Research Centre

EPA: Environment Protection Authority

ERS: Environment Reference Standard

GED: General Environmental Duty

NATA: National Association of Testing Authorities

OER: Odour Emission Rate

OPS: Odour Pathway Score

ORS: Odour Receiving Environment Score

OSS: Odour Source Score

OU: Odour Unit

PJRA: Peter J Ramsay & Associates

PSP: Precinct Structure Plan

RIRDC: Rural Industries Research and Development Corporation

TAS: Todoroski Air Sciences

TF: Temperature Factor

TOU: The Odour Unit

VDI: Verein Deutscher Ingenieure (Association of German Engineers)

VPA: Victorian Planning Authority

WRF: Weather Research and Forecasting

ZELEV: Zero Elevation

1. INTRODUCTION

On 3 March 2025, Peter J Ramsay & Associates (PJRA) was engaged by Netherby Nominees Pty Ltd (Netherby Nominees) and Ramsey Property Group Pty Ltd (Ramsey Property Group), to undertake an odour assessment in relation to the hatchery at 449 Burnside Road, Bannockburn, Victoria (the 'Site'). Netherby Nominees and Ramsey Property Group are the owners of land, or represent the owners of land, at 430 and 431 Burnside Road, Bannockburn (collectively the 'Subject Land'), respectively.

2. BACKGROUND

The Victorian Planning Authority (VPA) is preparing the Bannockburn South East Precinct Structure Plan (PSP) and Development Contributions Plan (DCP) in collaboration with the Golden Plains Shire Council (Council). The Bannockburn South East Precinct (the 'Precinct') is located to the southeast of the existing Bannockburn township, approximately 16 km north-west of Geelong. It has been identified as a priority growth area in the Bannockburn Growth Plan and is expected to accommodate approximately 16,000 residents across 5,200 dwellings. The area of the precinct is approximately 523 hectares.

A hatchery operated by Turosi Foods is located to the south of the precinct at 449 Burnside Road, Bannockburn, Victoria (the 'Site'). Breeder farms comprising seven separate facilities, also operated by Turosi Foods, are present to the south of the Site.

In a letter dated 4 May 2022[1], Environment Protection Authority Victoria (EPA) stated that the hatchery processes 500,000 eggs per week and that each breeder farm site holds approximately 40,000 birds. EPA state that these numbers were based on advice from Victorian Planning Authority (VPA). Agriculture Victoria (AV) state in its letter of 24 September 2024[2], on the basis of discussions with Turosi Foods in 2022, there are approximately 32,000 birds in 4 sheds in Breeder Farm No. 1, with similar numbers in the southern sheds.

As part of the PSP, VPA and Council have prescribed a preliminary 500 m separation distance to the hatchery on the basis of advice from AV. It is stated in the PSP that buffer areas must be kept free of sensitive land uses (including residential dwellings) until the relevant industries either cease or alter operations, or it can be demonstrated that their impacts can be appropriately mitigated. However, VPA and EPA have put forward that an odour risk assessment of the hatchery may be undertaken to determine the extent of any areas that would not be suitable for sensitive use and provide recommendations on a

[1] Environment Protection Authority Victoria 2022, Letter to Victorian Planning Authority regarding *Bannockburn South East Precinct Structure Plan – Calculation of Separation Distances for Poultry Farm Industry*, 4 May 2022
[2] Agriculture Victoria 2024, Letter to Victorian Planning Authority regarding *Request for Advice on Separation Distances to a Hatchery and Breeder Farm (Poultry)*, 24 September 2024

subsequent land use framework. Netherby Nominees and Ramsey Property Group are holders of land located within the Precinct that would be impacted by the 500 m hatchery buffer.

3. LEGISLATION AND GUIDELINES

3.1 Environment Protection Act 2017

The Environment Protection Act 2017 (EP Act) is the principal legislation for the management of the environment in Victoria. The EP Act provides a framework to achieve improvements in the environment.

The cornerstone of the EP Act is the general environmental duty (GED) which places obligations on Victorians to understand and minimise risks of harm to human health and the environment from pollution and waste. The GED is carried out through either the elimination of risks of harm as far as reasonably practicable, or the reduction of those risks as far as reasonably practicable.

Odour is defined in the EP Act as a pollution:

> *"pollution includes any emission, discharge, deposit, disturbance or escape of—*
>
> *(a) a solid, liquid or gas, or a combination of a solid, liquid or gas, including but not limited to smoke, dust, fumes or odour; …"*

Further, the EP Act provides the following definition of harm:

> *(1) In this Act, harm, in relation to human health or the environment, means an adverse effect on human health or the environment (of whatever degree or duration) and includes—*
>
> *(a) an adverse effect on the amenity of a place or premises that unreasonably interferes with or is likely to unreasonably interfere with enjoyment of the place or premises; or*
>
> *(b) a change to the condition of the environment so as to make it offensive to the senses of human beings; or*
>
> *(c) anything prescribed to be harm for the purposes of this Act or the regulations.*
>
> *(2) For the purposes of subsection (1), harm may arise as a result of the cumulative effect of harm arising from an activity combined with harm arising from other activities or factors.*

As defined in the EP Act, offensive odours constitute harm to human health and the environment. The EP Act requires that the risk of harm from offensive odour be eliminated or reduced as far as reasonably practicable.

3.2 Environment Reference Standard

The Environment Reference Standard (ERS) is made under the EP Act and provides a basis for assessing environmental conditions, including ambient air. The ERS requires that the environmental values of the ambient air environment including local amenity and aesthetic enjoyment; and life, health and well-being of humans are protected. Specifically, the ERS defines the following objective in relation to odour:

> *"An air environment that is free from offensive odours from commercial, industrial, trade and domestic activities".*

3.3 EPA Publication 1949 – Separation Distance Guideline

EPA Publication 1949 *Separation distance guideline* (August 2024) provides guidance to protect the community from human health and amenity risks associated with unintended offsite odour and dust generated by industry. It is stated in EPA Publication 1949 that unintended emissions may occur due to the nature of the operation, minor changes in weather conditions, minor accidents, or minor equipment failure. However, the unintended emissions described in the guideline do not extend to those resulting from major abnormal weather conditions, major accidents, or major equipment failure from activities.

The separation distances which are recommended in EPA Publication 1949 for poultry farms are provided in **Table 1**.

Table 1 Recommended separation distances for odour (EPA, 2024)

Industry	Activity	Scale and description	Recommended separation distance (m)	Further guidelines, references and exceptions
Poultry farm	Land used to keep or breed poultry	Chicken meat (including free range)	See further guidelines	Planning and environment guideline for establishing meat chicken farms (Guide 1 - Assessment guide) (2021)
		Chicken eggs (including free range)	See further guidelines	Egg Industry Environmental Guidelines - Edition II (2018)
		Low-density mobile outdoor - chicken meat or eggs.	See further guidelines	Victorian low-density mobile outdoor poultry farm planning permit guidelines (Department of Economic Development, Jobs, Transport and Resources, June

Industry	Activity	Scale and description	Recommended separation distance (m)	Further guidelines, references and exceptions
				2018), or as amended
		Other poultry (including quails, ducks, turkeys, geese) meat and eggs (including outdoor and free range)	See further guidelines	As per current Agriculture Victoria advice and guidance
		Hatcheries	See further guidelines	As per current Agriculture Victoria advice and guidance

It is recommended in EPA Publication 1949 to use *Planning and environment guideline for establishing meat chicken farms* (Agrifutures, 2021) to establish separation distances for activities relating to chicken meat. For hatcheries, it is recommended to follow AV advice and guidance.

Section 3.1 of EPA Publication 1949 outlines the agent of change principle which is that the responsibility for managing potential land use conflicts lies with the party proposing a new or altered use, whether that be a sensitive use (e.g. residential) or an industrial activity. This party must demonstrate that any variation from recommended separation distances is justified and that potential impacts, including odour, are appropriately mitigated. The principle applies to both individual planning applications and broader strategic planning processes, and aligns with obligations under the GED to minimise risks to human health and the environment.

3.4 Agrifutures – *Planning and environment guideline for establishing meat chicken farms: Guide 1 – Assessment guide*

The Agrifutures *Planning and environment guideline for establishing meat chicken farms: Guide 1 – Assessment guide* (Agrifutures, November 2021) (the Guideline) is intended to be used for new and expanding meat chicken farms, and therefore does not apply to existing broiler farms. However, Section 3.2.1.3 of the Guideline outlines that:

> *As part of the planning and development assessment process, many state planning frameworks require planning schemes, re-zonings and development assessments to consider the impacts on rural uses. To achieve this, the separation distance that applies between meat chicken farms and other land uses should also be applied to any incompatible land use that is proposed near existing meat chicken farms. This will protect the existing meat chicken farm's right to continue operating and, by not placing sensitive*

receptors near to an existing or approved land use, will minimise impacts at sensitive receptors.

Importantly, it is also stated in the Guideline that the *'guidance can be adapted for breeder and breeder-rearer farms, however the relevant methodology is not included in this document'*.

3.5 Australian Eggs – Egg Industry Environmental Guidelines

The Egg Industry Environmental Guidelines (Australian Eggs, 2018) provides guidance on the establishment of new farms or the expansion of existing operations for the egg industry. It is stated in the document that the guidance includes breeder farms, pullet rearing facilities, egg production facilities (cage, free range and barn) and on-farm grading floors and feed mills. However, the guideline is not designed to cover hatcheries and off-farm facilities that manufacture egg products.

It is stated in the guideline that:

Where distances are not specified by state and local government departments and agencies, the following minimum fixed separation distances are suggested:

1. *500m between the impact source and any land use zone that is not compatible with the development (e.g. residential, rural residential).*
2. *250m separation distance between the impact source and any sensitive land use (e.g. neighbouring houses) that is located on land that is compatible with the development (e.g. on land designated rural, farming or similar).*

Appendix A also details a method for calculating minimum separation distances that takes into account local meteorological conditions. The administering authority should be consulted before the use of this modified method. Where separation distances cannot be met with this modified approach, site specific odour impact assessment may be required. This would involve the use of an appropriate odour model, that uses appropriate odour emission rates and hourly meteorological data, that is representative of the site. A specialist in odour impact assessment should be consulted for expert advice.

Appendix A of the guideline provides the following formula which takes into account the farm capacity (i.e., number of birds), and locality of the farm (proximity to sensitive land uses, land surface roughness, terrain, and local climate).

$$Separation\ Distance\ (m) = \left(\frac{Number\ of\ Birds}{1{,}000}\right)^{0.63} \times S1 \times S2 \times S3 \times S4$$

Where:

S1 = Sensitive land-use factor for estimating the relative odour impact on different receptor types.

S2 = Surface roughness factor for estimating the potential changes to odour dispersion due to changes in the roughness of the land surface.

S3 = Terrain weighting factor for estimating the potential changes to odour dispersion in situations where terrain may influence weather conditions.

S4 = Optional wind frequency factor for estimating the relative odour impact due to wind direction frequency, for wind speeds less than 3 m/s.

Table 2 summarises the S-factors applicable to the formula.

Table 2 Summary of S-factors

Feature	Parameter	
S1 – Sensitive land use factor		
Receptor type	***Value***	
Sensitive land use (within a rural zone)	20	
Non-rural zone (the closest boundary of the non-rural zone)	30	
S2 – Surface roughness factor		
Features	***Value***	
Limited ground cover/short grass	1	
Undulating hills	0.93	
Level wooded country	0.85	
Heavy timber	0.77	
Significant hills and valleys	0.68	
S3 – Terrain weighting factor	**Weighting factor**	
Terrain	***Downslope of farm***	***Upslope of farm***
Flat (<2.0 from source to sensitive land use)	1	1
Valley drainage zone – broad valley >10 km and/or a valley or gully with low sidewalls, where the average slope from centre of valley/gully to confining ridgeline is <2%	1.2	1
Valley drainage zone – average slope from centre of valley/gully to confining ridgeline is 2-5%	1.5	1
Valley drainage zone – average slope from centre of valley/gully to confining ridgeline is >5%	2	1
Low relief at >2% from odour sources (not in a valley drainage zone, but the source lies above the sensitive land use at an average grade of more than 2%)	1.2	-
All other situations	1	1

The optional S4 factor is used to assess wind direction frequencies under low wind speed conditions (≤3 m/s), which are most relevant for predicting odour impacts. It involves analysing site-specific meteorological data to calculate relative wind frequencies for the 16 compass directions, adjusting for source-to-receptor direction, and applying a safety factor, with any values exceeding 1.0 capped accordingly.

The resulting wind frequency factors are provided in **Table 3**.

Table 3 Wind Frequency Factors (Wind Direction Frequency Obtained from Bureau of Meteorology She Oaks Airport Station (Station ID: 081123)

Wind Direction	Wind Direction Frequency (hrs) (less than 3m/s)	Wind Frequency Factor	Adjusted Wind Frequency Factor (safety factor applied)
N	479	0.24	0.32
NNE	489	0.25	0.32
NE	560	0.29	0.37
ENE	798	0.41	0.53
E	1005	0.51	0.67
ESE	1224	0.62	0.81
SE	1159	0.59	0.77
SSE	816	0.42	0.54
S	615	0.31	0.41
SSW	637	0.33	0.42
SW	785	0.40	0.52
WSW	1472	0.75	0.98
W	1960	1.00	1.00
WNW	766	0.39	0.51
NW	488	0.25	0.32
NNW	432	0.22	0.29

The guideline does not specify a methodology to determine the wind frequency factor for multiple wind sectors. In view of this, a separation distance is calculated for wind direction from each cluster of sheds. The resulting separation distances are provided in **Table 4** and are based on the formula below. The overall separation distance for the sheds is graphically in **Figure 1**.

$$Separation\ Distance\ (m) = \left(\frac{224{,}000}{1{,}000}\right)^{0.63} \times 30 \times 1 \times 1 \times S4$$

Table 4 Separation distances based on Egg Industry Environmental Guideline

Wind Direction	Separation Distance Direction	S1	S2	S3	S4	Separation Distance (m)
N	S	30	1	1	0.32	290
NNE	SSW	30	1	1	0.32	290
NE	SW	30	1	1	0.37	336
ENE	WSW	30	1	1	0.53	481
E	W	30	1	1	0.67	608
ESE	WNW	30	1	1	0.81	735
SE	NW	30	1	1	0.77	699
SSE	NNW	30	1	1	0.54	490
S	N	30	1	1	0.41	372
SSW	NNE	30	1	1	0.42	381
SW	NE	30	1	1	0.52	472
WSW	ENE	30	1	1	0.98	889
W	E	30	1	1	1	907
WNW	ESE	30	1	1	0.51	463
NW	SE	30	1	1	0.32	290
NNW	SSE	30	1	1	0.29	263

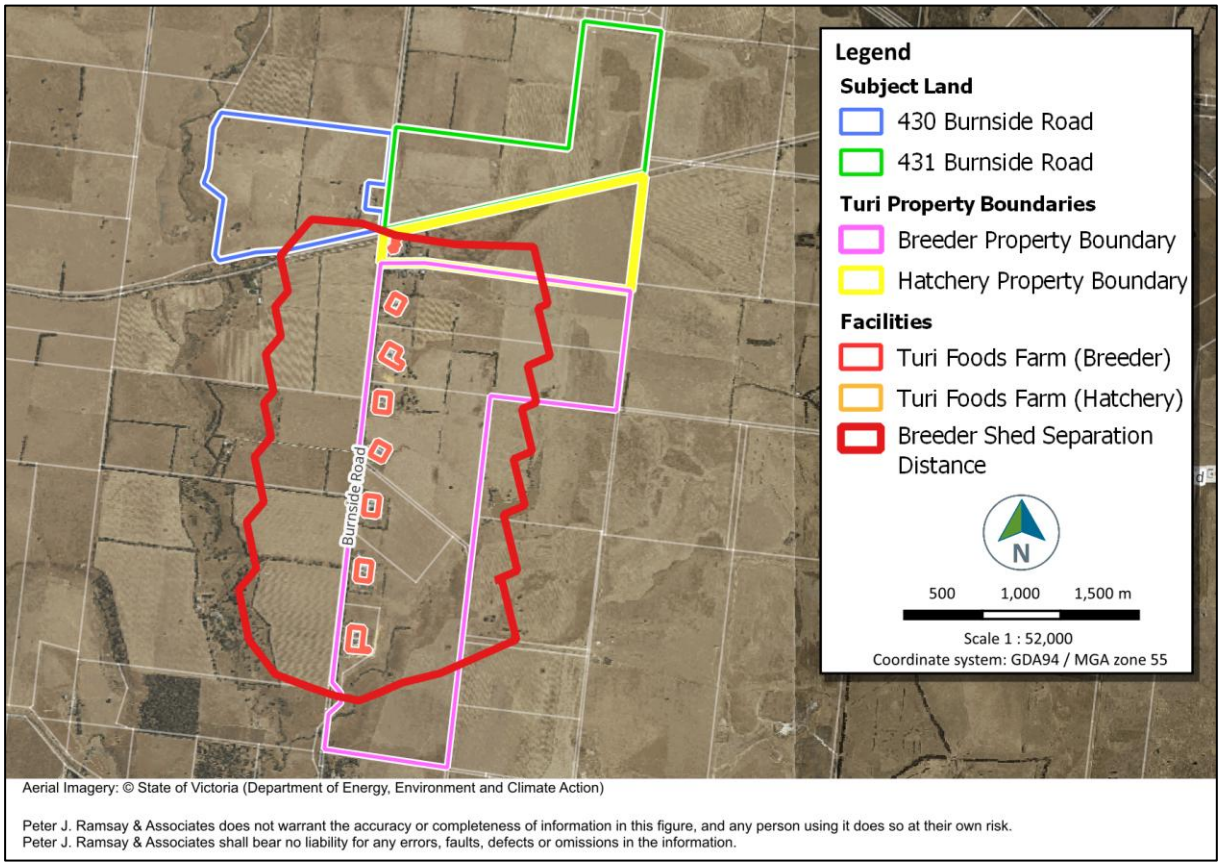


Figure 1 Separation distances applicable to breeder farms

3.6 EPA Publication 1881 – Guidance for Field Odour Surveillance

EPA Publication 1881 *Guidance for Field Odour Surveillance* (May 2021) provides recommended approaches for evaluating the extent, source, and frequency of odour emissions. This guide is intended for use by regulators, applicants for permissions to EPA or council, planning professionals, and consultants. It outlines methods for conducting odour surveillance to ensure effective environmental management and compliance.

3.7 EPA Publication 1883 – Guidance for Assessing Odour

EPA Publication 1883 *Guidance for Assessing Odour* (June 2022) provides guidance for assessing the risk to amenity from impact due to odorous emissions. This Publication has been referred to, to inform the methods for assessing the risks and impacts associated with the odour from the Plant, details are provided in **Section 5**.

The publication outlines that an odour risk assessment must be conducted when *'a separation distance is to be varied or assessed*' and during '*Planning assessments including; buffer area overlays, local council planning permit applications, precinct structure planning and rezoning applications.*' The primary method

recommended by the guideline is to assess the risk of odour through a staged approach comprising three levels of assessment. Of which, a Level 1 Assessment can be relied upon when conditions provided in the guideline are met, generally for industries with the least potential for odour impacts, whilst Level 2 or 3 Assessment should be undertaken for odour sources with higher potential for impacts. This report provides the findings of a Level 1, Level 2, and Level 3 Assessment in accordance with the guideline.

4. SITE CONTEXT

4.1 Site Locality

The Site is situated approximately 75 km southwest of the Melbourne Central Business District (CBD) in Bannockburn, which is approximately 18 km northwest of the City of Greater Geelong.

4.2 Description of Site

The Site is located at 449 Burnside Road, Bannockburn, on land zoned as Farming Zone (FZ), under the Golden Plains Planning Scheme. It is approximately 2,500 m south of Bannockburn's main business district and covers approximately 384 hectares.

The Site is made up of seven parcels, with the northernmost building housing the hatchery and the breeder farm buildings extend south. The hatchery is an enclosed facility with minimal external impact. Chicks hatched here are transferred offsite to broiler farms. The hatchery is situated about 50 m from the PSP boundary, while the closest breeder farm is approximately 420 m away from the PSP. The seven breeder farms collectively house 224,000 birds, supplying the hatchery with eggs that produce day-old chicks for broiler farms. A plan showing the layout of the Site is provided in **Figure 2**.

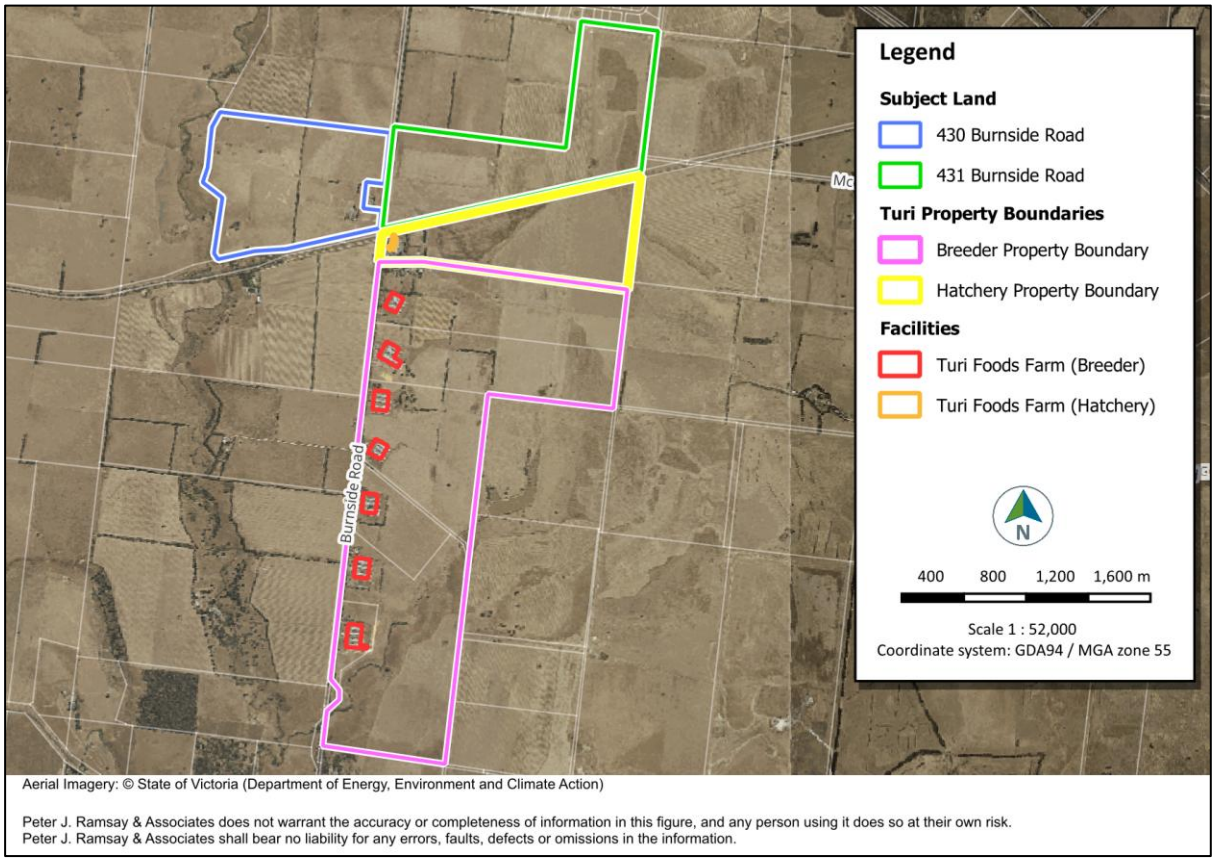


Figure 2 Site plan

4.3 Existing Surrounding Land Uses

The Site is zoned as Farming Zone (FZ) and is encompassed almost entirely by FZ. To the north, the Site is proximate to areas of Low Density Residential Zone – Schedule 1 (LDRZ1) and General Residential Zone – Schedule 1 (GRZ1). Located to the northwest of the Site are parcels zoned as Public Use Zone – Schedule 1 (PUZ1) and Public Conservation and Resource Zone (PCRZ). The surrounding land uses are shown in Figure 2.

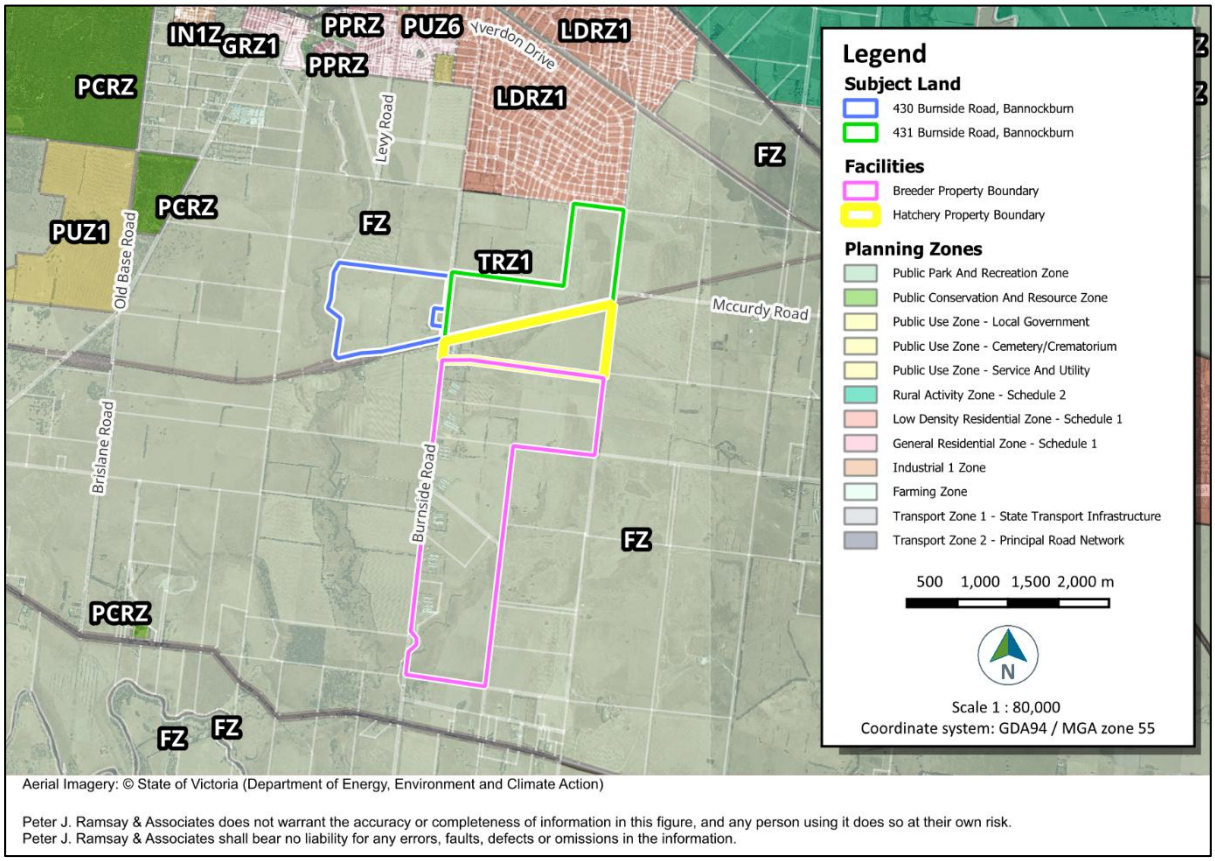


Figure 2 Planning Zone Map

4.4 Topography

The topography of the area surrounding the Site is predominantly flat at an elevation of approximately 70 meters AHD. The elevation gradually increases towards the north, reaching up to 100 m AHD at the main town of Bannockburn. Towards the west, the elevation decreases sharply to 50 m AHD, leading to a creek. Moving southward from the Site the elevation decreases sharply to 50 m AHD, leading to another creek.

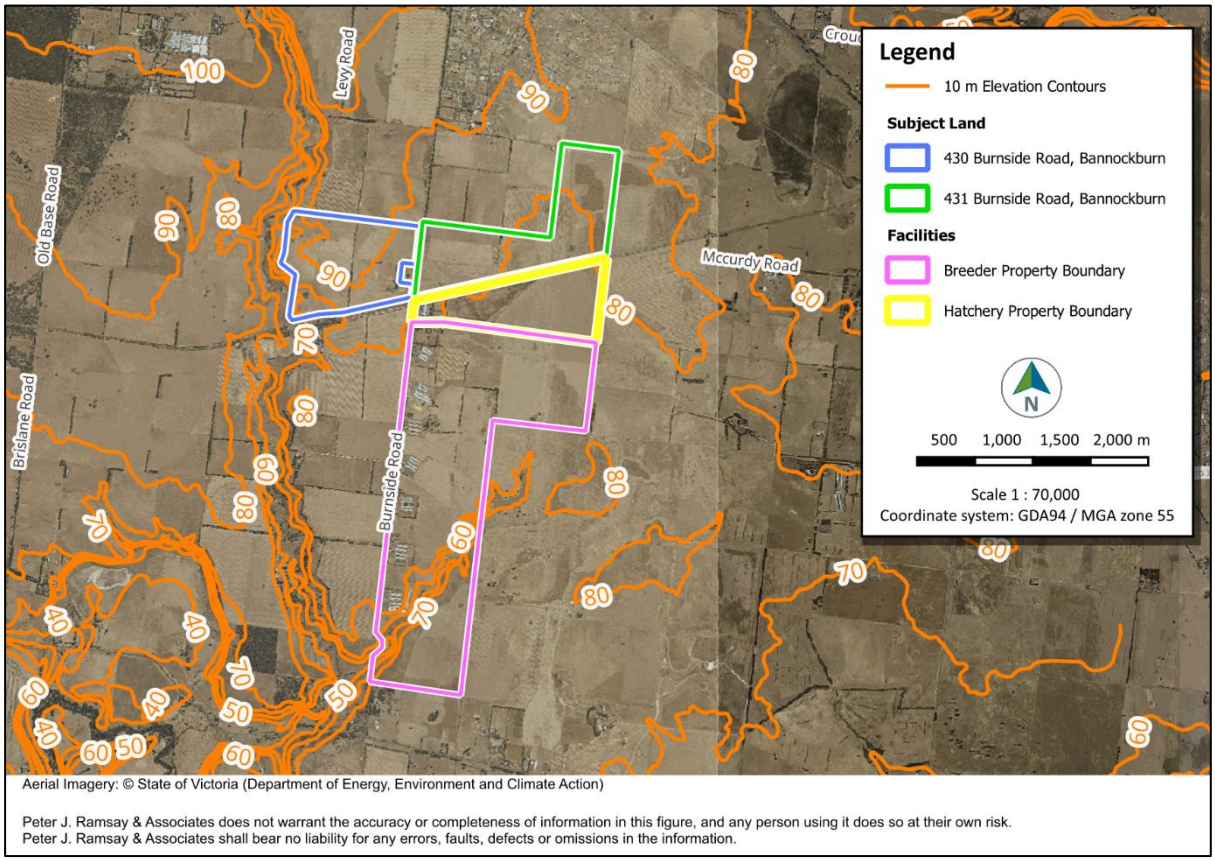


Figure 3 Topography map of the Site

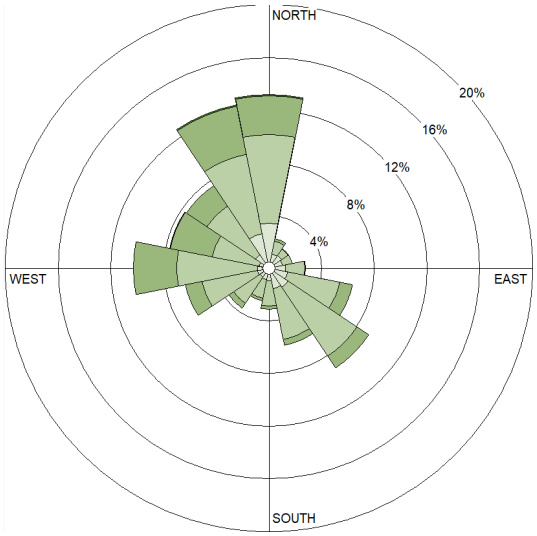
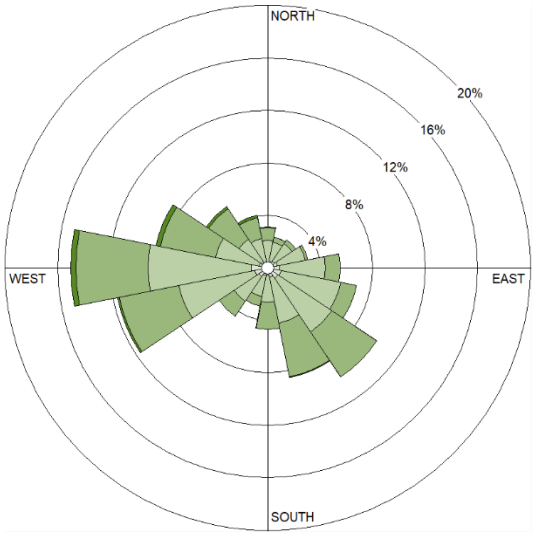
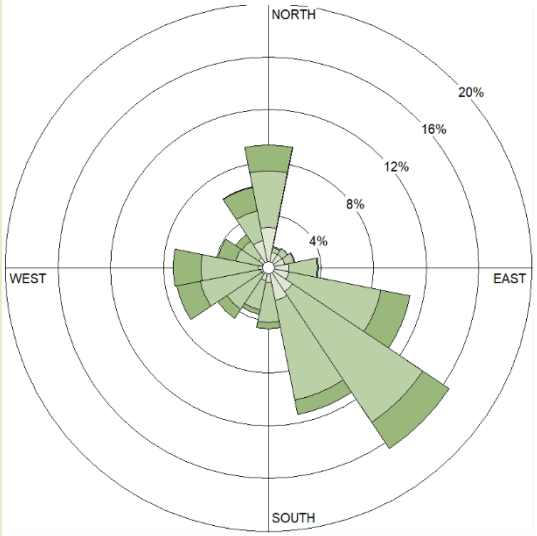
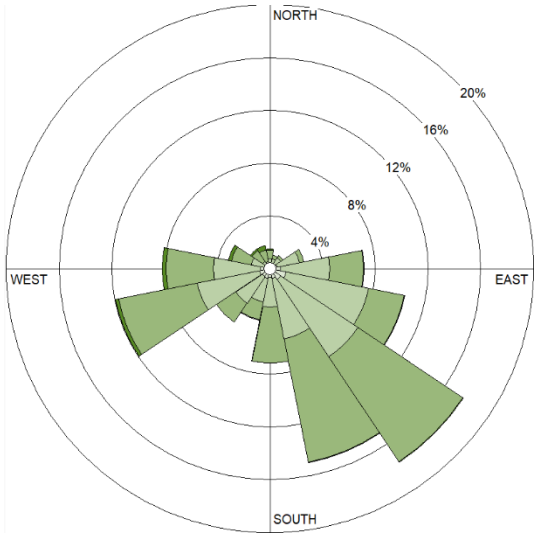
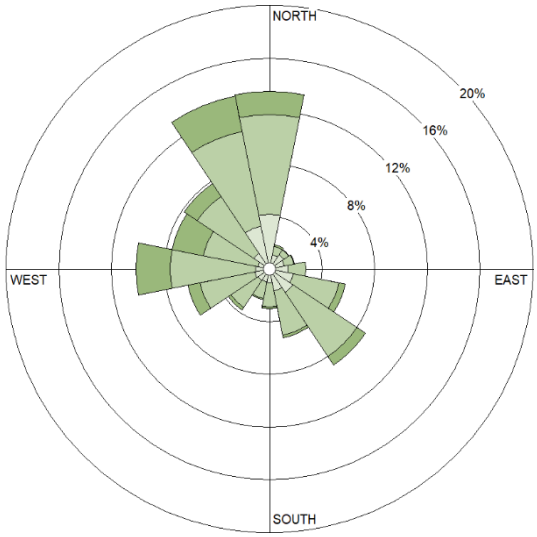
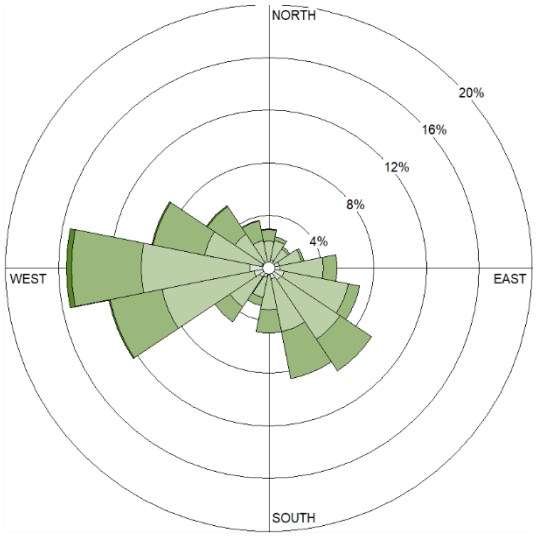
4.5 Meteorology

Meteorological data were obtained from the She Oaks Bureau of Meteorology (BOM) station, number: 087168 (the 'Station') which is located approximately 16 km north of the Site. Bannockburn has similar topographical characteristics to the Station and is a suitable representative of meteorological conditions at the Station. However, Site-specific meteorological data were also obtained from Lakes Environmental using a prognostic model. These prognostic data are discussed further in **Section 5.3.3.3**.

The effect of wind on dispersion patterns can be evaluated using general wind distributions and atmospheric stability data. The general wind conditions at a site can be displayed by means of wind rose plots. These provide the incidence of winds from different directions for various wind speed ranges. Key aspects are the prevailing wind direction and the relative incidence of more stable light wind conditions under 2 m/s. Winds over 5 m/s provide good dispersive conditions.

The wind roses produced from meteorological data, shown in **Table 5,** indicate that the predominant winds on a 5 yearly average are typically from the north, southeast, and west. During summer winds are predominantly southeasterly, while winter brings more westerly and northerly winds.

Table 5 Wind roses for She Oaks BOM station and the Site (2020 – 2024)

	She Oaks BOM Station	Site
Annual		
Summer		
Autumn		

5. ODOUR RISK ASSESSMENT

5.1 Level 1 Assessment

The Level 1 Assessment outlined in EPA Publication 1883 comprises three tests which are preliminary screening tools to determine if a more detailed assessment is necessary. If at any stage the tests are passed, then the risk of odour is considered to be low, and no further assessment is necessary. If all of the tests are failed, then the risk assessment must proceed to a Level 2 Assessment.

5.1.1 First Test

The first test is an estimation of the typical duration of emissions per year. This test does not consider wind direction frequencies nor emissions quantity. The duration of emissions assumes the worst-case scenario, in that sources will emit odour constantly at high enough concentrations during operation to cause impacts.

The Site has the potential to emit odour continuously (24/7). Therefore, odorous emissions may occur for more than 200 hours per year (>2% of the time), and the odour could occur for more than 8 hours at a time.

As the first test is failed, the assessment must proceed to the second test.

5.1.2 Second Test

The second test is an estimation of the maximum time that odorous emissions may impact nearby sensitive receptors based on the total duration of emissions, and the duration of which sensitive receptors are downwind of the Plant in view of prevailing wind patterns in the area.

Sensitive receptors are proposed to the north of the Site, and some dwellings already exist. Therefore, winds blowing from southerly directions may direct odorous emissions towards sensitive receptors. As shown in **Table 5**, southerly winds occur 4.6% of the time. Therefore, odorous emissions are directed toward sensitive receptors for more than 200 hours per year (>2% of the time). This test is failed, and the assessment must proceed to the third test.

5.1.3 Third Test

The third test of the Level 1 Assessment is to determine if the emission source may be classified as a minor emission source. The requirements to meet this classification are outlined below.

- *"• The source is stationary with a stack height of at least 10 m.*
- *The source height is at least 1.7 times the relevant building height(s), meaning there aren't any obstructions within a 15 m radius that could influence stack dispersion (including building wake effects).*
- *The emission source is situated on level terrain (free of terrain effects).*
- *The distance between the emission source and the receiving environment occupied by people is ≥100 m.*
- *At the source location, average wind speeds of <1 m/s occur less than 20% of the year.*
- *For stack heights > 50 m, the minor mass flow for the stack height of 50 m applies."*

As not all the requirements are met, the source cannot be classified as a minor emission source, therefore the risk assessment must proceed to a Level 2 Assessment.

5.2 Level 2 Assessment

A Level 2 assessment involves using a source/pathway/receiving environment approach by assigning a risk score to each of the following three attributes using the methodology provided in EPA Publication 1883. The risk scores are then translated to an overall risk score that provides a qualitative assessment of risk of odour and inform next steps. The following attributes are scored for this odour assessment:

- Hazard potential of the source (odour source score – OSS, **Section 5.2.1**)
- Exposure pathway between the source and sensitive locations (odour pathway score– OPS, **Section 5.2.2**)
- Sensitivity of the receiving environment (odour receiving environment score – ORS, **Section 5.2.3**)

The result of the assessment is a score between the values of 1 to 12. Based on the scores the following risk categories apply:

1 to 7 – Low Risk	The risk of odour is low; no further assessment is necessary.
8 or 9 – Medium Risk	These are borderline cases. One or more elements could trip the category to the high or low score and these cases should be further investigated.
10 or 11 – High Risk	A level 3 assessment is recommended to fully understand the risk.
12 – Very High Risk	A level 3 assessment is unlikely to demonstrate acceptable level of risk.

5.2.1 Odour Source Score – OSS

The Odour Source Score (OSS) is derived from consideration of the activity type, size of odour hazard, and offensiveness potential. An additional score may be added or subtracted based on the degree of effectiveness of odour controls at the Site.

Activity Type

Appendix A of EPA Publication 1883 categorises industrial odour sources by their odour potential. *Intensive farming (e.g., pigs, sheep, chickens)*, which is the industrial source relevant to the Site, is listed as *Very high odour potential.* **(4)**

Size of Odour Hazard

The site is considered to be *large size*, defined by the guideline as area sources of thousands of m^2. **(3)**

Offensiveness Potential

The offensiveness potential for chicken odour is categorised as *unwelcome* in Appendix B of EPA Publication 1883, in that although the odour is not likely to be perceived as toxic or unsafe, these odours are usually unwelcomed for most people. **(2)**

Degree of Effectiveness of Odour Controls

Information relating to specific odour control measures implemented at the Site is not available for this assessment. However, aerial imagery and observations from the street indicate that the ventilation system and general operation of the Site is typical for the industry. Therefore, a point is neither added nor subtracted. **(0)**

OSS Final Score

The three categories received a score of 4, 3 and 2 respectively. Therefore, the OSS score is **4**.

5.2.2 Odour Pathway Score – OPS

An OPS score evaluates the transmittal pathway of odour from the sources to the receiving environment. The score considers distance between the sources and receptors, meteorology, terrain and buildings, and hours of operation.

Distance

The nearest sensitive receptor is located approximately 275 m northwest of the hatchery building. Therefore, the distance is considered medium in accordance with the definition provided in Table 3 of the guideline: "*Receiving environment is tens to hundreds of metres from source."* **(2)**

Meteorology

The prevailing wind patterns as described in **Table 5**, direct odorous emissions towards the receiving environment from the source approximately 64% of the time based on winds blowing from the east to west-southwest, as shown in **Figure 3**. Therefore, the meteorology is considered *Unfavourable* in accordance with the definition provided in Table 3 of the guideline: *'High frequency (>20%) of winds from source to receiving environment'.*

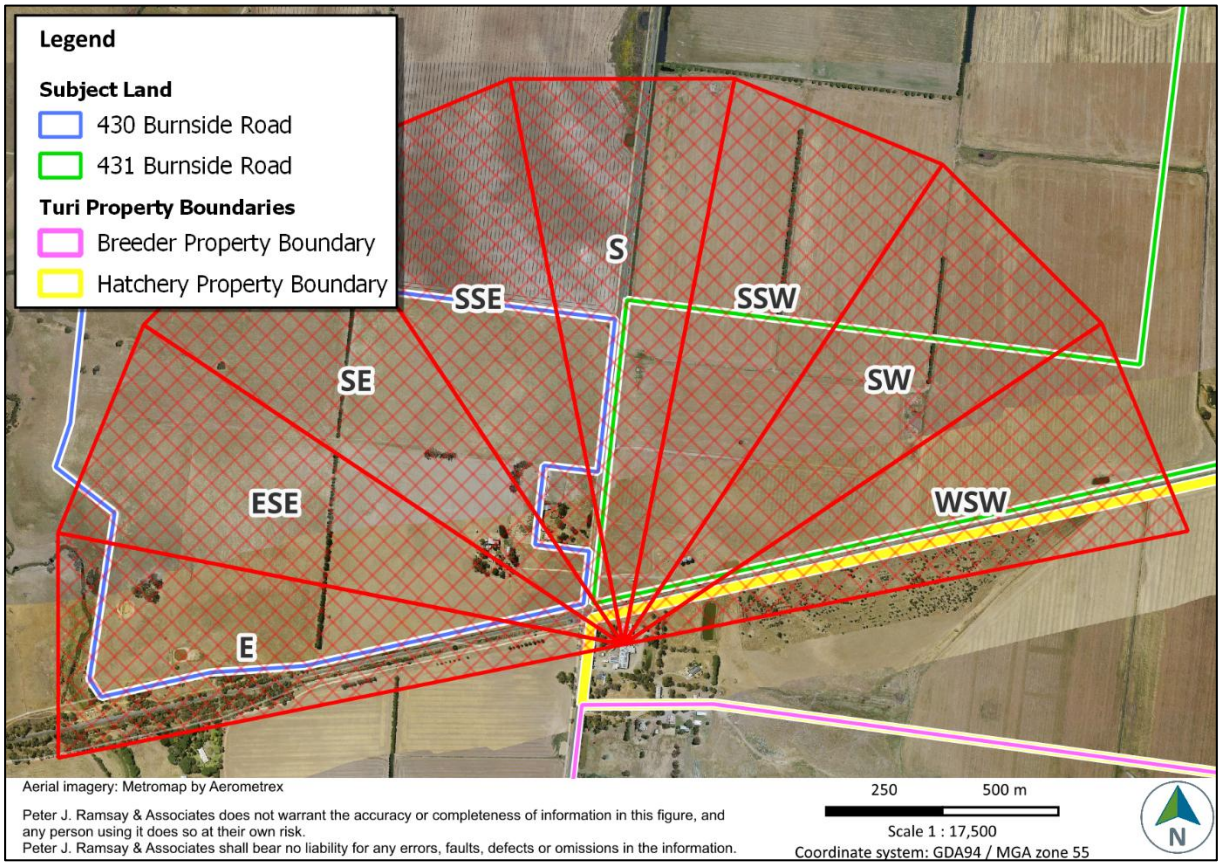


Figure 3 Wind sectors impacting Subject Land

Terrain

Topography in the area is relatively flat with most sensitive receptors being at the same altitude as the possible source of odour. Vegetation is considered to be moderate as some trees are situated between/within the lot boundaries. Therefore, the terrain is considered to be neutral.

Hours of Operation

The hours of operation are considered to be *High frequency* as defined in Table 3 of the guideline: *"Emissions continually occurring 24/7 or for long periods at a time."*

OPS Final Score

The distance, meteorology and hours of operation received scores of 2, 3, 2, and 3 respectively. Therefore, the OPS score calculated from Table 3 of the guideline is **3**.

5.2.3 Odour Receiving Environment Score – ORS

Odour Receiving Environment Score (ORS) is calculated with consideration of the land use in the receiving environment. And a weighting can be factored in consideration of the compliance history, political or legal aspects, and the amenity impacts experienced by the people in the receiving environment.

The subject land is within the recommended separation distance and it is proposed to be marked for future residential development. The sensitivity of the receiving environment is *high*. It is not considered necessary to add a +1 for historical context as there are no known ongoing amenity impacts, no history of odour complaints, no known histories of non-compliance, and the matter is not a contentious issue.

ORS Final Score

From Table 4 of EPA Publication 1883 a sensitivity of *High* results in a score of **3**. The total ORS score is **3**.

5.2.4 Results of Assessment

The overall source/pathway/receiving environment risk score is calculated by adding the OSS, OPS and ORS. According to Sections 4.2.1 to 4.2.3:

- OSS = 4
- OPS = 3
- ORS = 3

The total score from a Level 2 odour assessment is **10** and therefore the risk of odour is assessed to be *high* according to EPA Publication 1883. Therefore, a level 3 assessment is recommended to fully understand the risk.

5.3 Level 3 Assessment

EPA Publication 1883 outlines that a Level 3 Assessment becomes necessary when there are *"issues that are complex or where the other levels of assessment have been exhausted because there is not enough evidence to establish what the odour risk is"*. Should a Level 3 Assessment be necessary, the publication provides a series of assessment tools that should be applied based on availability, accessibility of data, and agent of change principles. These tools are:

- Comparison with similar operations;
- Risk assessment using field odour surveillance data;
- Complaint data analysis;
- Community surveys; and
- Dispersion modelling.

The application of these tools, where available, is detailed below.

5.3.1 Risk Assessment Using Field Odour Surveillance Data

EPA Publication 1883 recommends that data from odour observations are gathered using field odour surveillance in accordance with EPA Publication 1881 *Guidance for Field Odour Surveillance* (May 2021). The Publication recommends at least ten (10) odour surveys be completed. In a meeting of 29 May 2025, PJRA shared the scope of work with the EPA and other stakeholders, as well has some preliminary findings from the assessment. It was shared with EPA that twelve field odour surveys had been undertaken under a range of meteorological conditions in Summer and Autumn. EPA supported this approach[3].

5.3.1.1 Survey Methodology

The methodology for the assessment was the line (transect) method as outlined in Section 4.2 of EPA Publication 1881. Team members who were involved in the field odour surveillance had been screened to n-butanol standard by a NATA certified Laboratory to AS4323.3 and fall within the 20-80 ppb acceptance criteria. This is a requirement of EPA Publication 1881.

The assessor(s) determine if there is an odour present at the beginning of the transect, then proceed along the transect until an odour is observed. The assessor(s) note the character and intensity of the odour. If the odour intensity is subtle, they continue until the odour intensity becomes obvious, then make a note of this in the field sheet. They continue until there is no odour and note this in the field sheet.

If the odour intensity does not become obvious, the assessor(s) continue until the odour is no longer present and note this in the field sheet. They continue the transect, noting any other odours in the same way as the previous steps. If no odour is detected along the transect and the wind has remained in the same direction, there is no need to complete further transects. Otherwise, they continue to the next transect.

The assessor(s) identify where to start the second transect based on wind and odour observations from the first transect, then proceed to the start of the second transect. They repeat the steps from the first transect for the second transect. If odour is only observed in a small area, it is treated as a discrete observation point. The assessor(s) continue along further transects until the odour is no longer present and note this in the field sheet. During the survey, they make note of any major changes in weather conditions.

An example of the methodology utilised is provided in **Figure 4**.

[3] Victorian Planning Authority 2025, *Meeting File Note*, Meeting date: 29 April 2025 2-4pm, 1 May 2024

Figure 4 **Line (transect) method example (EPA Publication 1881)**

5.3.1.2 Odour Intensity

Observations of odour intensity were made using the recommended descriptions in Table 1 of Section 3.2 of EPA Publication 1881. The intensity of odour was described as either obvious, subtle, or no odour. The descriptors from Table 1 of EPA Publication 1881 and their associated description have been reproduced as **Table 6**.

Table 6 Odour intensity descriptors (adapted from Table 1, EPA Publication 1881, 2021)

Descriptor	Description
Obvious (O)	Odour is easily recognised, can be described and may be attributed to a source. The assessor can smell it without any effort or focus on it.
Subtle (S)	Odour can be recognised only when focusing. For example, by standing still, inhaling

Descriptor	Description
	slowly and concentrating.
No Odour (N)	No odour, or odour is not strong enough to be recognised.

5.3.1.3 Odour Character

Observations of odour character were made using the odour wheel provided in EPA Publication 1881 which is reproduced in **Figure 5**. It is noted that odour characterisation is a means to determine odour sources and describe odour in a consistent way, rather than an assessment as to whether an odour is offensive or not.

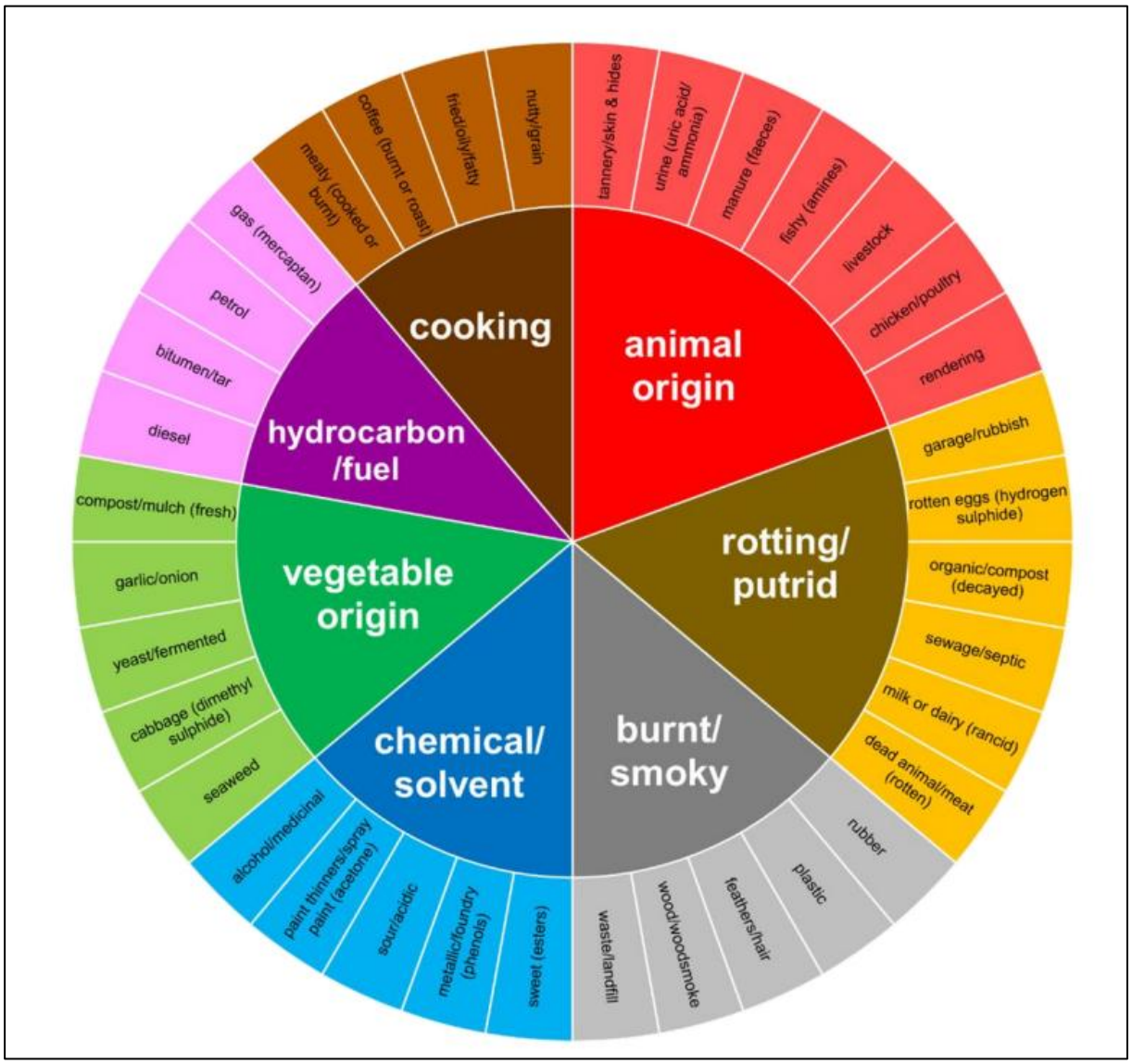


Figure 5 EPA odour wheel (EPA Publication 1881)

5.3.1.4 Field Odour Survey Results

As outlined in **Section 5.3.1** of this report, PJRA completed 12 odour surveys at the Site between 13 March 2025 and 29 April 2025 to assess potential odour impacts from the Site on the Subject Land. Field odour surveys were performed under various meteorological conditions and at different times of the day and week to capture the diurnal and weekly variations in weather and activities on the Site.

The characteristics of the odours detected were of chicken/poultry character. The specific source, whether the breeder farms or the hatcheries, could not be determined based solely on the odour character; however, the locations of the detections and comparison with similar sites indicate the source was most likely the breeder farms. Obvious odour was undetectable on all occasions. Subtle odour was detected from the Site during 5 of the 12 surveys and up to 80 m from the hatchery (440 m from Shed 1). Of the 191 individual observations, there were 8 detections.

A graphical presentation of the observations made during the 12 surveys is provided in **Figure 6**.

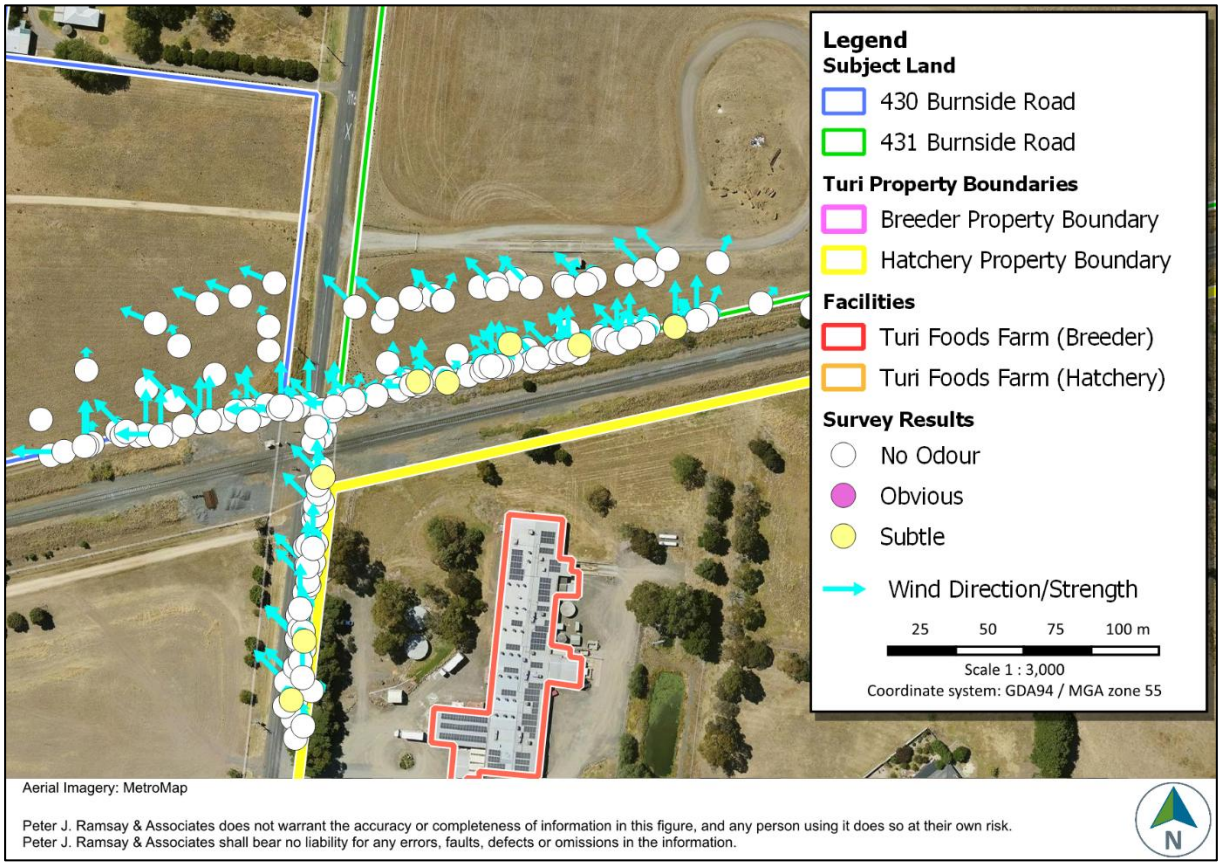


Figure 6 Field odour survey results

A summary of the results is provided in **Table 7**.

Table 7 Field Odour Survey Results

Odour Survey	Date	Start Time	Wind Direction	Wind Speed (Average)	Maximum Odour Detect Distance	
					From Hatchery	From Shed 1
1	13/03/2025	10:18 AM	S	1.5 m/s	0 m	0 m
2	13/03/2025	10:46 AM	ENE-SSW	1.2 m/s	0 m	0 m
3	21/03/2025	7:58 AM	SSE-SE	1.1 m/s	60 m	430 m
4	21/03/2025	8:56 AM	SSE-S	1.9 m/s	60 m	420 m
5	24/03/2025	11:00 AM	SSW	2.6 m/s	80 m	440 m
6	24/03/2025	11:50 AM	S	2.1 m/s	65 m	425 m
7	27/03/2025	1:46 PM	ESE-SE	4.0 m/s	0 m	0 m
8	27/03/2025	2:53 PM	E-SE	4.4 m/s	70 m	390 m
9	11/04/2025	7:53 AM	SW	2.1 m/s	0 m	0 m
10	11/04/2025	8:37 AM	WSW	1.5 m/s	0 m	0 m
11	29/04/2025	3:21 PM	SSE	3.9 m/s	0 m	0 m
12	29/04/2025	3:05 PM	SSE-S	3.9 m/s	0 m	0 m

5.3.2 Complaint Data Analysis

Analysing data on odour complaints relating to an industrial facility assists in identifying odour sources, their characteristics, and level of impact. It also serves as a benchmark for monitoring progress in achieving compliance. Reliable complaints can indicate the relationship between odour frequency and complaint numbers.

5.3.2.1 Odour Complaints to EPA

Data relating to odour complaints for the period 1 April 2020 to 1 April 2025 were requested from EPA under the *Freedom of Information Act 2017*. On 9 April 2025, EPA provided a Notice of Decision[4] relating to the request. The Notice of Decision stated that *'Based on the searches conducted, the EPA has discovered no documents relevant to your request. Therefore, the documents you seek do not exist or cannot, after a thorough and diligent search, be located.'* That is, EPA is not aware of any complaints relating to odour that allege the Turosi Food operations as the source, including the hatchery and all sheds, during the period.

[4] Environment Protection Authority Victoria 2025, *Freedom of Information: Notice of Decision*, EPA Ref: FOI-52-2025, 9 April 2025

5.3.2.2 Odour Complaints to Council

On 28 February 2025, PJRA was provided with an email[5] from the Coordinator of Strategic Planning at the Golden Plains Shire Council which stated that the Environmental Health Team and Investigations Officer were not aware of any complaints regarding odour from Turosi Food.

5.3.3 Dispersion Modelling

Dispersion modelling was used to predict the cumulative impact of odorous emissions to the Subject Land from the hatchery farm and the breeder sheds under a range of meteorological conditions. Data from the field odour surveillance was then used to verify the outputs from the dispersion modelling.

The dispersion modelling was conducted in accordance with EPA Publication 1957 *Guide to Air Pollution Modelling.*

5.3.3.1 Model Selection

The topography surrounding the hatchery and the breeder farm is relatively flat. Examination of meteorological data indicated that calms occur less than 5% of the time. Based on these considerations, it was considered appropriate to use the regulatory approved AERMOD dispersion model.

5.3.3.2 Model Domain

A 20 km x 20 km model domain centred at Farm 3 was modelled. A nested grid was used with a resolution of 50 m x 50 m within 2 km of the hatchery, 250 m x 250 m between 2 km to 5 km from the hatchery, and 500 m x 500 m between 5km to 15 km of the hatchery. Discrete receptors were set up cross the Subject Land to predict the impacts of odorous emissions from the farms.

Topography was incorporated into the model using a digital elevation model with approximately 30 m resolution, which has been gap filled. Since the terrain is relatively flat surrounding the site, the topographical resolution of the terrain was considered appropriate.

5.3.3.3 Meteorological Input Files

The nearest BOM observation station is more than 5 km from the Site. Therefore, in accordance with EPA Publication 1957, prognostic modelling was used to generate a five-year meteorological data file specific to the Site. Surface and upper air observations were generated using AERMOD-ready WRF (Weather Research and Forecasting model) data. The WRF data are site-specific centred at 38.09385 S 144.1756

[5] Golden Plains Shire Council 2025, Email from Golden Plains Shire Council to Ramsey Property Group *Re: Hatchery Complaints*, 27 February 2025

E for a five-year period 2020-2024, with a 4 km x 4 km grid and a domain size of 50 km x 50 km. The meteorological data file was prepared by LakesEnvironmental.

A comparison of the measured and prognostic meteorological data generated wind roses for 2020 to 2024 at She Oaks BOM station is shown in **Figure 7**. A similar pattern is observed between the measured and modelled meteorological data. However, the measured data indicate prevailing winds are from the north (13.2%), north-northwest (12.6%) and the west (10.3%), while the modelled data predicts high frequencies of wind across the north to west directions (~ 9% per wind sector). Southerly winds, which are the primary risk for the Subject Land, show relatively good correlation between WRF data and measured data. This indicates that the WRF data provide a reasonably accurate representation of wind conditions for the purpose of modelling odour impacts to the Subject Land from the Site.

A detailed data validation report is provided in Appendix C.

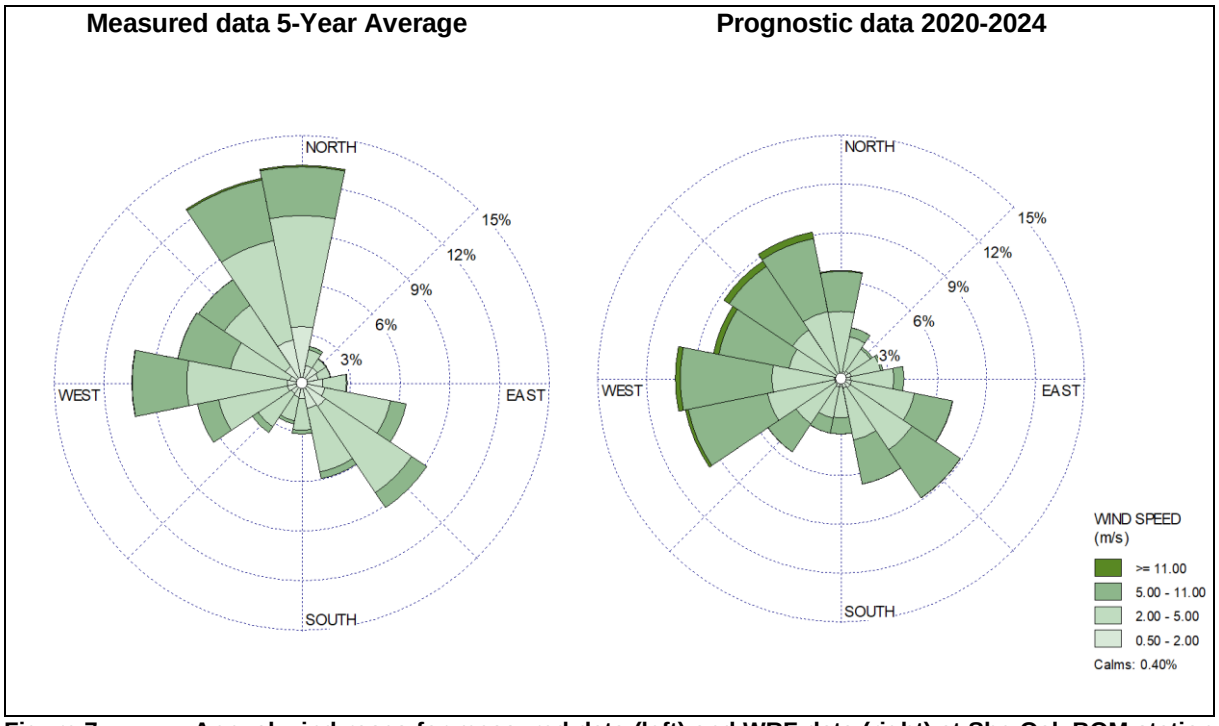


Figure 7 **Annual wind roses for measured data (left) and WRF data (right) at She Oak BOM station location for the years 2020-2024.**

5.3.3.4 Model Input Parameters

The predicted odour concentrations were modelled in accordance with EPA Publication 1957. The standard output from AERMOD is a one-hour average concentration prediction.

Table 8 Summary of AERMOD input parameters

Model Input Parameters	
Meteorological Data	Modelled - WRF
Pollutant	Odour
Deposition	None
Depletion	None
Dispersion	Rural
Averaging Time	Hourly
Terrain	Elevated, 30 m resolution, from SRTM1
Gridded Receptors	3 km x 3 km, 50 m grid spacing 5 km x 5 km, 250 m grid spacing 15 km x 15 km, 500 m grid spacing
Discrete Receptors	Placed across Subject Land area (shown in **Figure**)

5.3.3.5 Source Input References

In the absence of odour emission data, odour emission rates (OERs) were adapted from published literature for similar operations.

The literature considered includes:

- Dunlop *et al*, 2011, Dust and odour emissions from layer sheds, Australian Poultry CRC (APCRC), Project No. 04-45 (APCRC, 2011)
- GHD, 2014, Broiler Farm, Wollert Precinct- Adverse Amenity Impact Assessment, prepared for Whittlesea City Council, June 2014 (GHD 2014)
- Heggies Pty Ltd, 2009, *Marsden Park Industrial Precinct Level 3 Odour Assessment*, 14 July 2009 (Heggies, 2009)
- Rural Industries Research and Development Corporation (RIRDC), 2014, *Odour Dispersion Modelling of Meat Chicken Farms – Comparison of AERMOD, AUSPLUME and CALPUFF models,* October 2014, RIPDC Publication No.14/102 (RIRDC, 2014)
- Sohn, J. H., 2010, *Odour emissions from tunnel-ventilated broiler sheds: case study of nine Queensland farms.* Animal Production Science (Sohn, 2010)
- The Odour Unit (TOU), 2013, *Odour Impact & Dispersion Modelling Assessment of Proposed Free-Range Egg Layer Farm – Supplementary Report V.2*, prepared for Wanerie, Gingin Shire WA, January 2013 (TOU, 2013)
- Todoroski Air Sciences Pty Ltd (TAS), 2021, *Air Quality Assessment – 3000 Remembrance Drive Tahmoor*, prepared for The Anglican Schools Corporation, 15 February 2021 (TAS, 2021)

- Jiang and Sands (2000) "Odour and Ammonia Emissions from Broiler Farms - A report for the Rural Industries Research and Development Corporation". Prepared by J. K. Jiang and J. R. Sands, February 2000.

5.3.3.5.1 Breeder Farms

Table 9 Summary of odour emission rates from literature

Source	Shed Design	Facility Type	OER
Australian Poultry CRC, 2011	Tunnel ventilated	Layer sheds	• 50 to 500 OU/s per 1000 birds

GHD, 2014	Naturally Ventilated	Broiler farms	• Estimated OER between 200 to 800 OU·m^3/s per 1,000 birds
			• OER per 1000 birds = Age factor (week) * T_F
			• T_F = 51.12*T(ºC) – 458.2
			• T_F =800 when T >24.3 ºC
			• T_F =200 when T <12.3 ºC
			• Adopted variable emission rate calculated as a function of:
			  ○ batch age; and
			  ○ ambient temperature.

Heggies, 2009	Unclear	Broiler farms	• 195 OU·m^3/s/ per 1,000 birds • Adopted from Jiang and Sands 1998[2]
RIRDC 2014	Tunnel ventilated	Broiler farms	• Estimated OER between • 0 to 1150 OU·m^3/s per 1,000 birds • Adopted hourly varying OER, calculated as a function of shed design (K, factor of 1-5), and ventilation rate (V, m^3/s) • OERs = 0.025 K $V^{0.5}$
Sohn, J. H, 2010	Tunnel Ventilated	Broiler farms	• 330 to 2960 OU/s per 1000 birds. • Peak OER weeks 5-6 of the production cycle. OER trend match with ambient temperature.
TAS, 2021	Naturally ventilated	Breeder farm	• 200 OU·m^3/s per 1,000 birds • Adopted from GHD (2003) measured data for broiler farms[1]. • Adopted variable emission rate, 10% OER when temperature below 15ºC; OER of egg layer farm is 0.4 times that of broiler farms.
TOU, 2013	Tunnel ventilated	Free range egg Layer farm	• 200 OU·m^3/s per 1,000 birds
Jiang and Sands, 2000	Natural, tunnel and cross ventilation sheds.	Broiler farm	• Maximum OERs between 311 – 579 OU/s per 1000 birds across all broiler farm shed designs including natural, tunnel and cross ventilation sheds • Adopted worst case (Week 6) maximum odour concentration from a batch with the maximum

Source	Shed Design	Facility Type	OER
			ventilation rate • Adopted variable emission rate, 10% of maximum OER when temperature equal to or below 15ºC; 100% when temperature above 15ºC

1 GHD, 2003, *Review of modelling, emission measurement and treatment of odour and dust emissions from broiler farms*, prepared by GHD for Australian Poultry Cooperative Research Centre, November 2003
2 Jiang and Sands (1998) "Report on Odour Emissions from Poultry Farms in Western Australia – Principal Technical Report", Centre for Water and Waste Technology, University of NSW, Sydney.

It is stated in Agriculture Victoria's advice[2] that odour impacts from breeder farms are similar to egg layer farms by referring to the Egg Industry Environmental Guidelines: '*The national guideline scope includes; While the focus of the document is layer farms, the principles outlined in this document are equally applicable to pullet rearing and breeder farms'*.

Each of the seven breeder farms house approximately 32,000 birds from 22 to 56 weeks old across 4 sheds. A review of aerial imagery indicates that while Farms 1 to 6 each comprise four sheds, Farm 7 comprises five and therefore houses approximately 40,000 birds. Shed dimensions are generally consistent, except for two elongated sheds at Farm 2 and one at Farm 7. For ease of computation, it is assumed that there are 8,000 birds per shed, regardless of the size of the shed.

It is understood that the activity at the breeder farms involve the housing of hens and roosters to produce fertile eggs, the eggs are then transferred to the hatchery facility for hatching. According to the *Egg Industry Environmental Guidelines*, the parent hens and roosters are productive for approximately 12 months before being removed from the breeder farm. Variability in odour emission rates from the breeder farm operation is expected to be lower than a broiler farm as bird growth is not significant, and mature productive birds are kept on the farm for longer periods. The food intake is expected to be fixed, and the manure production tends to be consistent resulting in a steady generation of odour.

Odour emission rates vary diurnally, seasonally, and throughout the breeding cycle and can vary between farms depending on management practices and design. It is considered reasonable to adopt a representative average emission rate for the purpose of modelling the odorous emissions from the Site. As shown in **Table 9**, TAS (2021) and TOU (2013) both adopted an OER of 200 OUV/s per 1,000 birds for breeder farms and egg layer farms. Measured data reported by Australian Poultry CRC (2011) show odour emission rates between 58 to 512 OUV/s per 1,000 birds for egg layer farms. A study by Jiang and Sands (1998) and Pollock (2003) reported that odour emissions from chicken egg layer farms are approximately 0.4 times that of broiler farms.

Therefore, an OER of 200 OU/s per 1,000 birds is deemed reasonable when a factor of 0.4 is applied to emission rates for broiler farms from literature. Subsequently, an OER of 1,600 OU/s has been adopted for each shed (assuming 200 OU/s/1,000 birds and 8,000 birds per shed).

5.3.3.5.2 Hatchery

It is understood that chicks are hatched in the hatchery and day-old chicks are then transferred offsite to broiler farms. The hatchery generates 4 to 6 m^3 of waste per week that predominantly comprises eggshells. The hatching process is undertaken in an enclosed building. It is noted in the Draft *Animal production separation distance requirements* that '*hatcheries produce very little odour with minimal wastes that are generally removed offsite*'. In addition, EPA stated in its advice to VPA that '*The hatchery should have a smaller impact on odour compared with the breeder farms, and typically are not a significant odour source*'[1].

There are limited studies on odour emissions from poultry hatcheries. GHD has developed a method of estimating OERs from broiler sheds by taking into account the age of the chickens. **Table 10** shows that the emission rate from a one week old chick is 0.056 times that of a mature meat chicken. This ratio is considered to be representative, albeit conservative, of the emission rate from the hatchery that processes one day-old chicks.

Table 10 Age Factor for broiler shed emission rates (GHD, 2014)

Week	1	2	3	4	5	6	7	8	9*	10*
f	0.056	0.074	0.24	0.62	1	1	1	1	0.5	0

It is understood the hatchery processes 500,000 eggs per week and day-old chicks are removed from site. Assuming a 100% survival rate, there are approximately 72,000 chicks onsite per day. Therefore, applying the age factor to the middle value of GHD's predicted odour emission rates of 0 $OU \cdot m^3/s$ to 800 $OU \cdot m^3/s$ per 1,000 birds for broiler sheds, conservatively, the estimated odour emission rate from the hatchery is 1,600 $OU \cdot m^3/s$.

5.3.3.6 Quality of Emission Rates

Odour emission rates for poultry farms show study-to-study variability due to dependence on weather conditions, farm management practices, and design aspects. However, the emissions are widely studied. The studies referenced are conducted for government corporations. Therefore, the adopted emission rates are A-rated according to Section 3.4 of EPA Publication 1957.

5.3.3.7 Odour Categorisation

The ERS requires an air environment that is free from offensive odours from industrial activities. That is, no offensive odours from the operation of a facility should occur beyond its property boundary. No quantitative criterion for an egg farm is specified by the ERS or the Egg Industry Environmental Guidelines.

EPA Publication 1883 provides a framework to assess the risk of offensive odour as a product its character, intensity (i.e., obvious or subtle), frequency, and receiving environment. The risk assessment framework is provided in **Section 5.4**. Obvious odour is defined in EPA Publication 1883 as when '*odour is easily recognised, can be described and may be attributed to a source. The assessor can smell it without any effort*.' Subtle odour is when '*Odour can be recognised only when focusing*'. The guideline refers to obvious odours being 3 and higher on the German Standard VDI 3882 Part 1, with subtle odour being 1 to 2.

As shown in **Figure 8,** obvious and subtle odour may occur at 10 OU and 2 OU, respectively, according to Western Australian *Department of Environmental Protection – Odour Methodology Guideline* (March 2002), which provided an example for conversion from VDI to OU for butanol and hydrogen sulphide.

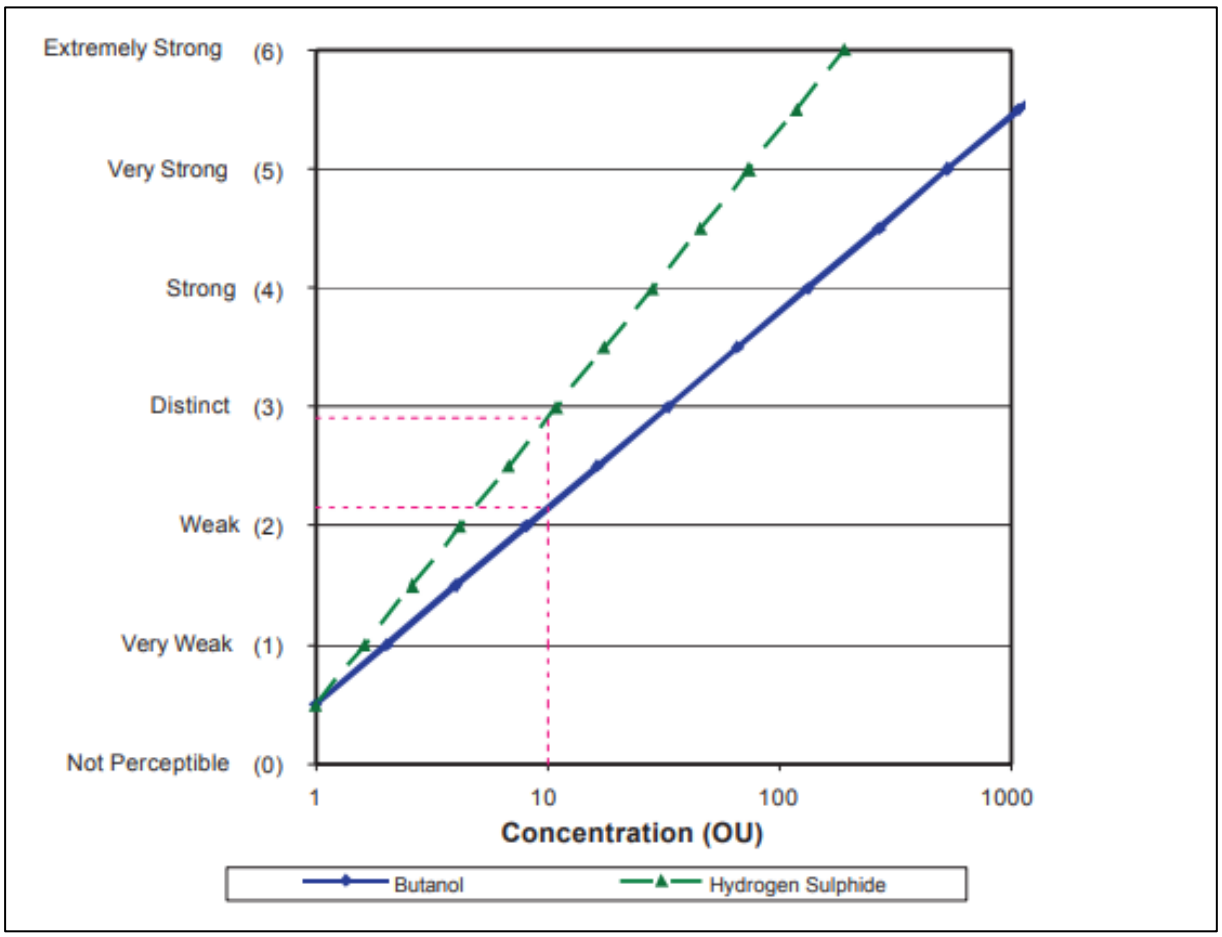


Figure 8 **Conversion of odour intensity and odour concentration**

As discussed in **Section 5.3.1**, no obvious odours were detected during the field surveillance program. However, subtle odours were identified at several locations, with assessors able to recognise the odour when deliberately focusing. These observations were geographically consistent with the area between the 2 OU and 5 OU contours generated by the 99.5th percentile model output. To align the field observations with modelled data and provide a consistent framework for assessment, a conservative interpretation has been adopted. Subsequently, subtle odour is assumed to occur where concentrations fall within the range of 2 OU to 5 OU, while obvious odour is defined as occurring at concentrations exceeding 5 OU.

5.3.3.8 Results of AERMOD Simulations and Interpretation

In accordance with EPA Publication 1957, the 99.9 percentile concentration has been considered as the averaging time for odour is one hour or less. A summary of the highest and 99.9th percentile five-year average values at the most impacted discrete receptors on the Subject Land is provided in **Table 11**. The locations of the discrete receptors are shown in **Figure 9.** The isopleths of the highest and 99.9th percentile predicted ground level concentrations are shown in **Figure 10** and **Figure 11**, respectively.

Table 11 Discrete receptor summary

Rank	Peak (1-hr), OU/m3	Receptor ID	X (m)	Y (m)	ZELEV (m)	Peak Date	Start Hour
1ST	4.4	RCPT_6	252151	5781563	93.20	1/02/2021	5
1ST	14.0	RCPT_8	252451	5781563	88.74	1/02/2021	5
1ST	10.3	RCPT_9	252451	5781863	89.76	10/11/2023	2
1ST	5.6	RCPT_10	252751	5781563	83.76	18/05/2021	19
1ST	7.2	RCPT_11	252751	5781863	89.57	30/01/2020	24
99.9 pct	3.0	RCPT_6	252151	5781563	93.20	-	-
99.9 pct	6.7	RCPT_8	252451	5781563	88.74	-	-
99.9 pct	3.3	RCPT_9	252451	5781863	89.76	-	-
99.9 pct	2.9	RCPT_10	252751	5781563	83.76	-	-
99.9 pct	2.4	RCPT_11	252751	5781863	89.57	-	-

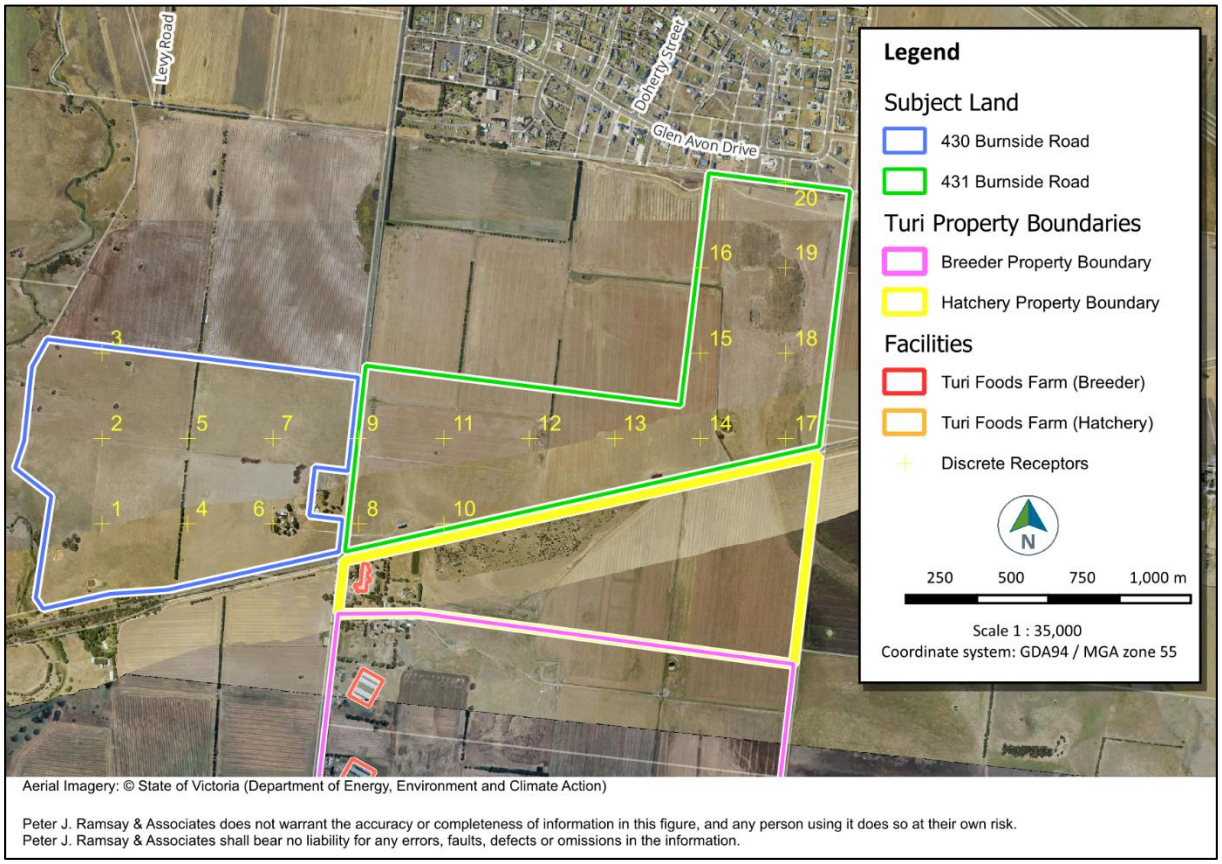


Figure 9 **Locations of discrete receptors**

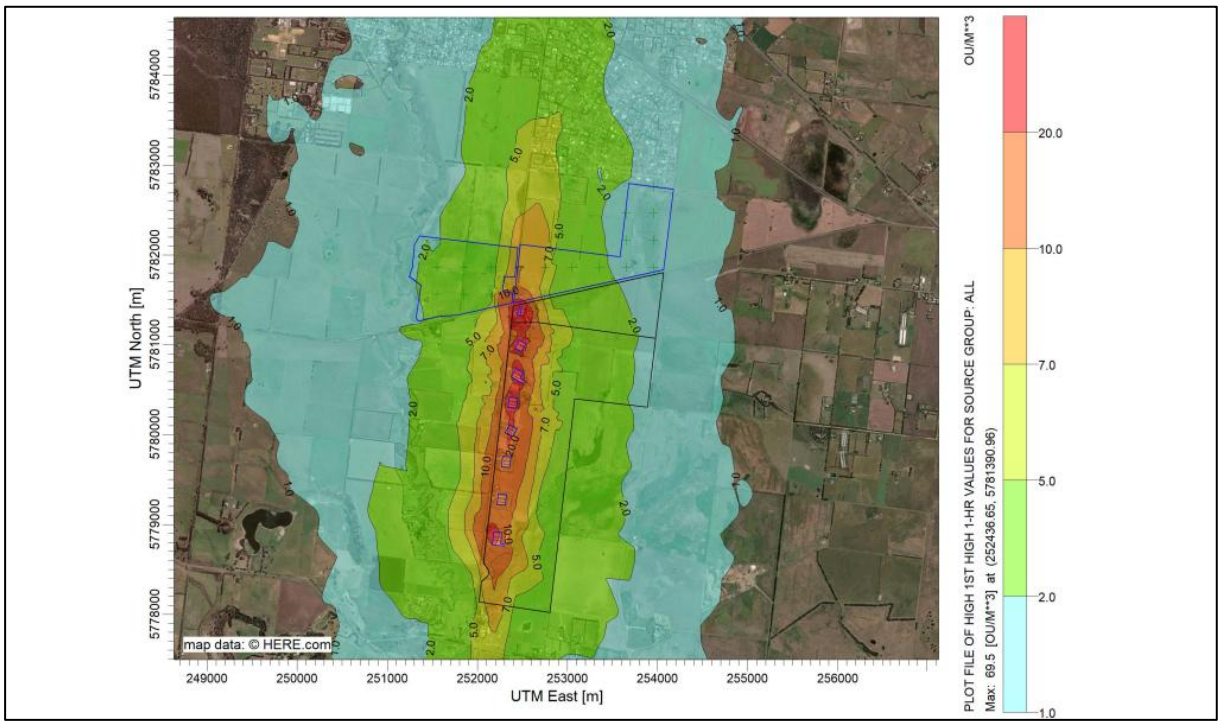


Figure 10 **Contour plot of the highest 1-hour values (2020-2024 5-year average)**

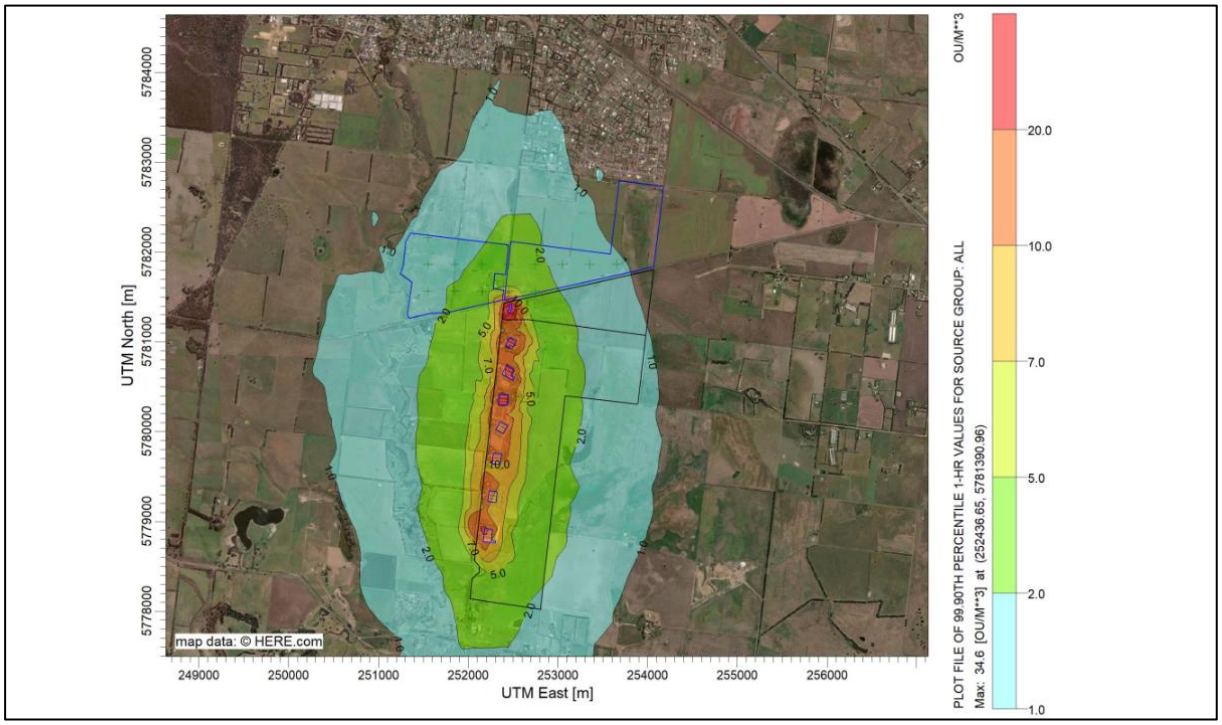


Figure 11 Contour plot of the 99.9th 1-hour values (2020-2024 5-year average)

The results above show that the maximum predicted hourly odour concentration for the years (2020-2024) modelled occurs immediately adjacent to the farms. The 99.9th percentile odour concentrations predicted at the discrete receptors within the Subject Land ranges from 0.7 to 6.7 OU. Obvious odour (>5 OU) is predicted to occur beyond the property boundary of the farms and within the Subject Land. An odour risk assessment has then been undertaken to consider the frequency of occurrence and determine the risk of offensive odour from the existing hatchery and breeder farms on potential residential receptors within the Subject Land.

5.4 Odour Risk Assessment

The framework for assessing the overall risk of offensive odour is provided in EPA Publication 1883. Specifically, the risk of odour exposure is assessed based on the character of the odour (i.e. unwelcome, unsafe) and the frequency (i.e. hours per year) at which obvious odour could be expected at the sensitive receptor. Subsequently, the risk of offensive odour at the sensitive receptor is determined based on the level of offensiveness of the odour (as described in Appendix B of EPA Publication 1883) and the risk of odour exposure previously determined. These criteria provided in EPA Publication 1883 are shown in **Table 12** to **Table 16**.

Table 12 Risk of odour exposure potential (adapted from EPA Publication 1883)

	Negligible exposure	Almost no chance of odour exposure
	Low exposure	Odour exposure unlikely
	Moderate exposure	Likely chance of odour exposure
	High exposure	Highly likely to have odour exposure
	Very high exposure	Odour exposure near certain

Table 13 Risk of odour based on character, obvious odour intensity and frequency of predicted odour (adapted from EPA Publication 1883)

Frequency	Hours per year (indicative)	Obvious odour character		
		Unsafe	Unwelcome	Innocuous
0.5 - 2.0%	< 200			
2.1% - 6.0%	200 to 525.			
6.1% - 10%	526 to 875			
> 10%	(> 875 hrs/yr.)			

Table 14 Risk of odour based on character, subtle odour intensity and frequency of predicted odour (adapted from EPA Publication 1883)

Frequency	Hours per year (indicative)	Subtle odour character (Obvious odour is < 2%)		
		Unsafe	Unwelcome	Innocuous
0 - 2.0%	< 200			
2.1% - 6.0%	200 to 525.			
6.1% - 10%	526 to 875			
> 10%	(> 875 hrs/yr.)			

Table 15 Risk of offensive odour key (adapted from EPA Publication 1883)

Rating	Likelihood of offensive odour
Very high	Almost certain
High	Highly likely
Moderate	Likely
Low	Unlikely but still possible

Table 16 Risk of offensive odour (adapted from EPA Publication 1883)

	Receiving environment sensitivity		
Risk of odour exposure	High	Medium	Low
Very high exposure	Very high	High	Moderate
High exposure	High	High	Moderate
Moderate exposure	High	Moderate	Low
Low exposure	Moderate	Moderate	Low
Negligible exposure	Low	Low	Low

The character of odour is defined as *'Chicken (sheds)'* which is classified as *unwelcome* in Appendix B of EPA Publication 1883.

Dispersion modelling was conducted using five years of meteorological data, which shows no exceptional weather conditions between 2020 and 2024 that could cause significant interannual discrepancies in the predicted ground-level concentrations. The analysis indicated that odour impact on the Subject Land was predicted to be slightly greater in 2024; therefore, this year has been selected as the model year for the risk assessment.

The isopleths of the 99.5th percentile (0.5%) predicted odour concentrations at ground level are presented in **Figure 12**. The maximum 99.5th percentile hourly average ground level concentrations on the Subject Land is 3.5 OU, which represents a subtle odour. Therefore, as obvious odour is predicted to be rare (less than 0.5% of the time), the assessment of the risk of offensiveness proceeds to consider the risk of subtle odour.

The isopleths of the 98th percentile (2%) predicted odour concentrations at ground level are presented in **Figure 13**. The contour which represents a subtle odour (2 OU, light blue) does not extend onto the Subject Land. This indicates that subtle odour will not occur on the Subject Land more than 2% of the time.

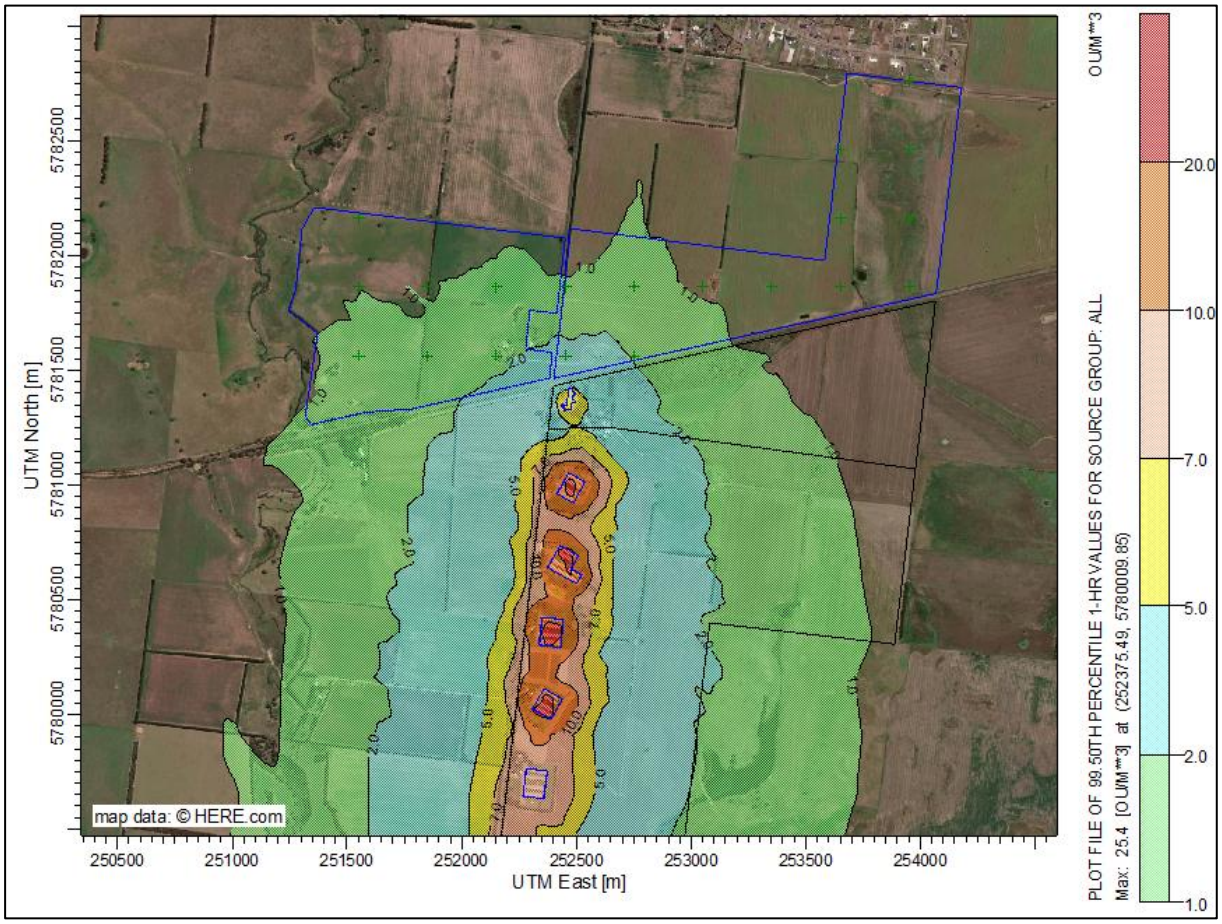


Figure 12 Contour plot of the 99.5th percentile 1-hour values (2024)

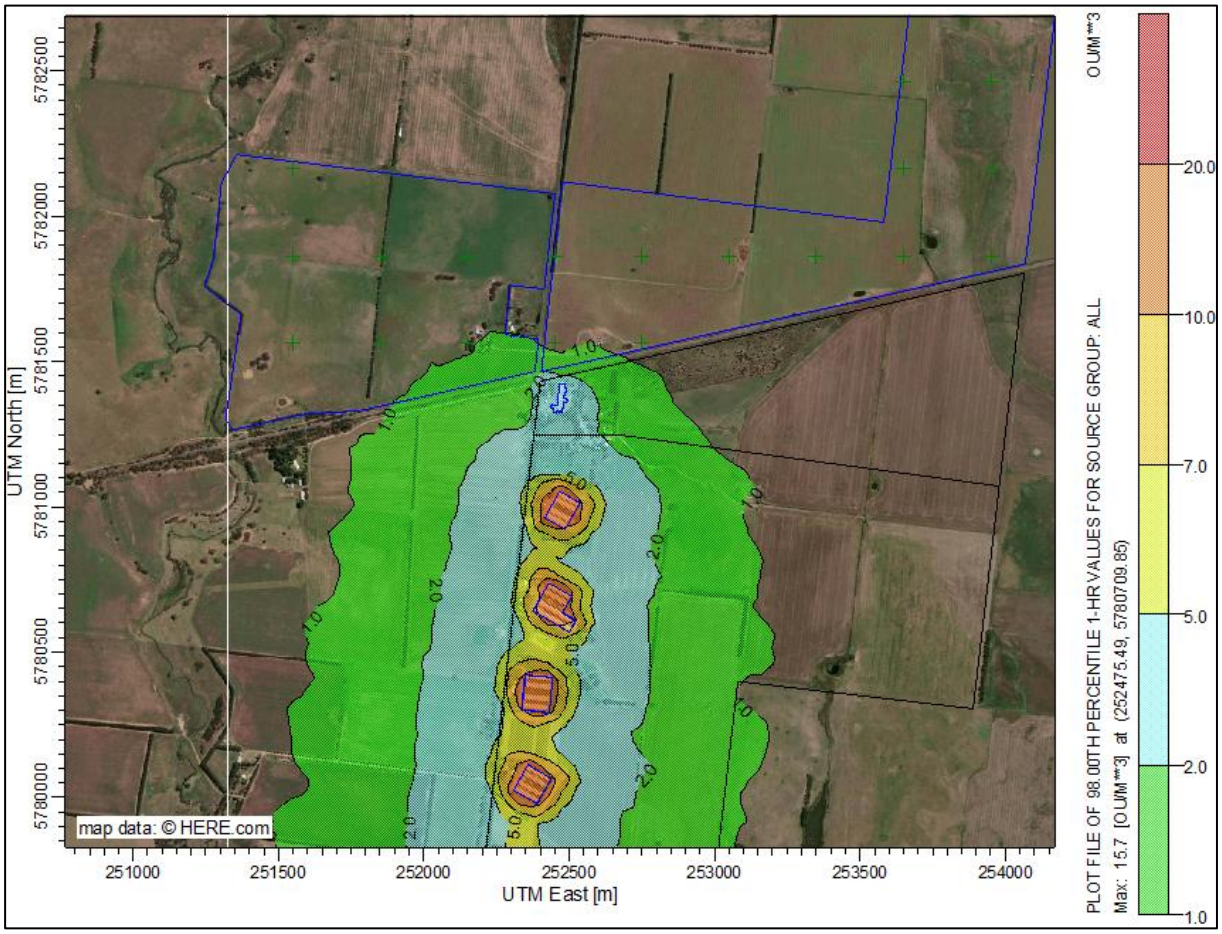


Figure 13 **Contour plot of the 98th percentile 1-hour values (2024)**

The risk of offensive odour for lands surrounding the Site, assessed using **Table 14** and **Table 16** and assuming high land use sensitivity, is visually presented as risk zones in **Figure 14**. The figure indicates that the area subject to very high odour risk is confined to the area immediately surrounding the breeder sheds. Most high-risk zones fall within the farm property boundaries except for a narrow strip that extends slightly beyond the property boundary to the west.

Regarding the Subject Land and broader PSP area, the risk of odour exposure is negligible. The risk assessment results in a low risk of offensive odour for all receptor sensitivities.

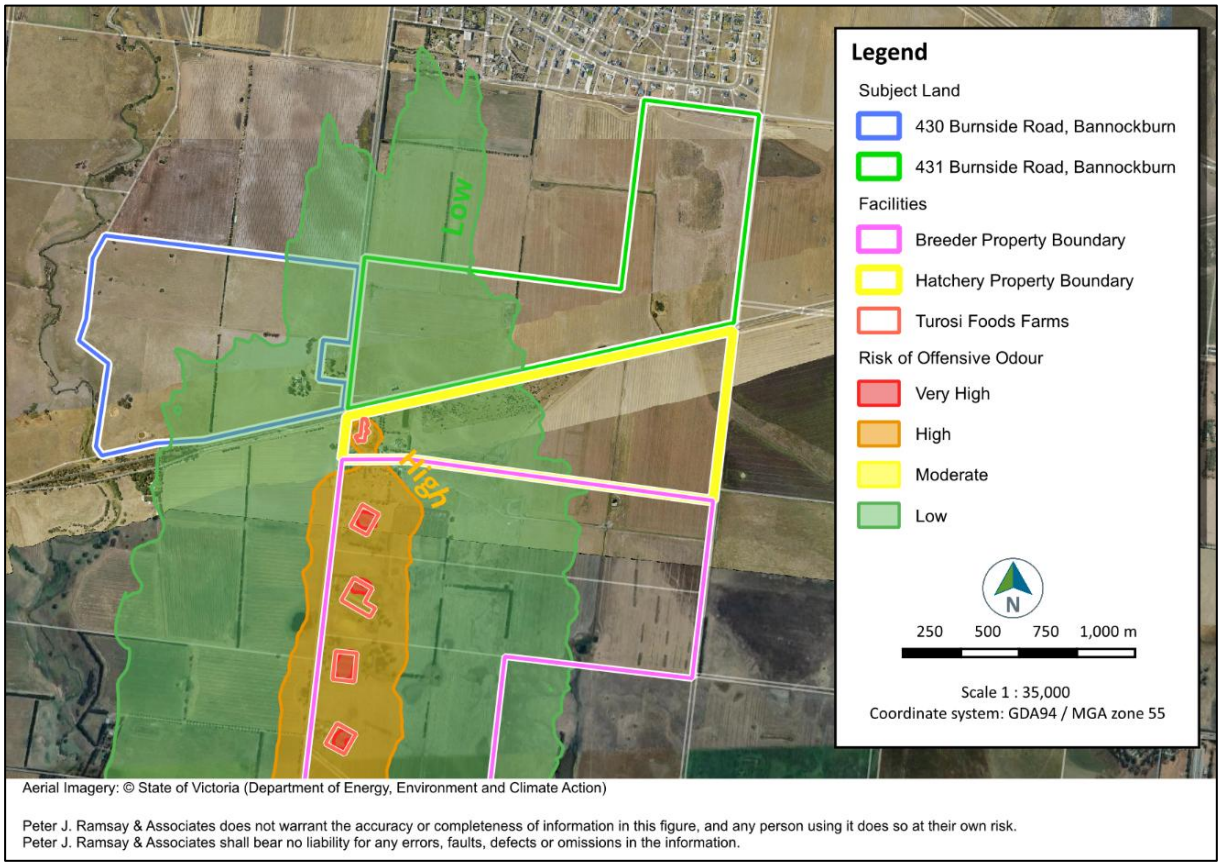


Figure 14 Contour Plot showing offensive odour risk zones (2024)

6. DISCUSSION

A preliminary 500 m separation distance from the hatchery has been outlined in the PSP and a portion of the Subject Land is within the buffer area. The 500 m separation distance was applied by VPA on the basis of regulatory advice, but without a site-specific risk assessment. Subsequently, an odour risk assessment of the hatchery and the breeder farms has been undertaken to determine the extent of potential impact from the hatchery and breeder farms.

This odour risk assessment has been undertaken considering expected worst-case emissions from the Site under normal conditions and the risk of offensive odour has been assessed as low. Therefore, the outcome of the assessment indicates that odorous emissions from the Turosi Foods hatchery and breeder farms do not preclude any sensitive uses of land located at 430 and 431 Burnside Road, Bannockburn.

6.1 Model Verification

The results from the field odour surveillance program are compared with the predicted odour concentration contours produced by AERMOD to verify the model results.

As outlined in **Section 5.3.3.7**, obvious and subtle odours are assumed to be odour concentrations predicted above 5 OU and 2 OU, respectively. **Figure 15** shows that all detects of subtle odour during the field odour surveillance program occurred within proximity of the 5 OU area of the 99.5th percentile ground level concentrations for the March to April period (the same period of field odour surveys).

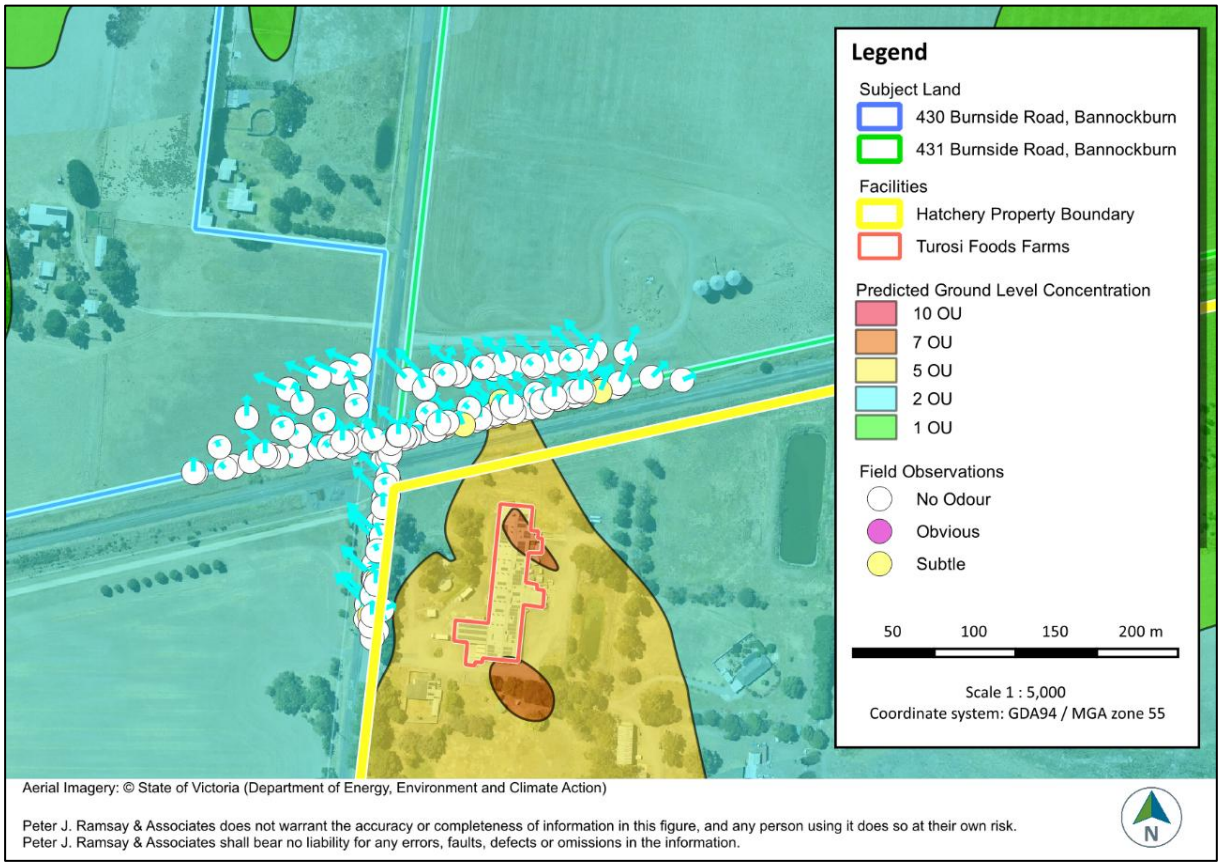


Figure 15 **Field data with respect to predicted odour concentration (99.5th percentile, March to April 2024)**

Further, the separation distance calculated for the breeder farms using the S-factor separation distance formula (provided in the Egg Industry Environmental Guidelines, as detailed in **Section 3.5**) demonstrates good alignment with the 2 OU isopleth of the 99.5th percentile model output (as shown in **Figure 16**).

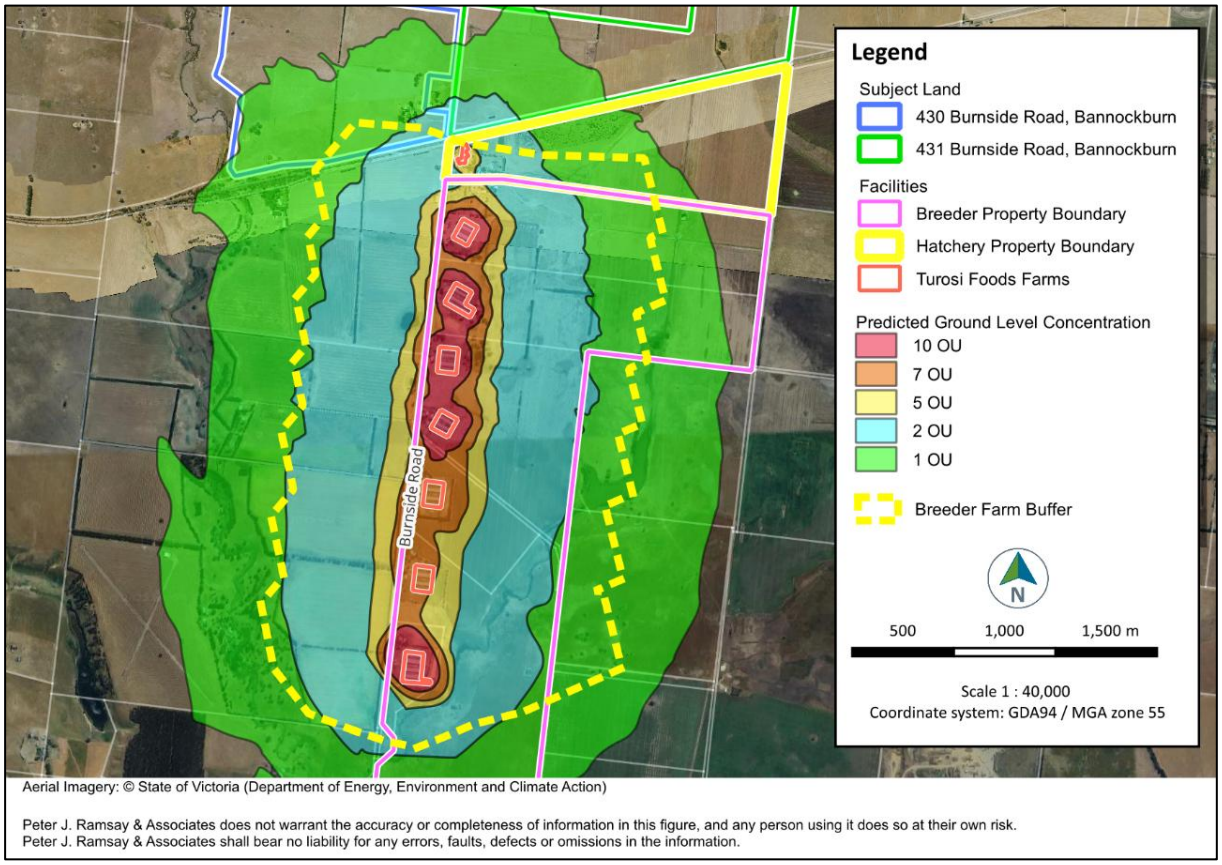


Figure 16 Predicted odour concentration (99.5th percentile) and calculated buffer zones for breeder farms

As the results from the model align with both the field odour survey results and the S-factor formula calculation, the model and the selected emission rates are considered to provide a reasonable representation of the actual Site conditions.

6.2 Model Assumptions

Odour dispersion modelling was conducted using AERMOD in accordance with EPA Publication 1957. In the absence of directly measured emission rates, the emission rates selected from literature are intentionally conservative, while remaining generally representative of expected conditions at the Site.

The assumptions which underpin the model include:

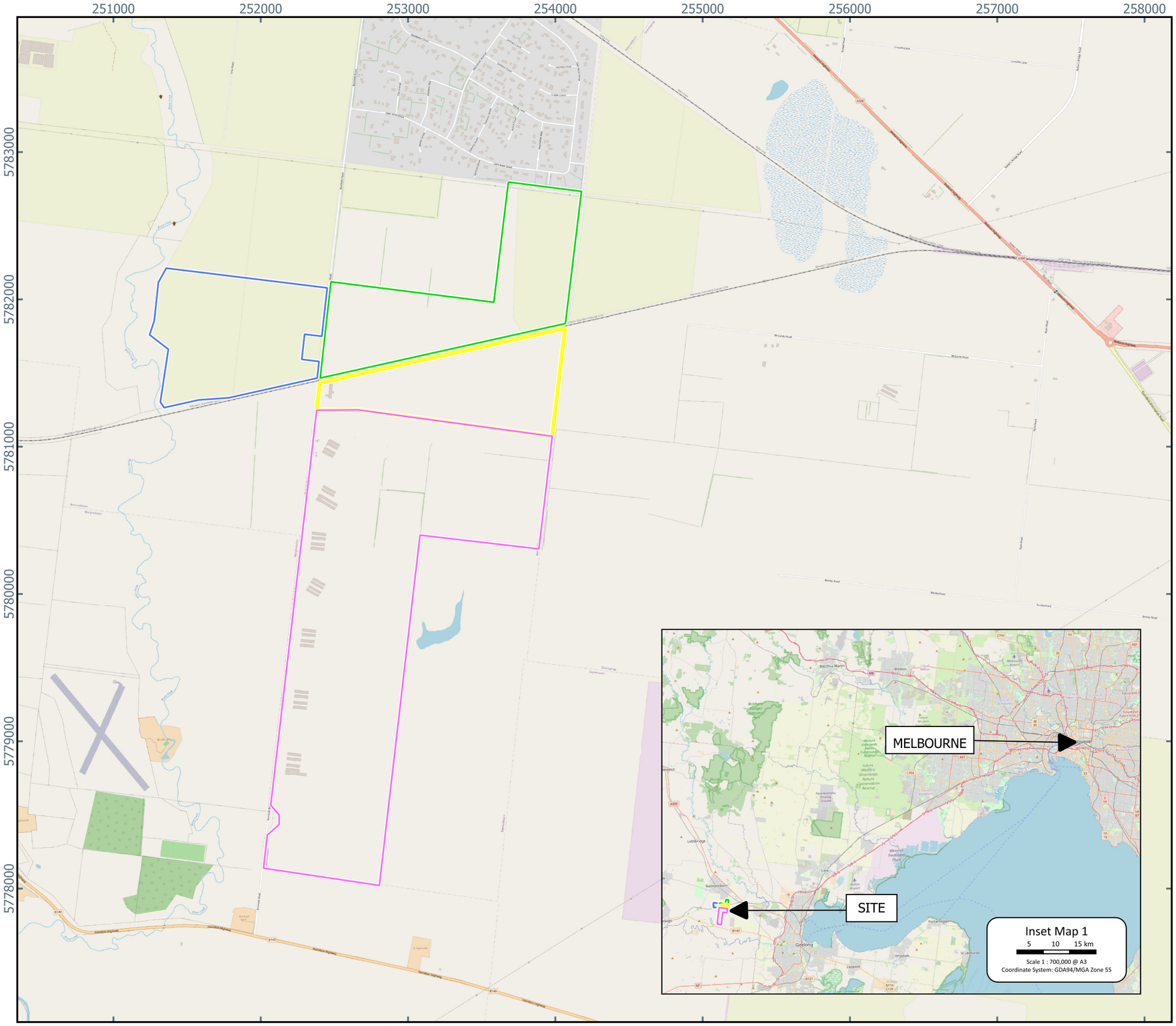
- Emission rates were sourced from published literature. The emission rates selected were suitably conservative in the absence of directly measured emission rates. Emission rates from the breeder farms were assumed to be constant; however, this does not account for a drop in odorous emissions when louvers are closed during cooler periods. Jiang and Sands (2000) observed that louvers on naturally ventilated poultry sheds are generally closed when the temperature drops below 15°C causing odour emission rates to fall by up to 90%;
- Due to limited published data on hatchery odour emissions, a conservative estimation has been adopted by modelling emissions from 1-day-old chicks using emission factors developed for 1-week-old broiler farm chicks;
- Each shed is assumed to house 8,000 chickens regardless of size;
- Prognostic meteorological data is used in the absence of site-specific measured data. Data validation (provided in Appendix C) shows a good correlation between the measured and the prognostic data except that the prognostic data underestimates wind from the north and north-northwestern directions. The prediction of prevailing winds in the direction towards the Subject Land is well aligned with measured data;
- Obvious and subtle odours are assumed to be odour concentrations predicted above 5 OU and 2 OU, respectively;
- The risk assessment was undertaken for the year of 2024 to provide the predicted worst case impact on the Subject Land; and
- It is assumed that Turosi Foods adopts reasonable environmental management practices for the Site to minimise potential off-site impacts and complies with its General Environmental Duty.

7. CONCLUSIONS

The following conclusions are made from the odour impact and risk assessment:

- Level 1 and Level 2 odour assessments of odour emissions from the Turosi Foods hatchery and breeder farms were undertaken in accordance with EPA Publication 1883. The outcome of the first two levels of assessment found that a Level 3 Assessment is necessary to determine the risk;
- A Level 3 odour assessment of the Turosi Foods was undertaken in accordance with EPA Publication 1883 and concluded that:
    - 12 field odour surveys were conducted between March to April. Subtle odour was detected at boundary of the Subject Land. Obvious odour was not observed on any occasions, and minimal odour was observed on the Subject Land.
    - An analysis of data on complaints from EPA and Council found that there is no history of odour complaints relating to the operations at the Site.
    - Odour dispersion modelling undertaken in accordance with EPA Publication 1957 indicates that the risk of odour exposure on the Subject Landis negligible. The risk of offensive odour for a high sensitivity receiving environment on the Subject Land is low. The assumptions are conservative, particularly for odour emissions from the hatchery.
- Therefore, odorous emissions from the Turosi Foods' operations do not preclude the development of sensitive land uses, including residential housing, at 430 and 431 Burnside Road, Bannockburn; and
- Further odour assessment is not considered necessary unless there is a material change in the operations at the Turosi Foods site or in the location, extent, or intended use of the Subject Land, in which case, the agent of change principle would apply.

Figures



PETER J RAMSAY & ASSOCIATES

Legend

Subject Land

- 430 Burnside Road
- 431 Burnside Road

Facilities

- Breeder Property Boundary
- Hatchery Property Boundary

Data Sources

Basemap: © 2025 OpenStreetMap contributors.
Available under the Open Database License, cartography licensed as CC BY-SA.
Property Boundary: DataShare Victoria, Department of Environment, Land, Water and Planning (DELWP), Accessed 19/03/2025

N

250 500 750 1,000 1,250 m

Scale 1 : 25,000 @ A3
Coordinate System: GDA94/MGA Zone 55

LOCALITY MAP

Odour Impact and Risk Assessment

449 Burnside Road, Bannockburn, Victoria, 3331

Netherby Nominees Pty Ltd and Ramsey Property Group Pty Ltd

Project:	1134.1
Date:	20/03/2025
Revision:	Rev.00
Designed:	ZV
Drawn:	ZV
Reviewed:	AD

Figure **F1**

File: C:\Users\zen.vanderstukken\OneDrive - PJRA\GIS - Documents\Projects\1134.1\Maps\Working\1134.1 - Working.qgz

Appendix A

AERMOD Results

Sensitive Receptor Summary

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
Prepared By: JL
Reviewed By: NW
Notes:

Averaging Period	Rank	Peak	Units	Receptor ID	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	2.44948	OU/M**3	RCPT_1	251550.59	5781563.45	84.81	0	92	31/07/2024, 22
1-HR	1ST	2.42788	OU/M**3	RCPT_2	251550.59	5781863.45	91.96	0	91.96	6/05/2024, 7
1-HR	1ST	1.87036	OU/M**3	RCPT_3	251550.59	5782163.45	93.98	0	93.98	4/03/2020, 7
1-HR	1ST	3.36849	OU/M**3	RCPT_4	251850.59	5781563.45	90.78	0	90.78	6/05/2024, 7
1-HR	1ST	2.13927	OU/M**3	RCPT_5	251850.59	5781863.45	98.78	0	98.78	2/07/2023, 21
1-HR	1ST	4.37848	OU/M**3	RCPT_6	252150.59	5781563.45	93.2	0	93.2	1/02/2021, 5
1-HR	1ST	4.20227	OU/M**3	RCPT_7	252150.59	5781863.45	92.95	0	92.95	1/02/2021, 5
1-HR	1ST	13.98067	OU/M**3	RCPT_8	252450.59	5781563.45	88.74	0	88.74	1/02/2021, 5
1-HR	1ST	10.27222	OU/M**3	RCPT_9	252450.59	5781863.45	89.76	0	89.76	10/11/2023, 2
1-HR	1ST	5.58218	OU/M**3	RCPT_10	252750.59	5781563.45	83.76	0	83.76	18/05/2021, 19
1-HR	1ST	7.15244	OU/M**3	RCPT_11	252750.59	5781863.45	89.57	0	89.57	30/01/2020, 24
1-HR	1ST	2.8113	OU/M**3	RCPT_12	253050.59	5781863.45	85.76	0	89	24/03/2023, 24
1-HR	1ST	2.06878	OU/M**3	RCPT_13	253350.59	5781863.45	78.23	0	78.23	15/08/2024, 4
1-HR	1ST	1.62067	OU/M**3	RCPT_14	253650.59	5781863.45	80.58	0	80.58	20/02/2022, 4
1-HR	1ST	1.69234	OU/M**3	RCPT_15	253650.59	5782163.45	79.55	0	79.55	13/05/2023, 2
1-HR	1ST	1.86033	OU/M**3	RCPT_16	253650.59	5782463.45	86.78	0	86.78	2/10/2024, 1
1-HR	1ST	1.48176	OU/M**3	RCPT_17	253950.59	5781863.45	82.23	0	82.23	17/11/2023, 24
1-HR	1ST	1.38205	OU/M**3	RCPT_18	253950.59	5782163.45	84.35	0	84.35	17/11/2023, 24
1-HR	1ST	1.56082	OU/M**3	RCPT_19	253950.59	5782463.45	86.02	0	86.02	13/05/2023, 2
1-HR	1ST	1.29907	OU/M**3	RCPT_20	253950.59	5782763.45	82.02	0	82.02	20/02/2022, 4
1-HR	99.90pct	1.5647	OU/M**3	RCPT_1	251550.59	5781563.45	84.81	0	92	
1-HR	99.90pct	1.54901	OU/M**3	RCPT_2	251550.59	5781863.45	91.96	0	91.96	
1-HR	99.90pct	1.39949	OU/M**3	RCPT_3	251550.59	5782163.45	93.98	0	93.98	
1-HR	99.90pct	2.1973	OU/M**3	RCPT_4	251850.59	5781563.45	90.78	0	90.78	
1-HR	99.90pct	1.44885	OU/M**3	RCPT_5	251850.59	5781863.45	98.78	0	98.78	
1-HR	99.90pct	3.0311	OU/M**3	RCPT_6	252150.59	5781563.45	93.2	0	93.2	
1-HR	99.90pct	2.23829	OU/M**3	RCPT_7	252150.59	5781863.45	92.95	0	92.95	
1-HR	99.90pct	6.74663	OU/M**3	RCPT_8	252450.59	5781563.45	88.74	0	88.74	
1-HR	99.90pct	3.2804	OU/M**3	RCPT_9	252450.59	5781863.45	89.76	0	89.76	
1-HR	99.90pct	2.93632	OU/M**3	RCPT_10	252750.59	5781563.45	83.76	0	83.76	
1-HR	99.90pct	2.41196	OU/M**3	RCPT_11	252750.59	5781863.45	89.57	0	89.57	

AERMOD Results

Sensitive Receptor Summary

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
Prepared By: JL
Reviewed By: NW
Notes:

Averaging Period	Rank	Peak	Units	Receptor ID	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	99.90pct	1.65787	OU/M**3	RCPT_12	253050.59	5781863.45	85.76	0	89	
1-HR	99.90pct	1.25801	OU/M**3	RCPT_13	253350.59	5781863.45	78.23	0	78.23	
1-HR	99.90pct	1.06613	OU/M**3	RCPT_14	253650.59	5781863.45	80.58	0	80.58	
1-HR	99.90pct	0.94033	OU/M**3	RCPT_15	253650.59	5782163.45	79.55	0	79.55	
1-HR	99.90pct	0.94848	OU/M**3	RCPT_16	253650.59	5782463.45	86.78	0	86.78	
1-HR	99.90pct	0.9498	OU/M**3	RCPT_17	253950.59	5781863.45	82.23	0	82.23	
1-HR	99.90pct	0.83056	OU/M**3	RCPT_18	253950.59	5782163.45	84.35	0	84.35	
1-HR	99.90pct	0.8068	OU/M**3	RCPT_19	253950.59	5782463.45	86.02	0	86.02	
1-HR	99.90pct	0.72466	OU/M**3	RCPT_20	253950.59	5782763.45	82.02	0	82.02	
1-HR	99.50pct	0.94564	OU/M**3	RCPT_1	251550.59	5781563.45	84.81	0	92	
1-HR	99.50pct	0.85585	OU/M**3	RCPT_2	251550.59	5781863.45	91.96	0	91.96	
1-HR	99.50pct	0.68641	OU/M**3	RCPT_3	251550.59	5782163.45	93.98	0	93.98	
1-HR	99.50pct	1.27573	OU/M**3	RCPT_4	251850.59	5781563.45	90.78	0	90.78	
1-HR	99.50pct	0.86331	OU/M**3	RCPT_5	251850.59	5781863.45	98.78	0	98.78	
1-HR	99.50pct	1.66175	OU/M**3	RCPT_6	252150.59	5781563.45	93.2	0	93.2	
1-HR	99.50pct	1.13778	OU/M**3	RCPT_7	252150.59	5781863.45	92.95	0	92.95	
1-HR	99.50pct	2.77867	OU/M**3	RCPT_8	252450.59	5781563.45	88.74	0	88.74	
1-HR	99.50pct	0.97913	OU/M**3	RCPT_9	252450.59	5781863.45	89.76	0	89.76	
1-HR	99.50pct	1.62802	OU/M**3	RCPT_10	252750.59	5781563.45	83.76	0	83.76	
1-HR	99.50pct	0.93535	OU/M**3	RCPT_11	252750.59	5781863.45	89.57	0	89.57	
1-HR	99.50pct	0.83032	OU/M**3	RCPT_12	253050.59	5781863.45	85.76	0	89	
1-HR	99.50pct	0.69708	OU/M**3	RCPT_13	253350.59	5781863.45	78.23	0	78.23	
1-HR	99.50pct	0.60684	OU/M**3	RCPT_14	253650.59	5781863.45	80.58	0	80.58	
1-HR	99.50pct	0.50444	OU/M**3	RCPT_15	253650.59	5782163.45	79.55	0	79.55	
1-HR	99.50pct	0.43893	OU/M**3	RCPT_16	253650.59	5782463.45	86.78	0	86.78	
1-HR	99.50pct	0.50869	OU/M**3	RCPT_17	253950.59	5781863.45	82.23	0	82.23	
1-HR	99.50pct	0.46483	OU/M**3	RCPT_18	253950.59	5782163.45	84.35	0	84.35	
1-HR	99.50pct	0.42955	OU/M**3	RCPT_19	253950.59	5782463.45	86.02	0	86.02	
1-HR	99.50pct	0.33551	OU/M**3	RCPT_20	253950.59	5782763.45	82.02	0	82.02	
1-HR	98.00pct	0.52403	OU/M**3	RCPT_1	251550.59	5781563.45	84.81	0	92	
1-HR	98.00pct	0.39276	OU/M**3	RCPT_2	251550.59	5781863.45	91.96	0	91.96	

AERMOD Results

Sensitive Receptor Summary

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
Prepared By: JL
Reviewed By: NW
Notes:

Averaging Period	Rank	Peak	Units	Receptor ID	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	98.00pct	0.27074	OU/M**3	RCPT_3	251550.59	5782163.45	93.98	0	93.98	
1-HR	98.00pct	0.65692	OU/M**3	RCPT_4	251850.59	5781563.45	90.78	0	90.78	
1-HR	98.00pct	0.35111	OU/M**3	RCPT_5	251850.59	5781863.45	98.78	0	98.78	
1-HR	98.00pct	0.74228	OU/M**3	RCPT_6	252150.59	5781563.45	93.2	0	93.2	
1-HR	98.00pct	0.32232	OU/M**3	RCPT_7	252150.59	5781863.45	92.95	0	92.95	
1-HR	98.00pct	0.71677	OU/M**3	RCPT_8	252450.59	5781563.45	88.74	0	88.74	
1-HR	98.00pct	0.18333	OU/M**3	RCPT_9	252450.59	5781863.45	89.76	0	89.76	
1-HR	98.00pct	0.60975	OU/M**3	RCPT_10	252750.59	5781563.45	83.76	0	83.76	
1-HR	98.00pct	0.20205	OU/M**3	RCPT_11	252750.59	5781863.45	89.57	0	89.57	
1-HR	98.00pct	0.25266	OU/M**3	RCPT_12	253050.59	5781863.45	85.76	0	89	
1-HR	98.00pct	0.25911	OU/M**3	RCPT_13	253350.59	5781863.45	78.23	0	78.23	
1-HR	98.00pct	0.25902	OU/M**3	RCPT_14	253650.59	5781863.45	80.58	0	80.58	
1-HR	98.00pct	0.16563	OU/M**3	RCPT_15	253650.59	5782163.45	79.55	0	79.55	
1-HR	98.00pct	0.1038	OU/M**3	RCPT_16	253650.59	5782463.45	86.78	0	86.78	
1-HR	98.00pct	0.23158	OU/M**3	RCPT_17	253950.59	5781863.45	82.23	0	82.23	
1-HR	98.00pct	0.16718	OU/M**3	RCPT_18	253950.59	5782163.45	84.35	0	84.35	
1-HR	98.00pct	0.11132	OU/M**3	RCPT_19	253950.59	5782463.45	86.02	0	86.02	
1-HR	98.00pct	0.082883	OU/M**3	RCPT_20	253950.59	5782763.45	82.02	0	82.02	
1-HR	94.00pct	0.15155	OU/M**3	RCPT_1	251550.59	5781563.45	84.81	0	92	
1-HR	94.00pct	0.078194	OU/M**3	RCPT_2	251550.59	5781863.45	91.96	0	91.96	
1-HR	94.00pct	0.045202	OU/M**3	RCPT_3	251550.59	5782163.45	93.98	0	93.98	
1-HR	94.00pct	0.14926	OU/M**3	RCPT_4	251850.59	5781563.45	90.78	0	90.78	
1-HR	94.00pct	0.067006	OU/M**3	RCPT_5	251850.59	5781863.45	98.78	0	98.78	
1-HR	94.00pct	0.15426	OU/M**3	RCPT_6	252150.59	5781563.45	93.2	0	93.2	
1-HR	94.00pct	0.062754	OU/M**3	RCPT_7	252150.59	5781863.45	92.95	0	92.95	
1-HR	94.00pct	0.15575	OU/M**3	RCPT_8	252450.59	5781563.45	88.74	0	88.74	
1-HR	94.00pct	0.049055	OU/M**3	RCPT_9	252450.59	5781863.45	89.76	0	89.76	
1-HR	94.00pct	0.13471	OU/M**3	RCPT_10	252750.59	5781563.45	83.76	0	83.76	
1-HR	94.00pct	0.041025	OU/M**3	RCPT_11	252750.59	5781863.45	89.57	0	89.57	
1-HR	94.00pct	0.047458	OU/M**3	RCPT_12	253050.59	5781863.45	85.76	0	89	
1-HR	94.00pct	0.048105	OU/M**3	RCPT_13	253350.59	5781863.45	78.23	0	78.23	

AERMOD Results

Sensitive Receptor Summary

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
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Reviewed By: NW
Notes:

Averaging Period	Rank	Peak	Units	Receptor ID	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	94.00pct	0.046619	OU/M**3	RCPT_14	253650.59	5781863.45	80.58	0	80.58	
1-HR	94.00pct	0.030241	OU/M**3	RCPT_15	253650.59	5782163.45	79.55	0	79.55	
1-HR	94.00pct	0.018286	OU/M**3	RCPT_16	253650.59	5782463.45	86.78	0	86.78	
1-HR	94.00pct	0.045377	OU/M**3	RCPT_17	253950.59	5781863.45	82.23	0	82.23	
1-HR	94.00pct	0.028476	OU/M**3	RCPT_18	253950.59	5782163.45	84.35	0	84.35	
1-HR	94.00pct	0.01882	OU/M**3	RCPT_19	253950.59	5782463.45	86.02	0	86.02	
1-HR	94.00pct	0.016195	OU/M**3	RCPT_20	253950.59	5782763.45	82.02	0	82.02	
1-HR	90.00pct	0.062966	OU/M**3	RCPT_1	251550.59	5781563.45	84.81	0	92	
1-HR	90.00pct	0.034119	OU/M**3	RCPT_2	251550.59	5781863.45	91.96	0	91.96	
1-HR	90.00pct	0.020324	OU/M**3	RCPT_3	251550.59	5782163.45	93.98	0	93.98	
1-HR	90.00pct	0.064001	OU/M**3	RCPT_4	251850.59	5781563.45	90.78	0	90.78	
1-HR	90.00pct	0.02959	OU/M**3	RCPT_5	251850.59	5781863.45	98.78	0	98.78	
1-HR	90.00pct	0.071169	OU/M**3	RCPT_6	252150.59	5781563.45	93.2	0	93.2	
1-HR	90.00pct	0.033394	OU/M**3	RCPT_7	252150.59	5781863.45	92.95	0	92.95	
1-HR	90.00pct	0.0868	OU/M**3	RCPT_8	252450.59	5781563.45	88.74	0	88.74	
1-HR	90.00pct	0.023293	OU/M**3	RCPT_9	252450.59	5781863.45	89.76	0	89.76	
1-HR	90.00pct	0.071044	OU/M**3	RCPT_10	252750.59	5781563.45	83.76	0	83.76	
1-HR	90.00pct	0.018229	OU/M**3	RCPT_11	252750.59	5781863.45	89.57	0	89.57	
1-HR	90.00pct	0.022864	OU/M**3	RCPT_12	253050.59	5781863.45	85.76	0	89	
1-HR	90.00pct	0.023136	OU/M**3	RCPT_13	253350.59	5781863.45	78.23	0	78.23	
1-HR	90.00pct	0.022527	OU/M**3	RCPT_14	253650.59	5781863.45	80.58	0	80.58	
1-HR	90.00pct	0.014005	OU/M**3	RCPT_15	253650.59	5782163.45	79.55	0	79.55	
1-HR	90.00pct	0.0081833	OU/M**3	RCPT_16	253650.59	5782463.45	86.78	0	86.78	
1-HR	90.00pct	0.021578	OU/M**3	RCPT_17	253950.59	5781863.45	82.23	0	82.23	
1-HR	90.00pct	0.0134	OU/M**3	RCPT_18	253950.59	5782163.45	84.35	0	84.35	
1-HR	90.00pct	0.0084925	OU/M**3	RCPT_19	253950.59	5782463.45	86.02	0	86.02	
1-HR	90.00pct	0.0074449	OU/M**3	RCPT_20	253950.59	5782763.45	82.02	0	82.02	

AERMOD Results

Peak Values

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
Prepared By: JL
Reviewed By: NW
Notes:

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	69.50745	OU/M**3	252436.65	5781391	87.9	0	87.9	2/08/2024, 3
1-HR	99.90pct	34.55001	OU/M**3	252436.65	5781391	87.9	0	87.9	
1-HR	99.50pct	24.65075	OU/M**3	252486.65	5780991	83.5	0	83.5	
1-HR	98.00pct	15.06656	OU/M**3	252351.16	5780418.9	81.9	0	81.9	
1-HR	94.00pct	8.74982	OU/M**3	252351.16	5780418.9	81.9	0	81.9	
1-HR	90.00pct	6.28102	OU/M**3	252486.65	5780991	83.5	0	83.5	

AERMOD Results

Top 100 Results

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
Prepared By: JL
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Notes:

** AERMOD (23132): C:\Users\temp\Deskto\Projects\1134\1134.isc*
** AERMET (23132): 05/05/25 17:38:21*
** MODELING OPTIONS USED: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data BULKRN*
** RANK VALUES FOR 1 SOURCE GROUPS*
** INCLUDES OVERALL MAXIMUM VALUES WITH DUPLICATE DATA PERIODS REMOVED*
** FORMAT: (1X,I6,1X,F13.5,1X,I8.8,2(1X,F13.5),3(1X,F7.2),2X,A8)*

RANK	AVERAGE CONC	DATE	X	Y	ZELEV	ZHILL	ZFLAG	GRP
1	69.50745	24080203	252436.65	5781390.96	87.9	87.9	0	ALL
2	61.04257	21060101	252436.65	5781390.96	87.9	87.9	0	ALL
3	60.40622	21090319	252436.65	5781390.96	87.9	87.9	0	ALL
4	60.16638	23051022	252436.65	5781390.96	87.9	87.9	0	ALL
5	60.1056	20081024	252436.65	5781390.96	87.9	87.9	0	ALL
6	59.72188	20071803	252436.65	5781390.96	87.9	87.9	0	ALL
7	59.11441	24022505	252436.65	5781390.96	87.9	87.9	0	ALL
8	59.04243	22110503	252436.65	5781390.96	87.9	87.9	0	ALL
9	57.956	21052024	252436.65	5781390.96	87.9	87.9	0	ALL
10	53.62714	21021902	252436.65	5781390.96	87.9	87.9	0	ALL
11	52.46654	24101003	252436.65	5781390.96	87.9	87.9	0	ALL
12	51.36262	20012902	252436.65	5781390.96	87.9	87.9	0	ALL
13	51.27525	22042424	252436.65	5781390.96	87.9	87.9	0	ALL
14	51.21186	20081420	252436.65	5781390.96	87.9	87.9	0	ALL
15	50.26132	23051323	252436.65	5781390.96	87.9	87.9	0	ALL
16	49.89018	24123005	252436.65	5781390.96	87.9	87.9	0	ALL
17	49.81932	23060301	252436.65	5781390.96	87.9	87.9	0	ALL
18	49.71929	23090124	252436.65	5781390.96	87.9	87.9	0	ALL

AERMOD Results

Top 100 Results

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
Prepared By: JL
Reviewed By: NW
Notes:

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** FORMAT: (1X,I6,1X,F13.5,1X,I8.8,2(1X,F13.5),3(1X,F7.2),2X,A8)*

RANK	AVERAGE CONC	DATE	X	Y	ZELEV	ZHILL	ZFLAG	GRP
19	47.77472	22042902	252436.65	5781390.96	87.9	87.9	0	ALL
20	46.85002	20042224	252436.65	5781390.96	87.9	87.9	0	ALL
21	45.03768	24091024	252436.65	5781390.96	87.9	87.9	0	ALL
22	44.80311	22053003	252436.65	5781390.96	87.9	87.9	0	ALL
23	44.63601	21041305	252436.65	5781390.96	87.9	87.9	0	ALL
24	44.0695	22040603	252436.65	5781390.96	87.9	87.9	0	ALL
25	43.28517	22070603	252436.65	5781390.96	87.9	87.9	0	ALL
26	42.6438	22122501	252436.65	5781390.96	87.9	87.9	0	ALL
27	42.41146	22052321	252436.65	5781390.96	87.9	87.9	0	ALL
28	41.83181	22092023	252436.65	5781390.96	87.9	87.9	0	ALL
29	41.0487	22061908	252436.65	5781390.96	87.9	87.9	0	ALL
30	40.3258	20032722	252436.65	5781390.96	87.9	87.9	0	ALL
31	40.01279	23091202	252436.65	5781390.96	87.9	87.9	0	ALL
32	39.49654	23082822	252436.65	5781390.96	87.9	87.9	0	ALL
33	38.90965	24093020	252436.65	5781390.96	87.9	87.9	0	ALL
34	38.11376	20122702	252436.65	5781390.96	87.9	87.9	0	ALL
35	37.99445	21071021	252436.65	5781390.96	87.9	87.9	0	ALL
36	37.16135	22082701	252436.65	5781390.96	87.9	87.9	0	ALL

AERMOD Results

Top 100 Results

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
Prepared By: JL
Reviewed By: NW
Notes:

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RANK	AVERAGE CONC	DATE	X	Y	ZELEV	ZHILL	ZFLAG	GRP
37	36.8206	23092305	252436.65	5781390.96	87.9	87.9	0	ALL
38	36.72543	24110124	252436.65	5781390.96	87.9	87.9	0	ALL
39	36.63382	22091402	252436.65	5781390.96	87.9	87.9	0	ALL
40	36.62154	20092902	252436.65	5781390.96	87.9	87.9	0	ALL
41	36.32845	23101103	252436.65	5781390.96	87.9	87.9	0	ALL
42	35.14409	23112124	252436.65	5781390.96	87.9	87.9	0	ALL
43	34.87634	24070607	252436.65	5781390.96	87.9	87.9	0	ALL
44	34.49122	23091201	252436.65	5781390.96	87.9	87.9	0	ALL
45	34.46748	23012802	252436.65	5781390.96	87.9	87.9	0	ALL
46	34.459	21101206	252436.65	5781390.96	87.9	87.9	0	ALL
47	34.42758	20010122	252436.65	5781390.96	87.9	87.9	0	ALL
48	33.63371	24022724	252436.65	5781390.96	87.9	87.9	0	ALL
49	33.31957	20110202	252436.65	5781390.96	87.9	87.9	0	ALL
50	33.25302	24061403	252436.65	5781390.96	87.9	87.9	0	ALL
51	33.20207	22101104	252436.65	5781390.96	87.9	87.9	0	ALL
52	33.04801	21110106	252436.65	5781390.96	87.9	87.9	0	ALL
53	32.78962	20051319	252486.65	5780990.96	83.5	83.5	0	ALL
54	32.65852	21111701	252486.65	5781090.96	85.8	85.8	0	ALL

AERMOD Results

Top 100 Results

Project Code: 1134.1
Client: NETHERBY NOMINEES PTY LTD AND RAMSEY PROPERTY GROUP PTY LTD
Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
Prepared By: JL
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Notes:

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** FORMAT: (1X,I6,1X,F13.5,1X,I8.8,2(1X,F13.5),3(1X,F7.2),2X,A8)*

RANK	AVERAGE CONC	DATE	X	Y	ZELEV	ZHILL	ZFLAG	GRP
55	32.33162	22120606	252386.65	5780390.96	80.7	80.7	0	ALL
56	32.21113	24081119	252436.65	5781390.96	87.9	87.9	0	ALL
57	32.09881	21122423	252386.65	5780390.96	80.7	80.7	0	ALL
58	32.07866	23111002	252386.65	5780390.96	80.7	80.7	0	ALL
59	31.83787	24021807	252386.65	5780390.96	80.7	80.7	0	ALL
60	31.77377	21121703	252436.65	5781390.96	87.9	87.9	0	ALL
61	31.44479	22080708	252386.65	5780390.96	80.7	80.7	0	ALL
62	31.43878	24072609	252386.65	5780390.96	80.7	80.7	0	ALL
63	31.35391	24092723	252436.65	5781390.96	87.9	87.9	0	ALL
64	31.26743	20122704	252436.65	5781390.96	87.9	87.9	0	ALL
65	31.23918	21101205	252436.65	5781390.96	87.9	87.9	0	ALL
66	31.01271	20110201	252436.65	5781390.96	87.9	87.9	0	ALL
67	31.01134	24060704	252386.65	5780390.96	80.7	80.7	0	ALL
68	30.75742	22060305	252436.65	5781390.96	87.9	87.9	0	ALL
69	30.59531	24070822	252436.65	5781390.96	87.9	87.9	0	ALL
70	30.50493	23092405	252486.65	5780990.96	83.5	83.5	0	ALL
71	30.37267	20061006	252486.65	5780990.96	83.5	83.5	0	ALL
72	30.35572	24110903	252486.65	5780990.96	83.5	83.5	0	ALL

AERMOD Results

Top 100 Results

Project Code: 1134.1
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Site ID: 449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA
Project Name: ODOUR IMPACT AND RISK ASSESSMENT
Revision: 0
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Notes:

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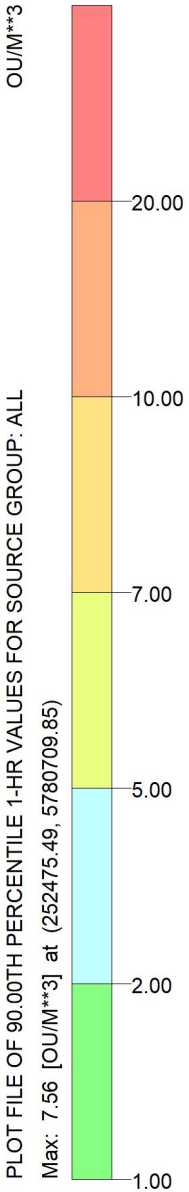
** RANK VALUES FOR 1 SOURCE GROUPS*
** INCLUDES OVERALL MAXIMUM VALUES WITH DUPLICATE DATA PERIODS REMOVED*
** FORMAT: (1X,I6,1X,F13.5,1X,I8.8,2(1X,F13.5),3(1X,F7.2),2X,A8)*

RANK	AVERAGE CONC	DATE	X	Y	ZELEV	ZHILL	ZFLAG	GRP
73	30.35277	20072507	252486.65	5780990.96	83.5	83.5	0	ALL
74	30.35114	22041402	252486.65	5780990.96	83.5	83.5	0	ALL
75	30.34775	24080419	252486.65	5780990.96	83.5	83.5	0	ALL
76	30.34384	23070323	252486.65	5780990.96	83.5	83.5	0	ALL
77	30.33941	21113001	252486.65	5780990.96	83.5	83.5	0	ALL
78	30.33842	23101924	252486.65	5780990.96	83.5	83.5	0	ALL
79	30.32669	24070703	252486.65	5780990.96	83.5	83.5	0	ALL
80	30.32101	22041422	252486.65	5780990.96	83.5	83.5	0	ALL
81	30.31321	24011002	252486.65	5780990.96	83.5	83.5	0	ALL
82	30.30422	24061404	252486.65	5780990.96	83.5	83.5	0	ALL
83	30.28068	20020106	252386.65	5780390.96	80.7	80.7	0	ALL
84	30.24315	22120306	252486.65	5780990.96	83.5	83.5	0	ALL
85	30.23068	23092402	252486.65	5780990.96	83.5	83.5	0	ALL

Appendix B

PROJECT TITLE:

Contour plot of the 90th 1-hour values (Year 2024)



COMMENTS:

SOURCES:

171

RECEPTORS:

4139

OUTPUT TYPE:

Concentration

MAX:

7.56 OU/M3**

COMPANY NAME:

Peter J Ramsay & Associates

MODELER:

AD

DATE:

5/05/2025

SCALE: 1:35,000

0 1 km

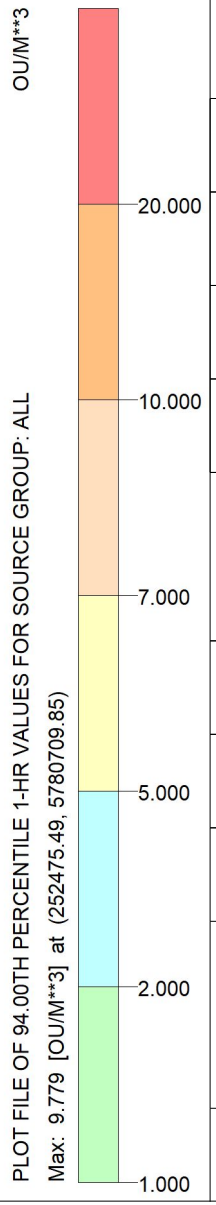
PETER J RAMSAY & ASSOCIATES

PROJECT NO.:

1134.1

PROJECT TITLE:

Contour plot of the 94th 1-hour values (Year 2024)



COMMENTS:

SOURCES:

171

RECEPTORS:

4139

OUTPUT TYPE:

Concentration

MAX:

9.779 OU/M3**

COMPANY NAME:

Peter J Ramsay & Associates

MODELER:

AD

DATE:

5/05/2025

SCALE: 1:35,000

0 1 km

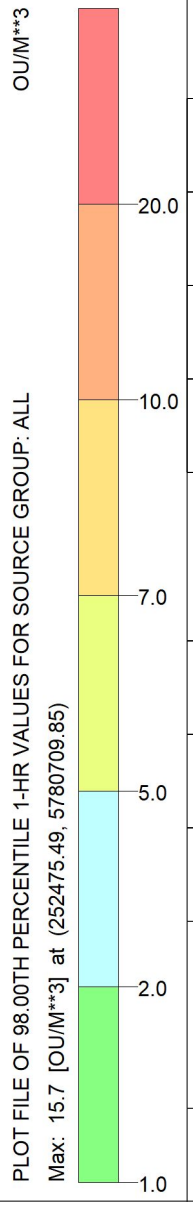
PETER J RAMSAY & ASSOCIATES

PROJECT NO.:

1134.1

PROJECT TITLE:

Contour plot of the 98th 1-hour values (Year 2024)



COMMENTS:

SOURCES:

171

RECEPTORS:

4139

OUTPUT TYPE:

Concentration

MAX:

15.7 OU/M3**

COMPANY NAME:

Peter J Ramsay & Associates

MODELER:

AD

DATE:

5/05/2025

SCALE: 1:35,000

0 1 km

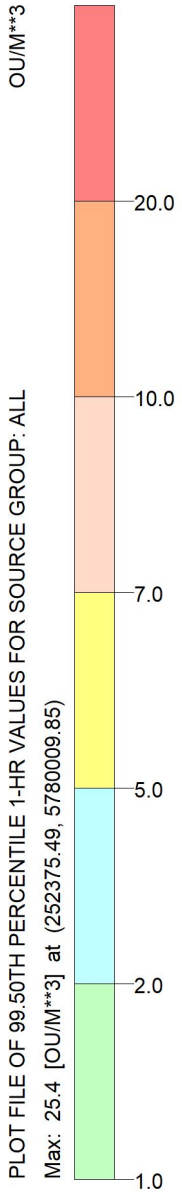
PETER J RAMSAY & ASSOCIATES

PROJECT NO.:

1134.1

PROJECT TITLE:

Contour plot of the 99.5th 1-hour values (Year 2024)



PLOT FILE OF 99.50TH PERCENTILE 1-HR VALUES FOR SOURCE GROUP: ALL

Max: 25.4 [OU/M**3] at (252375.49, 5780009.85)

COMMENTS:

SOURCES:

171

RECEPTORS:

4139

OUTPUT TYPE:

Concentration

MAX:

25.4 OU/M3**

COMPANY NAME:

Peter J Ramsay & Associates

MODELER:

AD

DATE:

5/05/2025

SCALE: 1:35,000

0 1 km

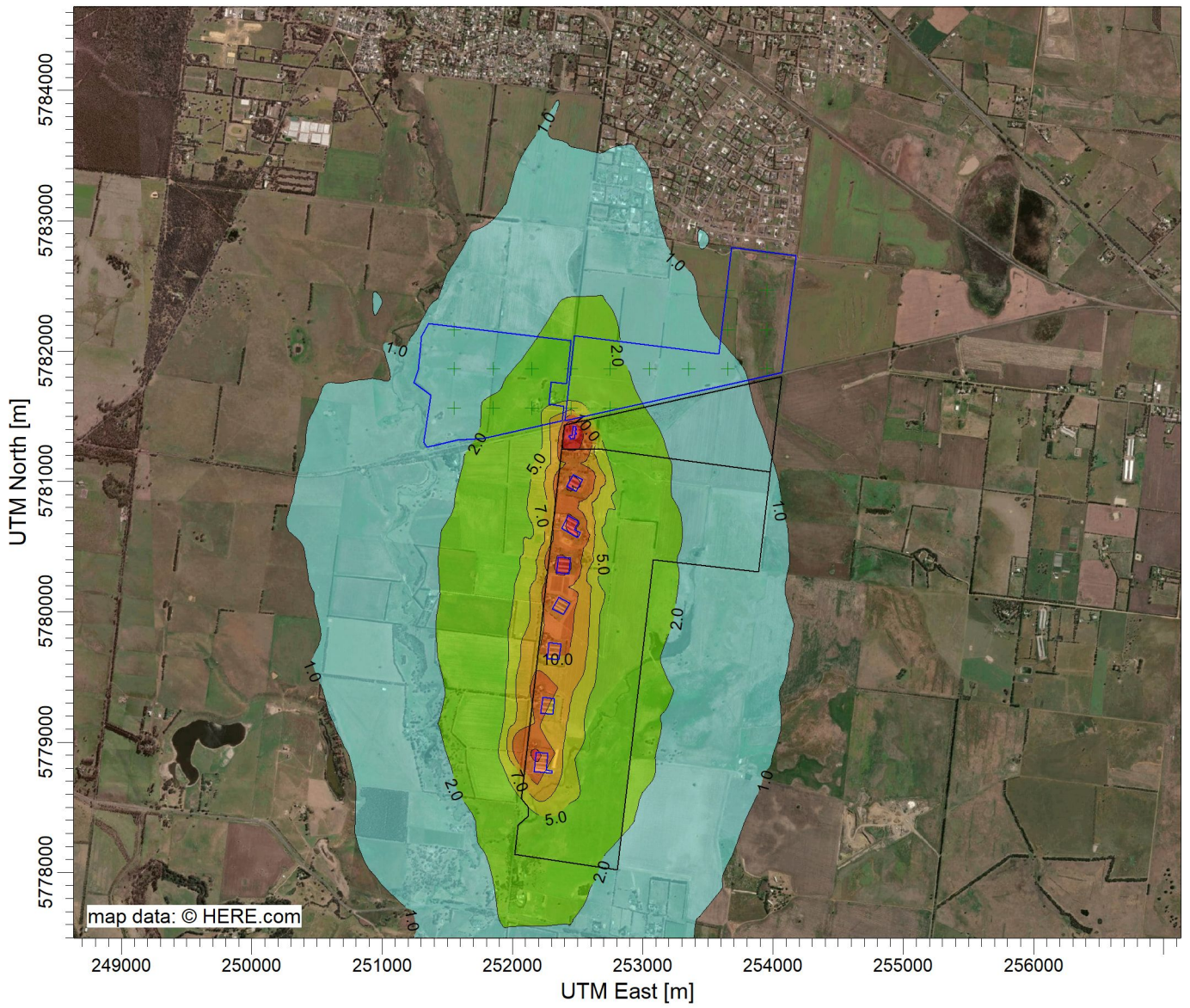
PETER J RAMSAY & ASSOCIATES

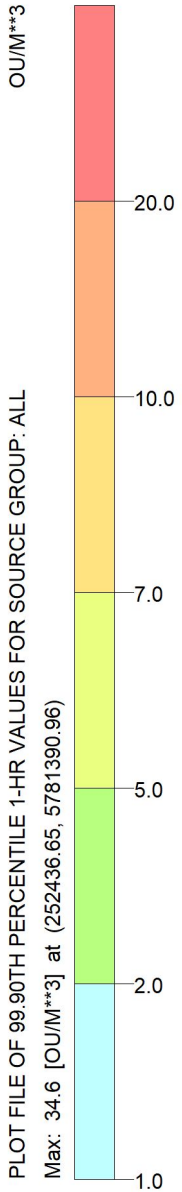
PROJECT NO.:

1134.1

PROJECT TITLE:

Contour plot of 99.9th 1-hour values (2020-2024)





PLOT FILE OF 99.90TH PERCENTILE 1-HR VALUES FOR SOURCE GROUP: ALL

Max: 34.6 [OU/M**3] at (252436.65, 5781390.96)

COMMENTS:

SOURCES:

149

RECEPTORS:

2383

OUTPUT TYPE:

Concentration

MAX:

34.6 OU/M3**

COMPANY NAME:

Peter J Ramsay & Associates

MODELER:

AD

DATE:

5/05/2025

SCALE: 1:50,000

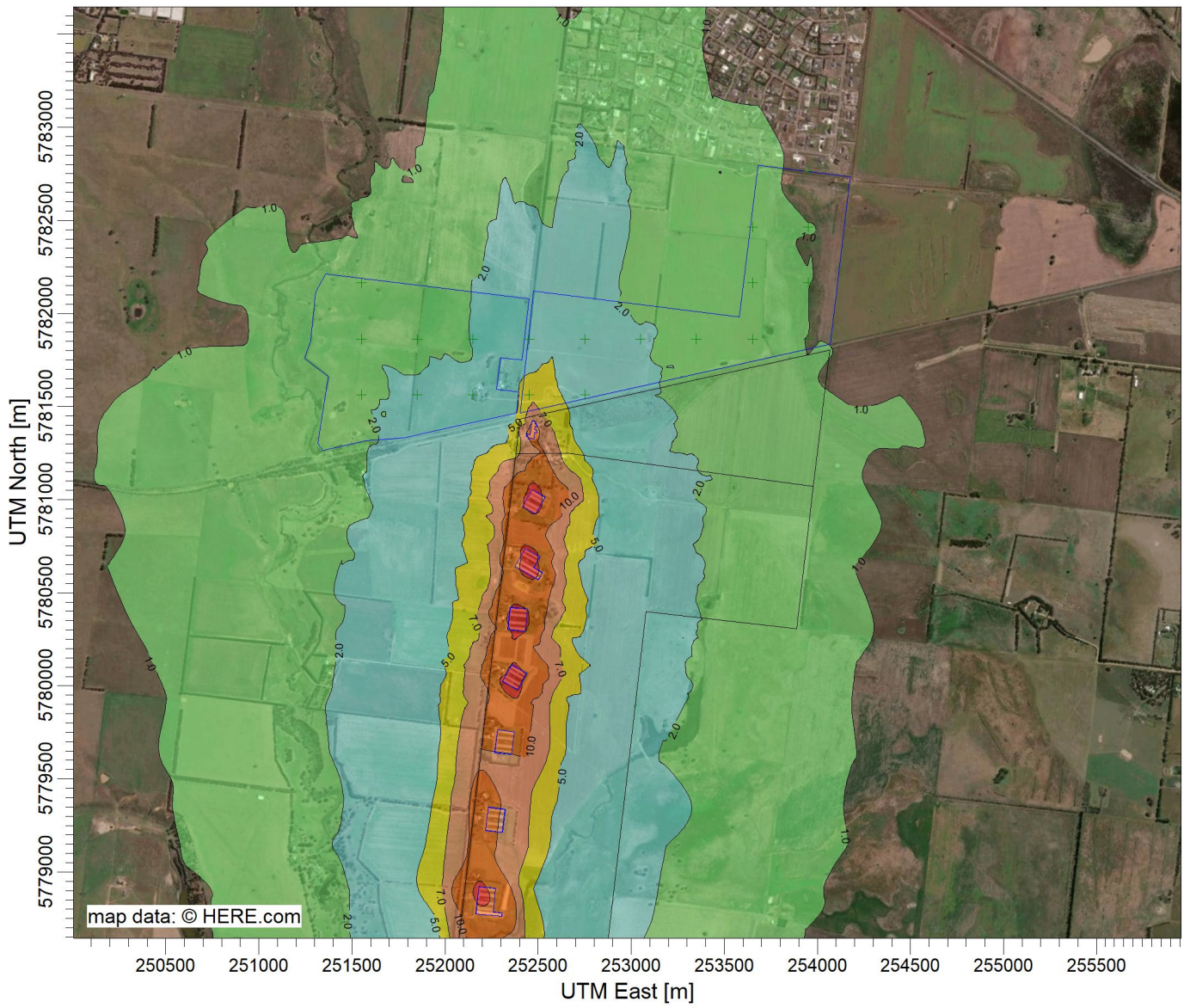
0 1 km

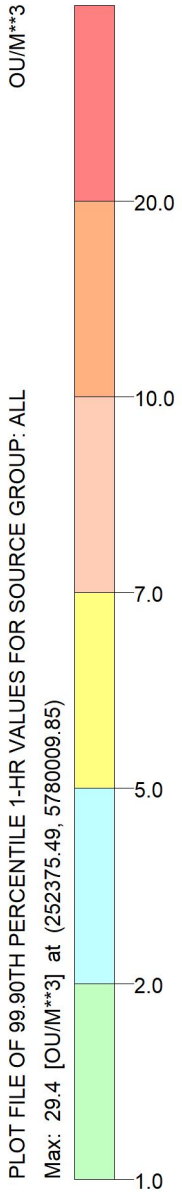
PETER J RAMSAY & ASSOCIATES

PROJECT NO.:

PROJECT TITLE:

Contour plot of the 99.9th 1-hour values (Year 2024)





COMMENTS:

SOURCES:

171

RECEPTORS:

4139

OUTPUT TYPE:

Concentration

MAX:

29.4 OU/M3**

COMPANY NAME:

Peter J Ramsay & Associates

MODELER:

AD

DATE:

5/05/2025

SCALE: 1:35,000

0 1 km

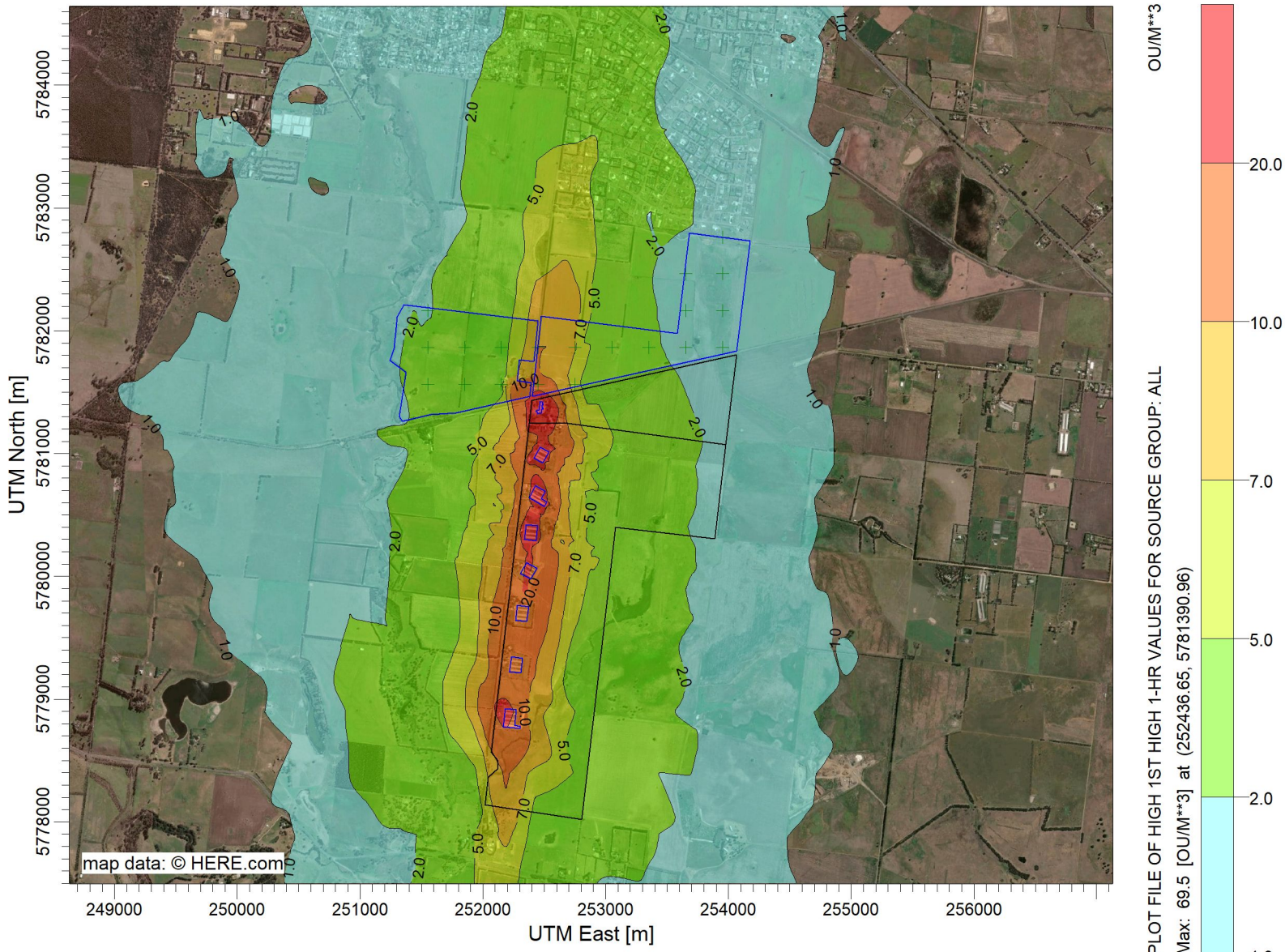
PETER J RAMSAY & ASSOCIATES

PROJECT NO.:

1134.1

PROJECT TITLE:

Contour plot of highest 1-hour values (2020-2024)



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

Max: 69.5 [OU/M**3] at (252436.65, 5781390.96)

COMMENTS:

SOURCES:

149

RECEPTORS:

2383

OUTPUT TYPE:

Concentration

MAX:

69.5 OU/M3**

COMPANY NAME:

Peter J Ramsay & Associates

MODELER:

AD

DATE:

5/05/2025

SCALE: 1:50,000

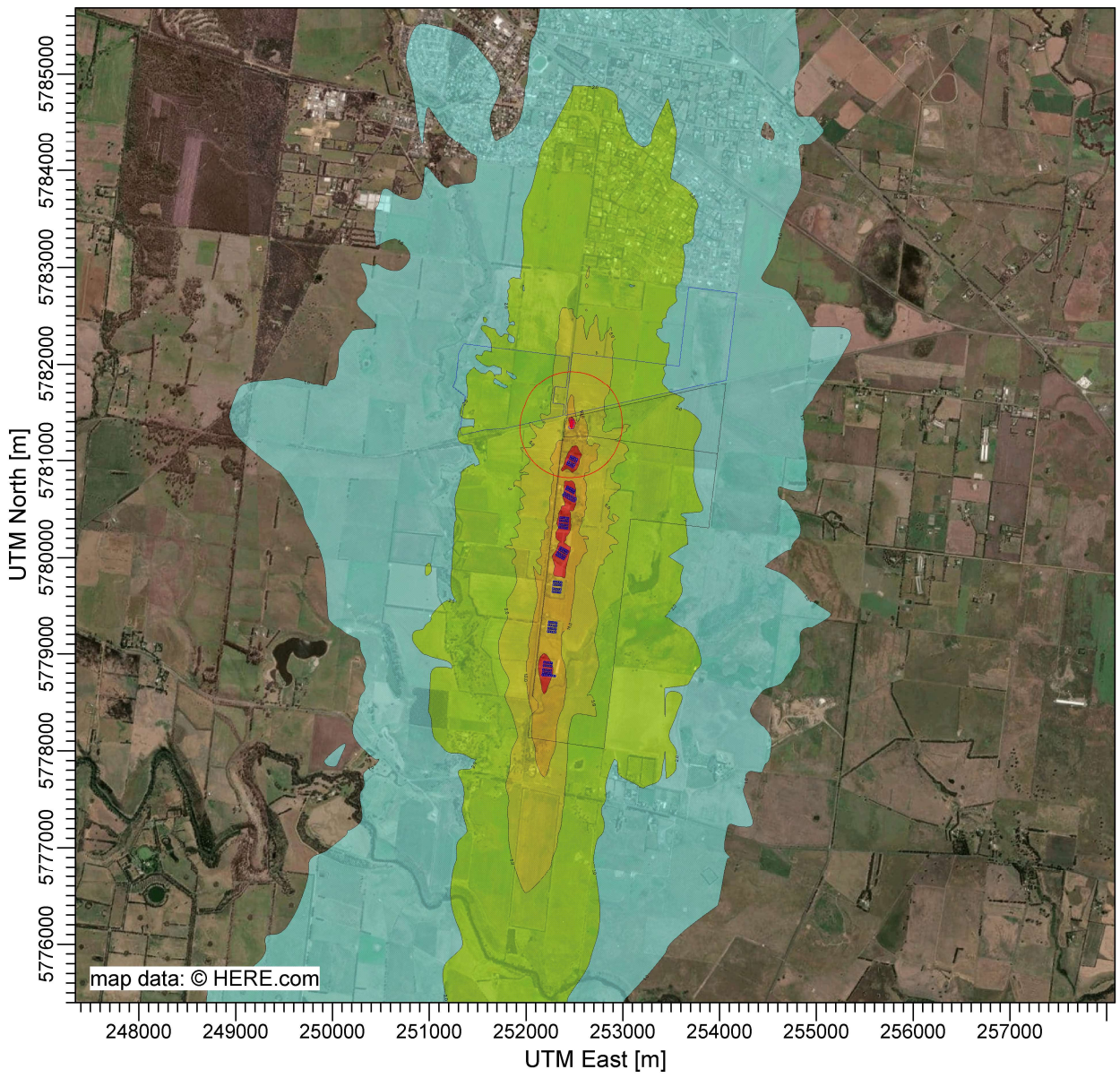
0 1 km

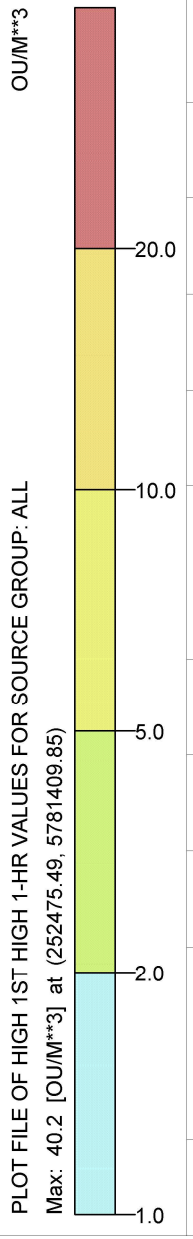
PETER J RAMSAY & ASSOCIATES

PROJECT NO.:

PROJECT TITLE:

Contour plot of the highest 1-hour values (Year 2024)





COMMENTS:

SOURCES:
171

RECEPTORS:
4139

OUTPUT TYPE:
Concentration

MAX:
40.2 OU/M3**

COMPANY NAME:
Peter J Ramsay & Associates

MODELER:
AD

DATE:
17/04/2025

SCALE: 1:70,000

0 2 km

PETER J RAMSAY & ASSOCIATES

PROJECT NO.:

Appendix C

Report

METEOROLOGICAL DATA VALIDATION REPORT

ODOUR IMPACT AND RISK ASSESSMENT

Reference: 1134.1

449 BURNSIDE ROAD, BANNOCKBURN, VICTORIA

13 May 2025

Environment, Health & Safety, and Sustainability Consultants

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USE OF REPORT

The preparation of the report has been undertaken for the purpose of validating meteorological data used in relation to the hatchery at 449 Burnside Road, Bannockburn, Victoria, 3331, and the report cannot be used for any other purpose. The report has been prepared solely for the benefit of Netherby Nominees Pty Ltd and Ramsey Property Group Pty Ltd. The report is provided on the condition that it is not made available to any other party except with the prior written consent of Peter J Ramsay & Associates Pty Ltd (which consent may or may not be given at its discretion).

DISCLAIMER

This report is provided on the condition that Peter J Ramsay & Associates Pty Ltd disclaims all liability to any person other than Netherby Nominees Pty Ltd and Ramsey Property Group Pty Ltd in respect of the actions, errors, or omissions of any such person in reliance, whether in whole or in part, upon the contents of this report.

LIMITATIONS

Peter J Ramsay & Associates Pty Ltd has undertaken this data validation in accordance with Environment Protection Authority Victoria and National guidelines. The nature of this assessment is influenced by factors such as professional judgement, selective testing of representative model inputs for the site and the reliability of the information relating to the site which was obtained by the methodology described in this report. Reasonable care has been taken to verify the accuracy of the data and information available to Peter J Ramsay & Associates Pty Ltd.

Our findings presented in this report are based on the information available to us during this assessment, and some of those findings could vary if the information upon which they are based is determined to be false, inaccurate, or incomplete. Peter J Ramsay & Associates Pty Ltd disclaims all liability to any person for events taking place after the time during which the assessment was undertaken.

LIST OF ABBREVIATIONS

AERMOD	American Meteorological Society and U.S. Environmental Protection Agency Regulatory Model
BOM	Bureau of Meteorology
EPA	Environment Protection Authority
PJRA	Peter J Ramsay & Associates
WRF	Weather Research and Forecasting
MMIF	Mesoscale Model Interface Program
AERMET	American Meteorological Society and U.S. Environmental Protection Agency Meteorological Pre-processor
WGS	World Geodetic System
UTM	Universal Transverse Mercator
GPS	Global Positioning System
WMO	World Meteorological Organisation
MAE	Mean Absolute Error
MAPE	Mean Absolute Percentage Error
RMSE	Root Mean Square Error
MBE	Mean Bias Error

1. INTRODUCTION

On 3 March 2025, Peter J Ramsay & Associates (PJRA) was engaged by Netherby Nominees Pty Ltd (Netherby Nominees) and Ramsey Property Group Pty Ltd (Ramsey Property Group), to undertake an odour assessment in relation to the hatchery at 449 Burnside Road, Bannockburn, Victoria (the 'Site'). This assessment was performed in accordance with EPA Publication 1883 *Guidance for assessing odour*, and dispersion modelling was conducted in compliance with EPA Publication 1957 *Guide to Air Pollution Modelling*, utilising the regulatory dispersion model AERMOD.

It is a requirement of EPA Publication 1957 that meteorological data used in air quality assessments must be representative of the Site. EPA Publication 1957 stipulates that measured meteorological data are preferred over modelled data, provided that the data are site-specific (i.e., measured on-site) or within 5 kilometres of the site without significant topographical barriers. Special considerations may be arranged with the EPA for distances exceeding 5 kilometres, provided the terrain is relatively flat.

The nearest meteorological station to the Site is the She Oaks Bureau of Meteorology (BOM) station (087168), situated approximately 20 kilometres north of the Site. In the absence of suitable measured data, meteorological data used in this odour assessment were generated using the Weather Research and Forecasting (WRF) model. AERMOD-ready meteorological files were obtained from LakesEnvironmental.

This data validation report provides an evaluation of the suitability and representativeness of the prognostic meteorological data for use in the odour assessment and encompass the following details in accordance with EPA Publication 1957:

- Comparison of prognostic meteorological data with measured data from a specific site within the prognostic model domain;
- Description of the proximity of the project site to the measured meteorological data site;
- Description of differences or similarities in terrain and surface parameters between the Site and the meteorological data site.

2. SITE CONTEXT

The Site is located at 449 Burnside Road, Bannockburn, which is in southwest Victoria. The nearest BOM stations to Bannockburn, according to BOM, are:

- 087168 She Oaks VIC (16.1km away)
- 087184 Geelong VIC (22.6km away)
- 087113 Avalon VIC (27.0km away)

- 087166 Point Wilson [wind Only] VIC (32.3km away)
- 090035 Colac (Mt Gellibrand) VIC (38.6km away)

The location of the Site in relation to the She Oaks BOM station is illustrated in **Figure 1**.

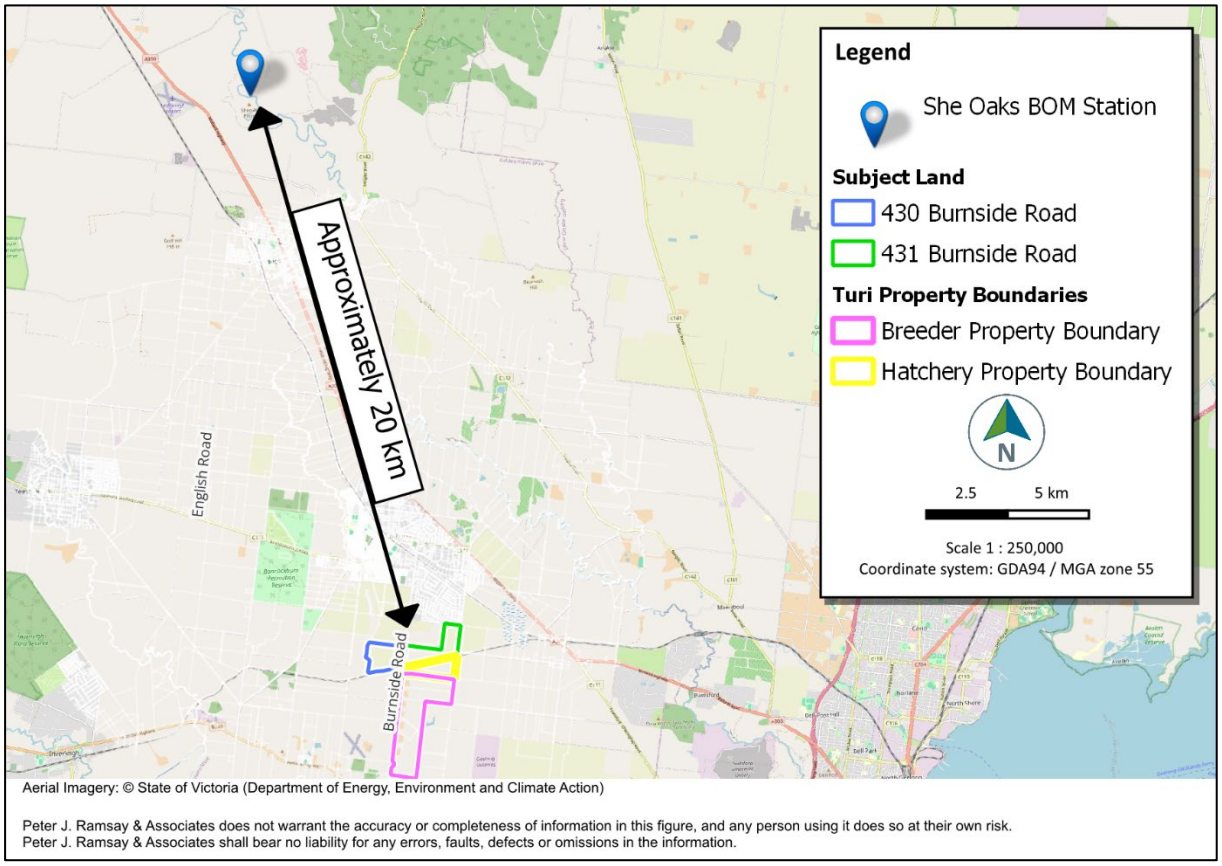

Figure 1 **The Site in relation to the She Oaks BOM station**

3. WRF DATA DESCRIPTION

The WRF-produced meteorological data for the Site were obtained from LakesEnvironmental. The data were accompanied by a report which included the following order information table.

Table 1 WRF data at Project Site

Met Data Type	AERMET-Ready WRF-MMIF (Prognostic & Upper Air Met Data) AERMOD-Ready WRF-MMIF
Start-End Date	Jan 01, 2020 hour 00 - Dec 31, 2024 hour 23
Center Point	Lat.: 38.09385 S – Long.: 144.1756 E
Datum	WGS 84
UTM Zone	-55
Base Elevation	75.01 m
WRF Grid Cell	4 km x 4 km
Site Time Zone	UTC+1000
Closest City & Country	Bannockburn - Australia

The order included two sets of meteorological data files as output by the US EPA Mesoscale Model Interface Program (MMIF):

- AERMET-Ready Prognostic (*.DAT) & Upper Air (*.FSL), and
- AERMOD-Ready Surface (*.SFC) & Profile (*.PFL)

The AERMOD-Ready files were generated by LakesEnvironmental by processing the AERMET-Ready data files output by MMIF through the latest version of the US EPA AERMET meteorological pre-processor executable (Version 24142). This process includes the use of the MMIF-generated AERSURFACE output file, which contains surface characteristics (albedo, Bowen ratio, and surface roughness length) around the pseudo meteorological station.

WRF-produced data and measured data for the location of the She Oaks BOM station have been used to validate the quality of WRF generated meteorological data provided by LakesEnvironmental. Information on WRF data at She Oaks BOM station is shown in **Table 2**.

Table 2 WRF data at She Oaks BOM Station

Met Data Type	AERMET-Ready WRF-MMIF (Prognostic & Upper Air Met Data) AERMOD-Ready WRF-MMIF (SFC & PFL Met Data)
Start-End Date	Jan 01, 2020 hour 00 - Dec 31, 2024 hour 23
Center Point	Lat.: 37.9075 S – Long.: 144.1303 E
Datum	WGS 84
UTM Zone	-55
Base Elevation	212.44 m
WRF Grid Cell	4 km x 4 km
Site Time Zone	UTC+1000
Closest City & Country	She Oaks- Australia

3.1 Data Tables

The WRF-produced meteorological data were processed through WRPLOT and the resulting frequency of occurrence of winds in each of the specified wind direction sectors and wind speed classes is shown in **Table 3** and **Table 4**.

Table 3 WRF wind frequency table (hours)

Directions / Wind Classes (m/s)		0.50 - 2.00	2.00 - 5.00	5.00 - 11.00	>= 11.00	Total
North (N)	348.75 - 11.25	162	1662	1075	25	2924
North-Northeast (NNE)	11.25 - 33.75	214	951	247	2	1414
Northeast (NE)	33.75 - 56.25	263	702	67	0	1032
East-Northeast (ENE)	56.25 - 78.75	300	806	63	0	1169
East (E)	78.75 - 101.25	269	1169	273	2	1713
East-Southeast (ESE)	101.25 - 123.75	311	1721	1046	6	3084
Southeast (SE)	123.75 - 146.25	322	1999	1559	5	3885
South-Southeast (SSE)	146.25 - 168.75	284	1424	1206	1	2915
South (S)	168.75 - 191.25	242	833	442	2	1519
South-Southwest (SSW)	191.25 - 213.75	259	847	414	1	1521
Southwest (SW)	213.75 - 236.25	203	1278	902	4	2387
West-Southwest (WSW)	236.25 - 258.75	193	1841	2170	82	4286
West (W)	258.75 - 281.25	187	1686	2466	133	4472
West-Northwest (WNW)	281.25 - 303.75	142	1299	1926	145	3512
Northwest (NW)	303.75 - 326.25	136	1452	2048	172	3808
North-Northwest (NNW)	326.25 - 348.75	138	1714	2002	176	4030
Sub-Total		3625	21384	17906	756	43671
Calms						177
Missing/Incomplete						0
Total						**43848**

Table 4 WRF wind frequency table (percentage)

Directions / Wind Classes (%)		0.50 - 2.00	2.00 - 5.00	5.00 - 11.00	>= 11.00	Total
North (N)	348.75 - 11.25	0.37	3.79	2.45	0.06	6.67
North-Northeast (NNE)	11.25 - 33.75	0.49	2.17	0.56	0.00	3.22
Northeast (NE)	33.75 - 56.25	0.60	1.60	0.15	0.00	2.35
East-Northeast (ENE)	56.25 - 78.75	0.68	1.84	0.14	0.00	2.67
East (E)	78.75 - 101.25	0.61	2.67	0.62	0.00	3.91
East-Southeast (ESE)	101.25 - 123.75	0.71	3.92	2.39	0.01	7.03
Southeast (SE)	123.75 - 146.25	0.73	4.56	3.56	0.01	8.86
South-Southeast (SSE)	146.25 - 168.75	0.65	3.25	2.75	0.00	6.65
South (S)	168.75 - 191.25	0.55	1.90	1.01	0.00	3.46
South-Southwest (SSW)	191.25 - 213.75	0.59	1.93	0.94	0.00	3.47
Southwest (SW)	213.75 - 236.25	0.46	2.91	2.06	0.01	5.44
West-Southwest (WSW)	236.25 - 258.75	0.44	4.20	4.95	0.19	9.77
West (W)	258.75 - 281.25	0.43	3.85	5.62	0.30	10.20
West-Northwest (WNW)	281.25 - 303.75	0.32	2.96	4.39	0.33	8.01
Northwest (NW)	303.75 - 326.25	0.31	3.31	4.67	0.39	8.68
North-Northwest (NNW)	326.25 - 348.75	0.31	3.91	4.57	0.40	9.19
Sub-Total		8.27	48.77	40.84	1.72	99.60
Calms						0.40
Missing/Incomplete						0
Total						**100**

3.2 Wind Roses

WRPLOT was also used to produce wind roses for the She Oaks BOM station location based on the WRF-produced meteorological data. The seasonal results are provided in **Figure 2** and the 5-year annual average is provided in **Figure 3**.

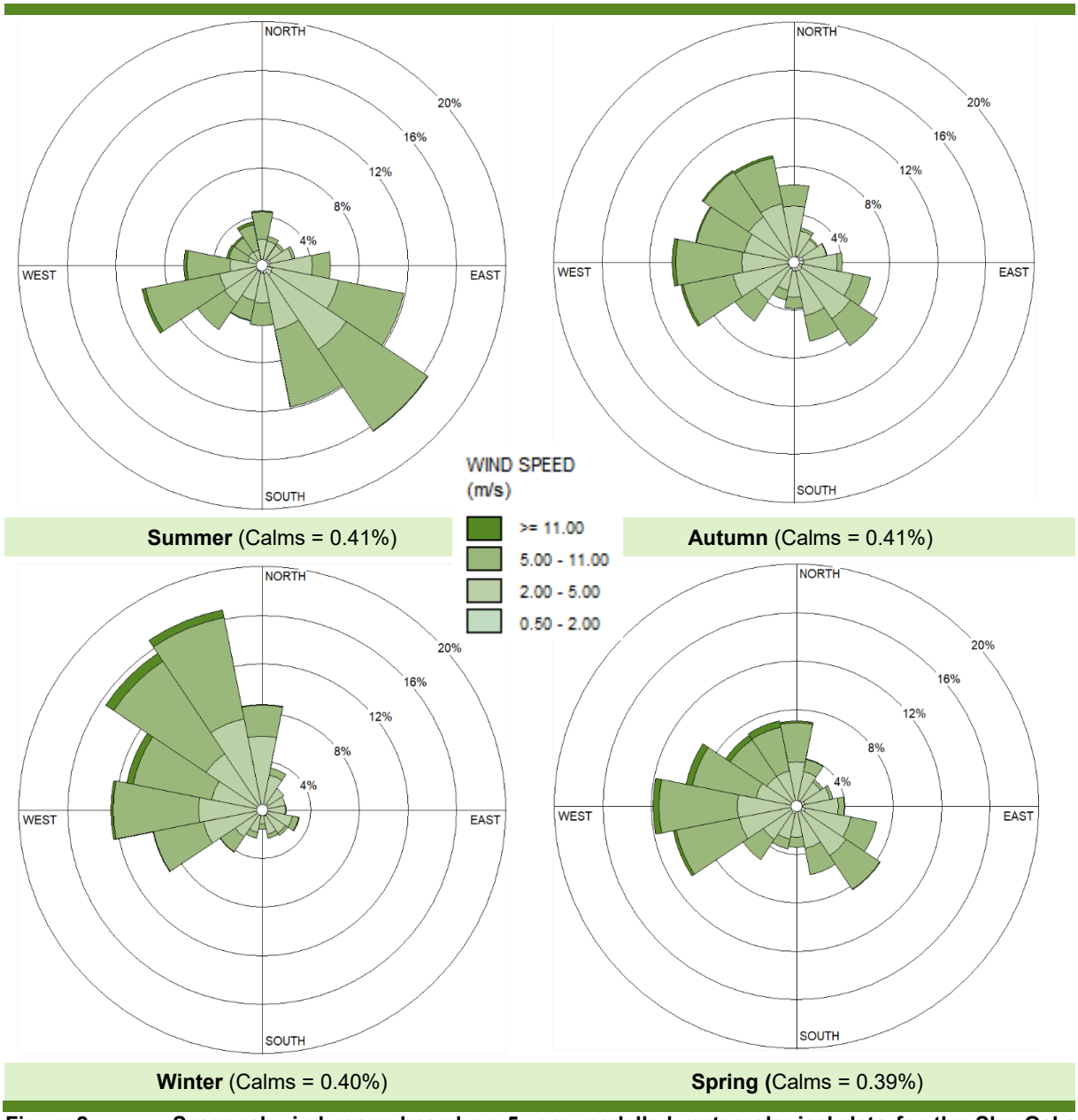

Figure 2 **Seasonal wind roses based on 5-year modelled meteorological data for the She Oaks Bureau of Meteorology (BOM) station**

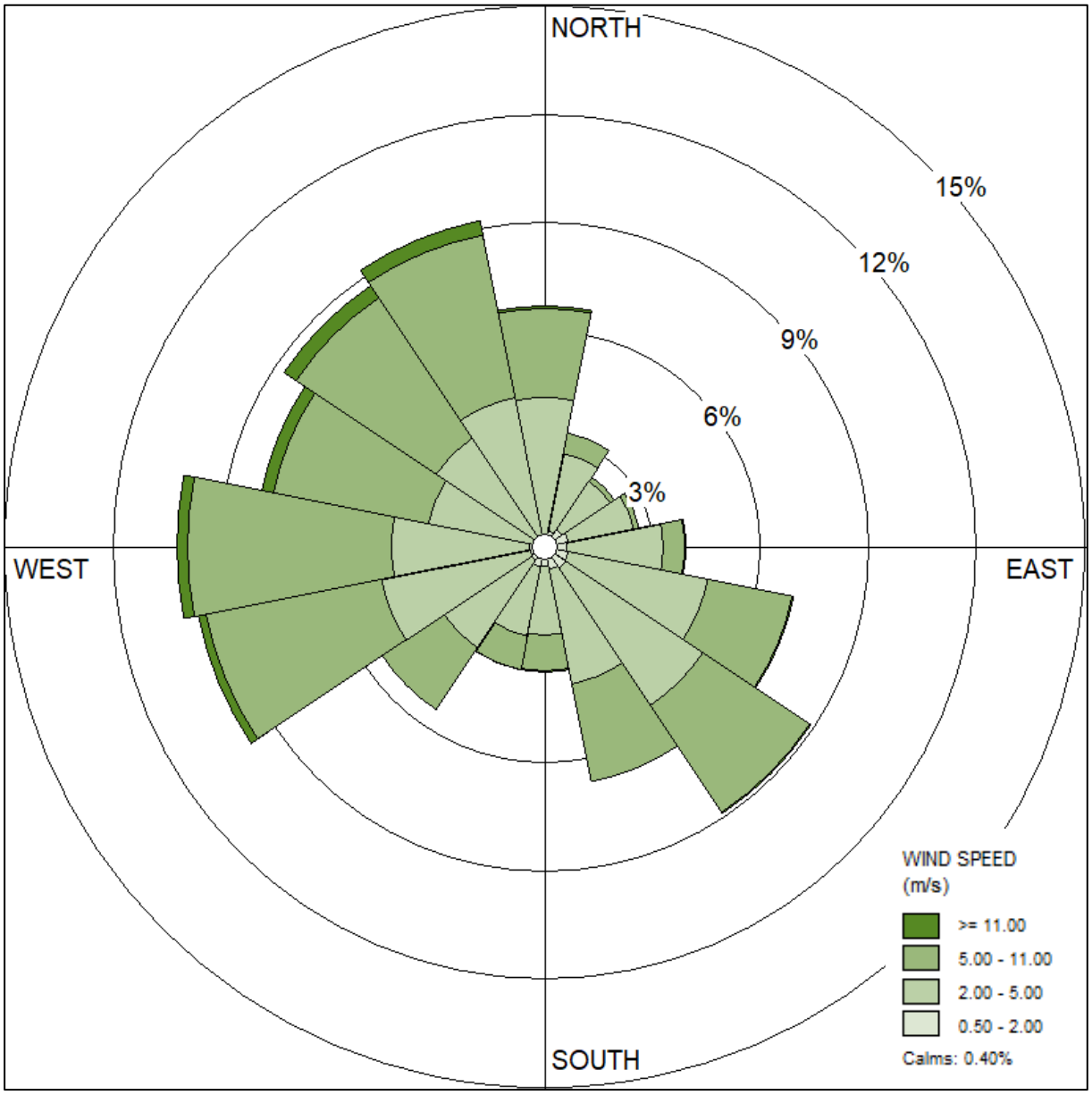

Figure 3 **Wind rose based on 5-year modelled meteorological data for the She Oaks Bureau of Meteorology (BOM) station**

4. MEASURED DATA DESCRIPTION

Measured meteorological data were obtained from BOM for the She Oaks BOM station for the period 26 March 2020 to 26 March 2025. The data were accompanied by information from BOM which included the details provided in **Table 5** below.

Table 5 BOM data notes

Field	Value
Record identifier - st	st
Bureau of Meteorology Station Number.	87168
Rainfall district code	87
Station Name.	SHE OAKS
Month/Year site opened. (MM/YYYY)	06/1990
Month/Year site closed. (MM/YYYY)	
Latitude to 4 decimal places - in decimal degrees.	-37.9075
Longitude to 4 decimal places - in decimal degrees.	144.1303
Method by which latitude/longitude was derived.	GPS
State.	VIC
Height of station above mean sea level in metres.	236.7
Height of barometer above mean sea level in metres.	237.3
WMO (World Meteorological Organisation) Index Number.	94863
First year of data supplied in data file.	2020
Last year of data supplied in data file.	2025
Percentage complete between first and last records.	99
Percentage of values with quality flag 'Y'.	99
Percentage of values with quality flag 'N'.	1
Percentage of values with quality flag 'W'.	0
Percentage of values with quality flag 'S'.	*
Percentage of values with quality flag 'I'.	0

4.1 Data Tables

The measured meteorological data was processed through WRPLOT and the resulting frequency of occurrence of winds in each of the specified wind direction sectors and wind speed classes is shown in **Table 6** and **Table 7**.

Table 6 Measured wind frequency table (hours)

Directions / Wind Classes (m/s)		0.50 - 2.00	2.00 - 5.00	5.00 - 11.00	>= 11.00	Total
North (N)	348.75 - 11.25	1511	2937	1287	42	5777
North-Northeast (NNE)	11.25 - 33.75	486	426	91	3	1006
Northeast (NE)	33.75 - 56.25	516	263	20	1	800
East-Northeast (ENE)	56.25 - 78.75	463	321	11	0	795
East (E)	78.75 - 101.25	562	636	21	0	1219
East-Southeast (ESE)	101.25 - 123.75	639	1769	422	0	2830
Southeast (SE)	123.75 - 146.25	767	2743	481	0	3991
South-Southeast (SSE)	146.25 - 168.75	708	1712	184	0	2604
South (S)	168.75 - 191.25	438	834	101	0	1373
South-Southwest (SSW)	191.25 - 213.75	402	637	86	0	1125
Southwest (SW)	213.75 - 236.25	357	1056	186	0	1599
West-Southwest (WSW)	236.25 - 258.75	415	1850	566	0	2831
West (W)	258.75 - 281.25	397	2665	1442	8	4512
West-Northwest (WNW)	281.25 - 303.75	346	1592	1416	9	3363
Northwest (NW)	303.75 - 326.25	553	1932	818	3	3306
North-Northwest (NNW)	326.25 - 348.75	1180	2676	1636	47	5539
Sub-Total		9740	24049	8768	113	42670
Calms						851
Missing/Incomplete						327
Total						**43848**

Table 7 Measured wind frequency table (percentage)

Directions / Wind Classes (%)		0.50 - 2.00	2.00 - 5.00	5.00 - 11.00	>= 11.00	Total
North (N)	348.75 - 11.25	3.45	6.70	2.94	0.10	13.18
North-Northeast (NNE)	11.25 - 33.75	1.11	0.97	0.21	0.01	2.29
Northeast (NE)	33.75 - 56.25	1.18	0.60	0.05	0.00	1.82
East-Northeast (ENE)	56.25 - 78.75	1.06	0.73	0.03	0.00	1.81
East (E)	78.75 - 101.25	1.28	1.45	0.05	0.00	2.78
East-Southeast (ESE)	101.25 - 123.75	1.46	4.03	0.96	0.00	6.45
Southeast (SE)	123.75 - 146.25	1.75	6.26	1.10	0.00	9.10
South-Southeast (SSE)	146.25 - 168.75	1.61	3.90	0.42	0.00	5.94
South (S)	168.75 - 191.25	1.00	1.90	0.23	0.00	3.13
South-Southwest (SSW)	191.25 - 213.75	0.92	1.45	0.20	0.00	2.57
Southwest (SW)	213.75 - 236.25	0.81	2.41	0.42	0.00	3.65
West-Southwest (WSW)	236.25 - 258.75	0.95	4.22	1.29	0.00	6.46
West (W)	258.75 - 281.25	0.91	6.08	3.29	0.02	10.29
West-Northwest (WNW)	281.25 - 303.75	0.79	3.63	3.23	0.02	7.67
Northwest (NW)	303.75 - 326.25	1.26	4.41	1.87	0.01	7.54
North-Northwest (NNW)	326.25 - 348.75	2.69	6.10	3.73	0.11	12.63
Sub-Total		22.21	54.85	20.00	0.26	97.31
Calms						1.94
Missing/Incomplete						0.75
Total						**100.00**

4.2 Wind Roses

WRPLOT was also used to produce wind roses for the She Oaks BOM station location based on the measured meteorological data. The seasonal results are provided in **Figure 4** and the 5-year annual average is provided in **Figure 5**.

Figure 4 **Seasonal wind roses based on 5-year measured meteorological data from the She Oaks Bureau of Meteorology (BOM) station**

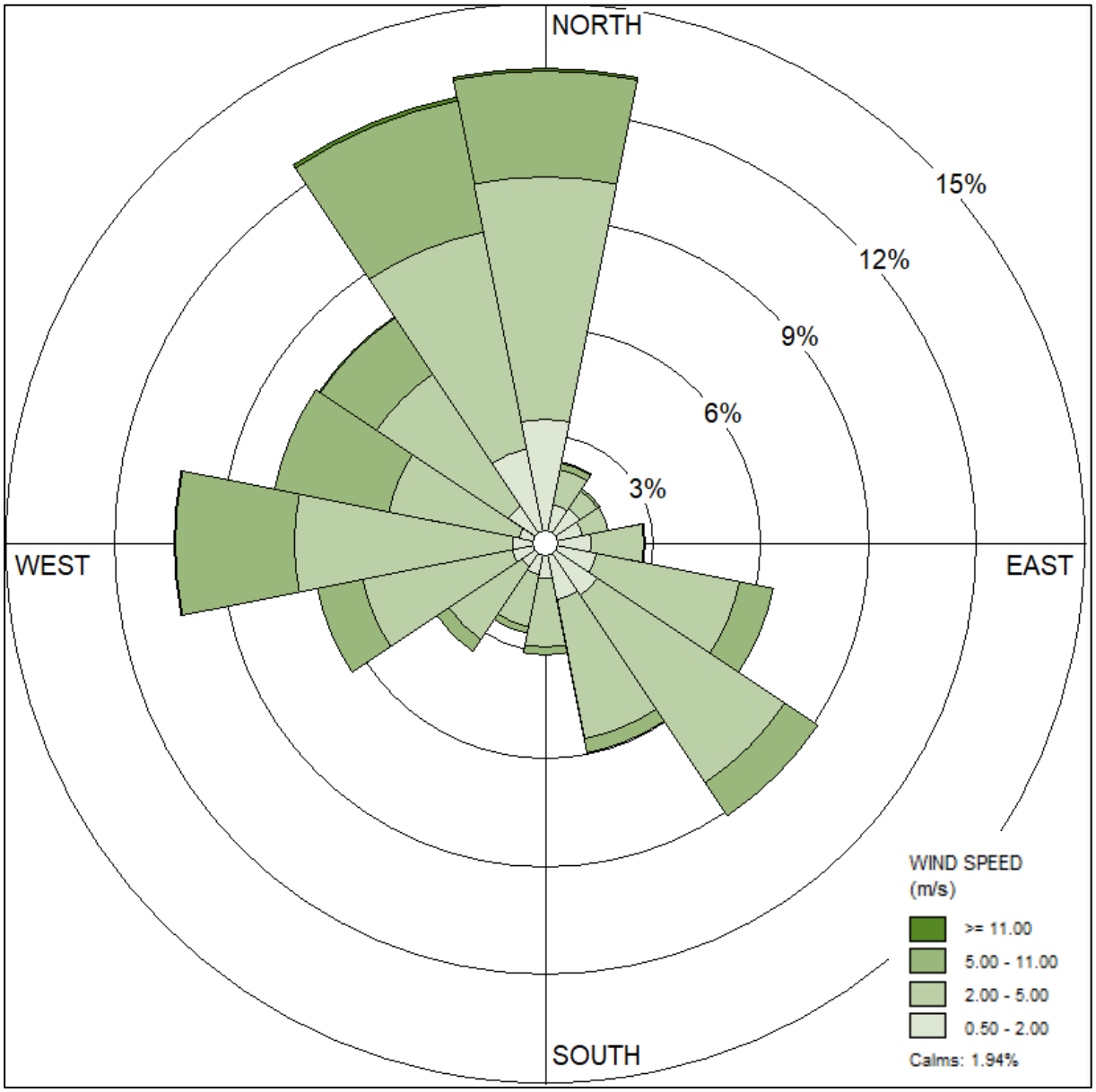

Figure 5 **Wind rose based on 5-year measured meteorological data from the She Oaks Bureau of Meteorology (BOM) station**

5. DATA COMPARISON

EPA Publication 1957 does not provide a framework for comparing meteorological datasets or assessing their representativeness for use in dispersion modelling. In view of this, both a quantitative and qualitative comparison was undertaken between modelled data produced by the WRF model and the measured data recorded by BOM, with both datasets being centred at the She Oaks BOM station.

The validation focused on wind speed and wind direction, which are the primary meteorological parameters influencing plume dispersion and downwind concentrations. The assessment was limited to the dataset timeframe used in the dispersion model.

The comparison included the following components:

- Visual comparisons, including:
    - Wind roses: Plot and overlay wind roses for both datasets to visually inspect differences in direction and magnitude distributions;
    - Bar Charts: Compare frequency distributions by wind classes and directions; and
    - Scatter Plots: Plot modelled vs. measured values from corresponding parameters.
- Calculation of statistical indicators, including:
    - Pearson correlation coefficient (r);
    - Mean bias error (MBE);
    - Mean absolute error (MAE);
    - Mean absolute percentage error (MAPE); and
    - Root mean square error (RMSE).

These methods were selected to provide a balanced assessment of the WRF model's ability to reproduce observed meteorological conditions at the BOM station, and subsequently the Site. The results inform the suitability of the modelled dataset for use in air dispersion modelling and provide transparency in the model input selection process.

5.1 Visual Comparison

5.1.1 Wind Roses

The 5-year annual wind roses for the WRF dataset and measured dataset were produced and are provided in **Figure 3** and **Figure 5**. These two wind roses can be overlain to provide a visual comparison of the differences in the frequency of wind speeds and directions. This comparison is shown in **Figure 6**.

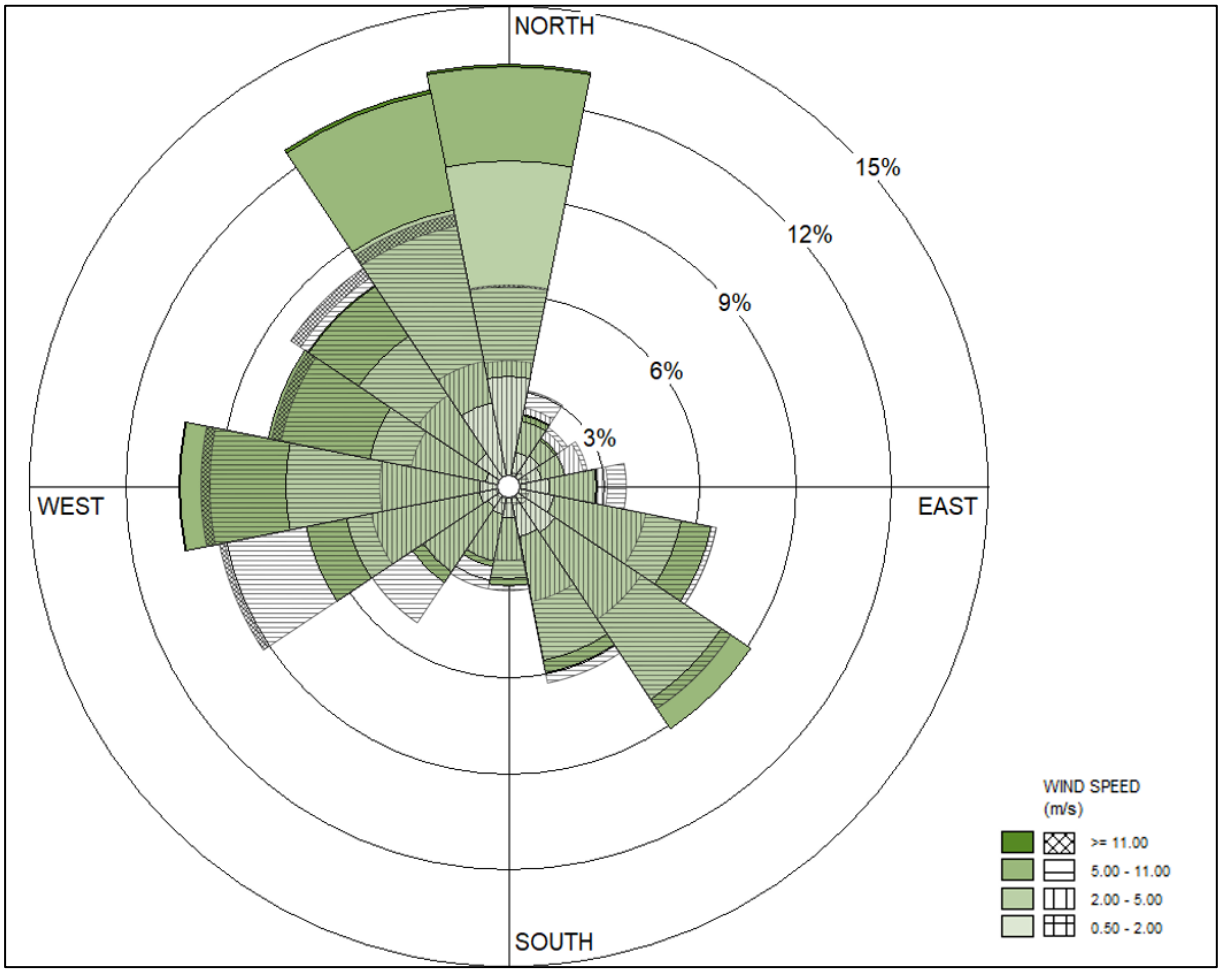

Figure 6 **Wind rose comparison of WRF data (hatching) vs. measured data (green)**

As shown in **Figure 6**, the shape of the two wind roses is generally consistent in most directions. The wind rose produced from WRF data (shown in hatching) underestimates northerly and north-northwesterly winds, and overestimates west-southwesterly and southwesterly winds. It also underestimates calm and low wind speeds (0 – 2 m/s) and overestimates high wind speeds (5 – 11m/s).

5.1.2 Bar Charts

Comparison of the modelled and measured frequency of wind speeds and wind directions are shown in **Figure 7** and **Figure 8**, respectively. The values shown are percentages so that any variance in the total number of hours is accounted for.

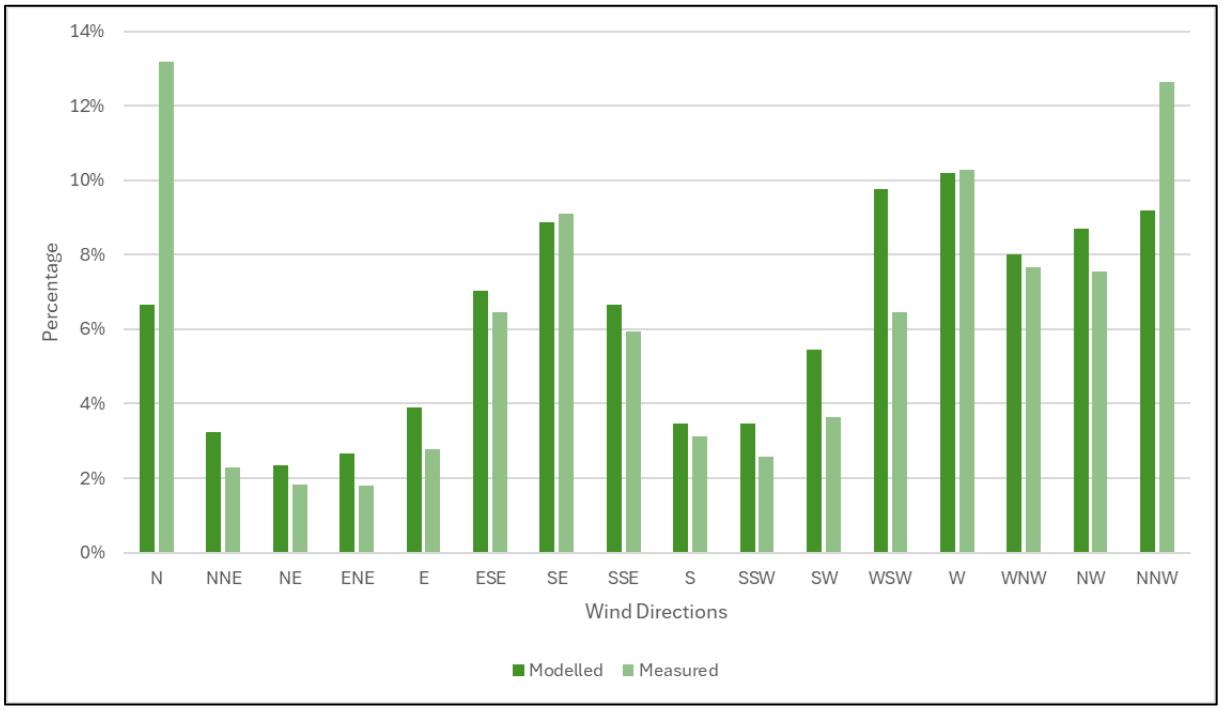

Figure 7 **Comparison of the frequency of wind directions between modelled and measured data**

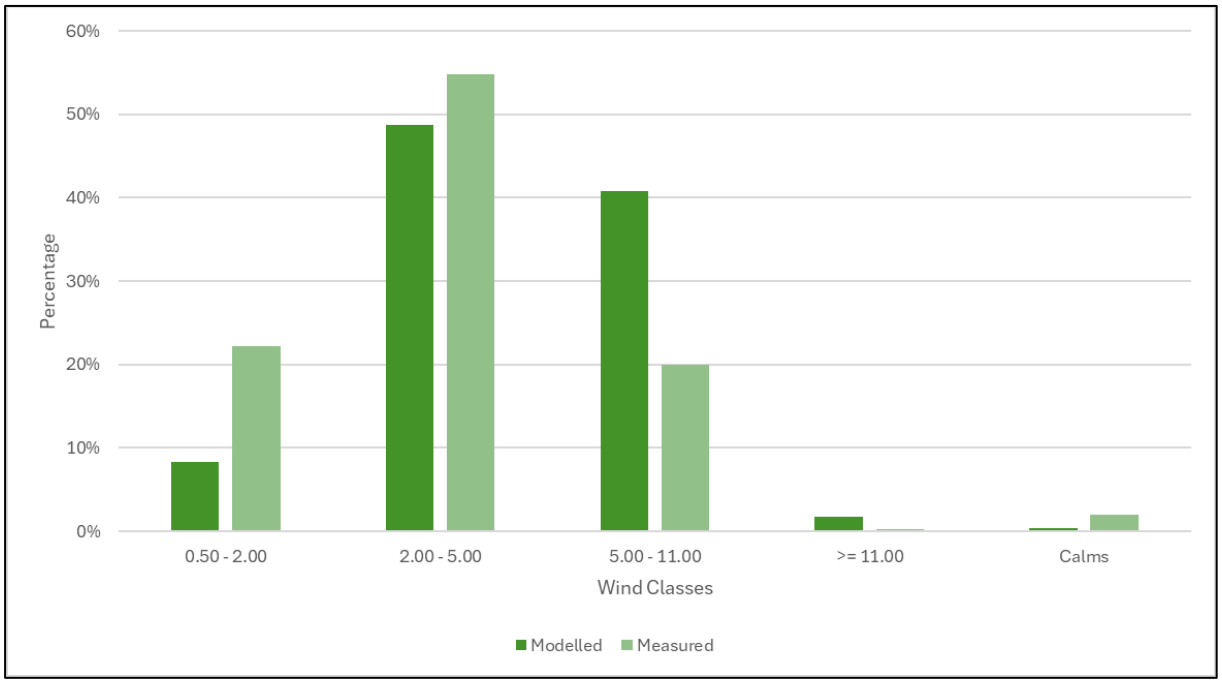

Figure 8 **Comparison of the frequency of wind directions between modelled and measured data**

The observations made from reviewing the bar charts are consistent with the wind roses in that the WRF data underestimates northerly and north-northwesterly winds, and overestimates west-southwesterly winds. It also underestimates calm and low wind speeds (0 – 2 m/s) and overestimates high wind speeds (5 – 11m/s). However, the bar charts show that the general pattern of wind directions are consistent between the two datasets.

5.1.3 Scatter Plots

Scatter plots were generated to assess how well the model predicts the distribution of wind speed and direction for the modelling period. Each scatter plot includes a 1:1 reference line to indicate the degree of agreement between datasets.

For wind speed, a strong correlation is expected to present as a clustering of data points along the 1:1 line, indicating that WRF reproduces the measured wind speeds with reasonable accuracy. Deviations from this line suggest over or underestimation by the model. Ideally, the scatter plot will show minimal dispersion and no consistent bias across the range of speeds. In practice, some variance may be observed, particularly at low wind speeds.

For wind direction, the comparison is more complex due to the circular nature of directional data (i.e., values ranging between 0° and 360°). Good agreement is still expected to appear as a diagonal clustering of points near the 1:1 line. However, it is noted that around the 0° and 360° boundary small angular differences may appear visually large.

The scatter plots for wind speed and wind direction are shown in **Figure 9** and **Figure 10**.

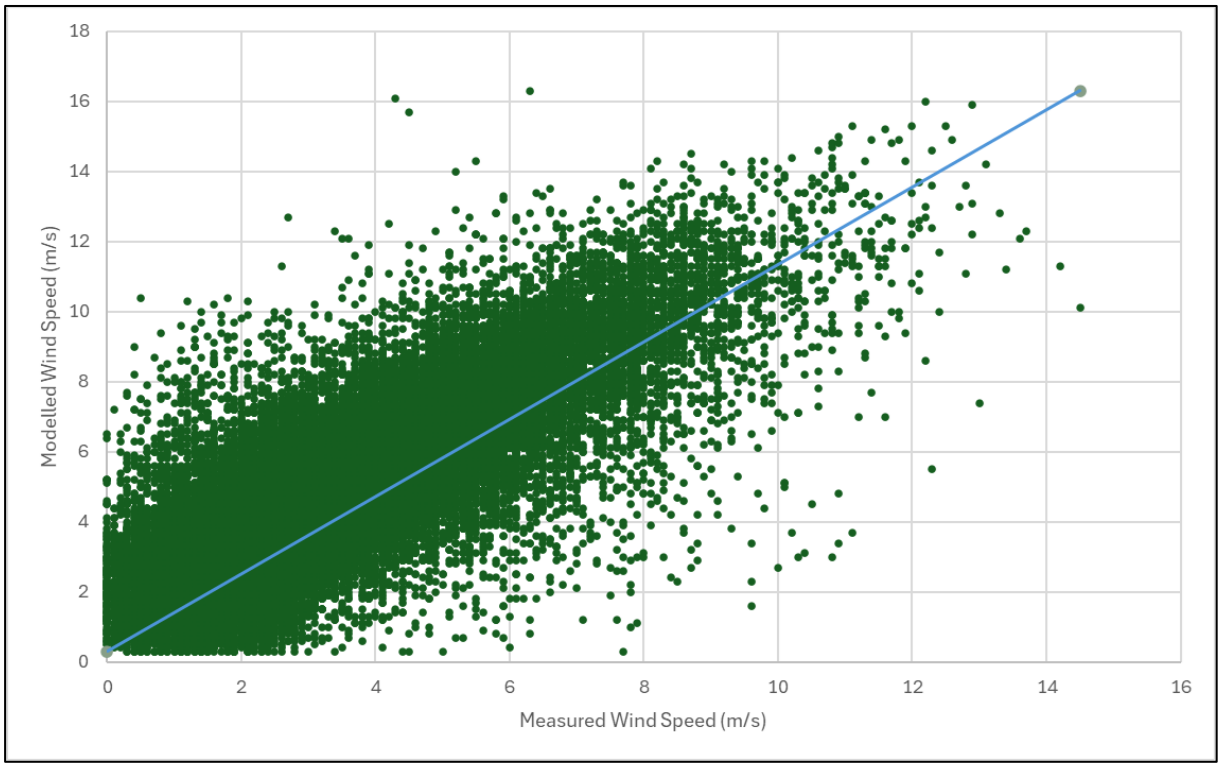

Figure 9 **Scatter plot showing modelled vs. measured wind speed**

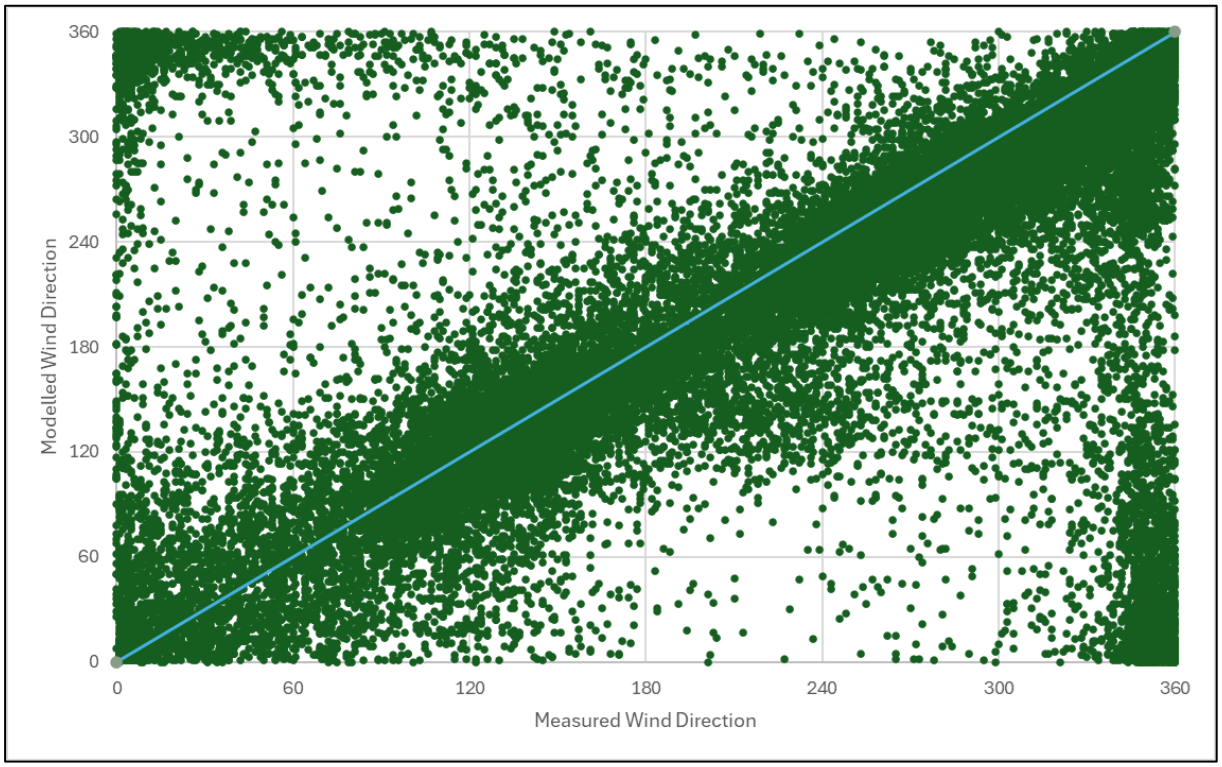

Figure 10 **Scatter plot showing modelled vs. measured wind direction**

As provided in **Figure 9**, the data points show a reasonably strong positive linear relationship, and most values are clustered around the 1:1 line. This indicates that, in general, the WRF model predicts the trend of measured wind speeds well. However, there is a noticeable spread, particularly at higher wind speeds. The dispersion above and below the 1:1 line suggests some level of underestimation and overestimation by the model depending on conditions. The upper bound of modelled wind speeds reach slightly higher values than the measured range, meaning that the WRF model slightly underestimates the peak wind speeds. However, the majority of points clustering near the 1:1 line suggests that the model performs well across the most common wind speeds (e.g., 2–5 m/s), which are generally the most relevant for air dispersion modelling.

Figure 10 shows that a 1:1 relationship is evident, but with some scatter. This level of scatter is not unusual when validating modelled wind direction, particularly in complex terrain or under calm atmospheric conditions, where small changes in atmospheric conditions can lead to large shifts in direction. Despite the scatter, the fact that a visible linear pattern is still clear indicates that the model predicts the general directional trends well.

5.2 Statistical Analysis

The Pearson correlation coefficient was used to quantify the linear relationship between datasets, with values closer to 1 indicating stronger agreement. To assess model accuracy, the mean absolute error (MAE), mean absolute percentage error (MAPE), and root mean square error (RMSE) were calculated.

MAE provides the average difference between modelled and observed values and RMSE identifies larger deviations. Mean bias was also considered to determine whether the model typically over or underestimates observations.

5.2.1 Pearson Correlation Coefficient

Possible values for the Pearson correlation coefficient range from -1 to 1; -1 being a perfect negative correlation and 1 being a perfect positive correlation. A Pearson correlation coefficient greater than 0.75 is generally considered to indicate a strong positive relationship between modelled and measured values. **Table 8** provides a summary of the Pearson correlation coefficient based on the summary values for the five year data period. Given that a constant emission rate was applied across the entire modelled period, analysis was conducted using on summary statistics (as provided in **Table 4** and **Table 7**) rather than hourly values.

Table 8 Pearson correlation coefficient

	Measured Total (%)	Modelled Total (%)
North (N)	13.18	6.67
North-Northeast (NNE)	2.29	3.22
Northeast (NE)	1.82	2.35
East-Northeast (ENE)	1.81	2.67
East (E)	2.78	3.91
East-Southeast (ESE)	6.45	7.03
Southeast (SE)	9.10	8.86
South-Southeast (SSE)	5.94	6.65
South (S)	3.13	3.46
South-Southwest (SSW)	2.57	3.47
Southwest (SW)	3.65	5.44
West-Southwest (WSW)	6.46	9.77
West (W)	10.29	10.20
West-Northwest (WNW)	7.67	8.01
Northwest (NW)	7.54	8.68
North-Northwest (NNW)	12.63	9.19
Wind Direction Correlation	**0.81**	
Calm	1.94	0.40
0.50 - 2.00	22.21	8.27
2.00 - 5.00	54.85	48.77
5.00 - 11.00	20.00	40.84
>= 11.00	0.26	1.72
Wind Speed Correlation	**0.84**	

The Pearson correlation coefficients for wind direction (r = 0.81) and wind speed (r = 0.84) indicate strong linear relationships between the modelled (WRF) and measured (BOM) datasets.

5.2.2 Mean Bias Error, Mean Absolute Error, Mean Absolute Percentage Error, and Root Mean Square Error

Mean Bias Error (MBE) measures the average difference between predicted and observed values, indicating whether predictions are generally overestimated (positive MBE) or underestimated (negative MBE). An MBE close to zero suggests unbiased predictions. MAE, MAPE, and RMSE are metrics for assessing how well modelled data align with measured data. MAE provides the average size of the errors in the same units as the data. MAPE expresses these errors as a percentage of the observed values.

RMSE, by squaring the errors before averaging, places more emphasis on larger discrepancies. These metrics provide a well-rounded understanding of both the magnitude and impact of model errors and are summarised in **Table 9**.

Table 9 Mean error values

Directions / Wind Classes (m/s)	0.50 - 2.00	2.00 - 5.00	5.00 - 11.00	>= 11.00	Total
			Absolute difference (percentage points)		
North (N)	-3.08	-2.91	-0.48	-0.04	-6.51
North-Northeast (NNE)	-0.62	1.20	0.36	0.00	0.93
Northeast (NE)	-0.58	1.00	0.11	0.00	0.53
East-Northeast (ENE)	-0.37	1.11	0.12	0.00	0.85
East (E)	-0.67	1.22	0.57	0.00	1.13
East-Southeast (ESE)	-0.75	-0.11	1.42	0.01	0.58
Southeast (SE)	-1.01	-1.70	2.46	0.01	-0.24
South-Southeast (SSE)	-0.97	-0.66	2.33	0.00	0.71
South (S)	-0.45	0.00	0.78	0.00	0.33
South-Southwest (SSW)	-0.33	0.48	0.75	0.00	0.90
Southwest (SW)	-0.35	0.51	1.63	0.01	1.80
West-Southwest (WSW)	-0.51	-0.02	3.66	0.19	3.32
West (W)	-0.48	-2.23	2.34	0.29	-0.09
West-Northwest (WNW)	-0.47	-0.67	1.16	0.31	0.34
Northwest (NW)	-0.95	-1.09	2.81	0.39	1.14
North-Northwest (NNW)	-2.38	-2.19	0.83	0.29	-3.44
Sub-Total	-13.95	-6.08	20.84	1.47	2.28
Calms					-1.54
Missing/Incomplete					-0.75
Total					0.00
Mean Bias Error (MBE)		0.04%			0.14%
Mean Absolute Error (MAE)		0.85%			1.43%
Mean Absolute Percentage Error (MAPE)		243%			26.52%
Root Mean Square Error (RMSE)		1.23%			2.16%

The statistical analysis comparing WRF modelled data to BOM observations produced differing results depending on whether the comparison was made using individual wind speed and direction groups, or summary values by wind direction (i.e., the ‘Total’ column). When assessed at the individual level, the

MBE was low at 0.04, indicating minimal overall bias, while the MAE and RMSE were 0.85 and 1.23 respectively, reflecting a modest average and slightly higher weighted error. However, the MAPE was 243%, which is attributed to very small BOM frequencies in some groups causing percentage errors to inflate disproportionately. For example, if the measured frequency is 0.01 and the modelled prediction is 0.05, the absolute difference is just 0.04, but the percentage error is 400%.

When comparing the total percentage of wind direction frequencies, the MBE increased to 0.14, and both MAE and RMSE were higher (1.4 and 2.2 respectively), indicating a larger overall discrepancy between modelled and observed wind direction distributions. The MAPE for this summary data was significantly lower at 26%, suggesting that the distortion seen in the detailed data was largely due to low-frequency cells.

6. DISCUSSION

The visual comparison between measured and modelled wind data indicates some differences in both wind direction and speed distributions. In relation to wind direction, the model broadly predicts the general spread across all compass points; however, it underrepresents winds from the north, particularly the N and NNW sectors, which show measured frequencies of 13.2% and 12.6% respectively, compared to modelled values of 6.67% and 9.19%. This consistent underprediction in the northern quadrants suggests a directional bias. Comparatively, the model tends to slightly overrepresent westerly and south-westerly directions, such as WSW and SW, where modelled frequencies exceed the measured ones by around 2 to 3 percentage points.

Given that the modelled meteorological data are for use in an air dispersion model, and the emission source is located to the south of sensitive receptors, the accuracy of southerly winds becomes particularly important. In this context, the modelled data appear to represent southerly wind directions (including SSE, S, and SSW) with reasonable accuracy. The differences between measured and modelled values for these directions are relatively minor, for example, S winds are measured at 3.13% and modelled at 3.46%, while SSE and SSW are within about 0.7 percentage points of the measured values. This indicates that the model is likely to accurately predict emissions travelling from the source to the receptors under southerly wind conditions. While the model shows some discrepancies in other wind directions, particularly underpredicting northerly winds and overpredicting westerly and south-westerly components, these differences may be of limited consequence in this assessment.

When assessing the wind speed, the model underestimates calm and low wind speed conditions. Calm conditions were observed 1.94% of the time in the measured data but only 0.40% in the modelled output. Similarly, low wind speeds between 0.5–2.0 m/s occurred in over 22% of measured observations but were represented in only 8.27% of the modelled data. The underrepresentation of lower wind speeds is contrasted by an overprediction of higher speeds, particularly in the 5.0–11.0 m/s range, where modelled

data accounted for 40.8% compared to 20.0% in the measured dataset. The highest wind speed category (≥11.0 m/s), which was rare in measurements (0.26%), appears slightly more frequently in the model (1.72%). The potential impact of these variances may be an underestimation of high odour concentrations close to the source, and an overestimation of low odour concentrations far from the source.

Based on the statistical results, the modelled meteorological data shows a mixed level of agreement with the measured data. At the individual wind speed and direction level, the low Mean Bias Error (0.04) suggests that, on average, the model is not consistently over- or under-predicting. However, the MAE and RMSE values indicate some variation between the datasets, and the very high MAPE (243%) indicates discrepancies in low-frequency fields where small observed values have inflated the percentage errors.

When assessing the summary wind direction frequencies, the higher MAE (1.43) and RMSE (2.16) suggest a deviation in the directional distribution of winds; however, the MAPE (26.5%) is within a reasonable range. The results indicate that the WRF model predicts general wind patterns at the She Oaks BOM station reasonably well, particularly at a broader directional level; however, it is less accurate at replicating finer-scale distributions of wind speed and direction. The limitations of the modelled data are unlikely to impact the results of the dispersion model given the context of the location of the Site, as discussed above.

7. CONCLUSIONS

- The model underrepresents winds from the north (N and NNW) and overrepresents westerly and south-westerly winds (WSW and SW).
- The model accurately predicts southerly wind directions (SSE, S, SSW), which is more important for the air dispersion model given the location of the emission sources.
- The model underestimates calm and low wind speeds but overpredicts higher wind speeds, potentially affecting odour concentration predictions.
- The model shows general agreement with measured data, with low Mean Bias Error (0.04) indicating no consistent over- or under-prediction.
- The WRF model predicts general wind patterns reasonably well and give an appropriate representation of conditions at the Site to enable dispersion modelling.

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