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31 August 2020

Department of Planning, Industry and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Ania Dorocinska – ania.dorocinska@planning.nsw.gov.au

Dear Ania,

RE: BAIADA INTEGRATED POULTRY PROCESSING FACILITY (SSD 9394) – EPA REQUEST FOR ADVICE

I refer to your correspondence dated 3 August 2020 regarding matter identified by the Environmental Protection Agency relating to the noise, air and water impacts assessments, along with further information requested regarding wastewater and waste management, as a result of changes to the water treatment process. A response is provided below to each of the matters raised.

MATTERS RAISED	APPLICANT'S RESPONSE
1. Revised Noise Impact Assessment	
The proponent has adequately address issues relating to background noise monitoring and tonal aspects from mechanical plant and equipment, raised in the EPA's submission for the EIS. *Further information and/or clarification is requested regarding effectiveness of proposed mitigation measures including physical noise controls during construction and operation phases of the project, particularly during adverse meteorological conditions.*	Noted. Please see response below.
a) Adverse Meteorological Conditions – Effectiveness of Proposed Noise Mitigation Measures *The Revised Noise Impact Assessment (RNIA) states the following regarding exceedance of the Project Noise Trigger Level (PNTL) under adverse meteorological conditions:* *"It is highly unlikely that all items included in our acoustic model will be operating simultaneously implying compliance. In saying this, there is some uncertainty in all theoretical calculations, as such, we recommended a noise monitoring program is the commissioning in the early life of the site to verify our theoretical calculations*	A Revised Acoustic Report is included in **Attachment 1**. Section 3.2.2. has been updated to read: "*The above Table shows that compliance with the criteria is predicted at all nearby receivers, with the exception of a minor 1dB(A) exceedance at Abbeylands under adverse weather conditions, with inclusion of the noise control detailed above. It is highly unlikely that all items included in our acoustic model will be operating simultaneously implying compliance. In saying this, there is some uncertainty in all theoretical calculations, as such, we recommended a noise monitoring program is the commissioning in the early life of the site to verify our theoretical calculations and enable further noise control strategies to be implemented in the event of any non-compliance.*" While not strictly necessary, additional, practical noise mitigations are now proposed to provide further comfort that the noise criteria at the nearest sensitive receptors will be met. These are

MATTERS RAISED

and enable further noise control strategies to be implement in the event of any non-compliance",

(RNIA – p19 – Section 3.2.2. – referencing Table 13 0 Received Noise Levels – Render Plant).

The EPA notes that within RNIA – Section 3.1.2 it states that measurements have previously been undertaken at other Baiada facilities.

Also, within RNIA – Section 4.1.2 there is a noise mitigation strategy which includes the following recommendation:

"6. A noise monitoring program, during commissioning, or in the early life of the site is recommended. This program will verify our predictions and in the unlikely event that complaints may arise, enable noise control strategies to be implemented, where required". (RNIA – p24 – Section 4.1.2 – General Noise Control Recommendations)

As the EPA must take into consideration the practical measures that could be undertaken to prevent, control, abate or mitigate pollution, the EPA believes further investigation or practical measures is warranted to validate the likely effectiveness of the proposed mitigation, rather than wholly relying on a post-completion verification process, at which point mitigation options may be more limited.

If there are reasonable and feasible mitigation measures available as item 6 in the RNIA implies, then these should be investigated and adopted if there is a likelihood of non-compliance with the PTNLs.

Similarly, if the proponent can confirm based on previous measurements and expected operating procedures, that all noise sources will not be operating concurrently, then the accuracy of the noise levels presented will need to be verified.

***Additional information:** Confirmation of effectiveness of all feasible and practical mitigation measures and revision of accuracy of noise levels.*

APPLICANT'S RESPONSE

outlined in Section 3.2.2 of the Nosie Report and are summarised below.

Strategy	Version of the Noise Impact Assessment	
	Version 4 dated June 2020	Version 5 dated August 2020
Erect acoustic mound around the west side of the Live Bird Module and Hardstand	Yes – 2700mm above Finished Ground Level (FGL)	Yes – 3000mm above FGL
Erect acoustic barrier adjacent to Cooling Towers and Associated Pumps	Yes – 2100mm above FGL	Yes – 2100mm above FGL
Erect acoustic barrier along north side of the Rendering Building loop road	No	Yes – 2100mm above FGL
Erect acoustic barrier along the north side of the Cold Store Distribution Dock	No	Yes – 2400mm above FGL

With these additional measures in place, the noise modelling shows further reduction in the received noise levels at the nearest residential receivers as shown below:

	Received Noise Levels, dB(A),Leq					
Residential Receiver	Neutral Conditions (Day)		3m/sec Wind Source to Rec (Day/Evening)		3°C/100m Inversion (Night)	
Report Version	V4	V5	V4	V5	V4	V5
Girrawheen	32	32	34	34	35	35
Abbeylands	33	32	**36**	34	35	34
The Billabong	30	28	35	33	34	32
Airport South	20	20	25	25	23	23

As can be seen from the above comparison, with the additional noise mitigations in place, the modelling demonstrates compliance with the NPfI criteria.

<table>
<tr><th>MATTERS RAISED</th><th>APPLICANT'S RESPONSE</th></tr>
<tr><td></td><td>Regardless demonstrated compliance, a noise monitoring program is still being recommended by Reverb Acoustics to provide verification of the compliance.</td></tr>
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b) *Effectiveness of Proposed Noise Mitigation Measures – Physical Noise Controls*

The physical noise controls (barriers/mounds) proposed for the site to control noise appear to be placed in specific locations to control selected noise sources. While this is appropriate for the site, the predicted exceedance of the PNTLs indicates that there may be opportunity to extend these controls.

A noise contour graph showing the noise levels as each receiver from peak operating conditions and the effect of each physical noise control would assist in determining what is reasonable and feasible for the project and confirm if further controls are warranted.

Additional Information: *Provision of a noise contour graph showing noise levels at each receiver and associated effect of physical noise control.*

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As outlined above, a revised set of noise mitigations have been proposed and are documented in Section 3.2.2 of the Revised Noise Impact Assessment (refer to **Attachment 1**). These include the following:

- Erect acoustic mound or wall 3000mm above FGL along the west side of the Live Bird Module and Hardstand.
- Erect acoustic mound or wall 2100mm above FGL along the north side Rendering Building loop road.
- Erect acoustic barrier 2100mm above FGL adjacent to Cooling towers and associated pumps, etc, on the north side processing plant.
- Erect acoustic barrier 2400mm above "truck" FGL north side of Cold Store distribution dock.

Table 13 of revised assessment (reproduced below) demonstrates compliance with the NPfI criteria nearest residential receivers under neutral and noise enhancing atmospheric conditions with the additional strategies in place.

<table>
<tr><th></th><th colspan="3">Received Noise Levels, dB(A),Leq</th></tr>
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Criteria: All Receivers Day=40, Evening=35, Night=35.

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c) Construction Noise – Effectiveness of Proposed Noise Mitigation Measures

There appears to be conflicting advice regarding noise mitigations options during the construction phase.

RNIA Section 3.2.6, relating to construction noise, states that:

"Consultation with the construction contractor confirms that due to the nature of ground conditions there are no quieter alternates available." (RNIA – p21 Section 3.2.6 – referencing Table 14 – Predicted Plant Item Noise Levels)

Section 4 of the RNIA lists recommendations for temporary barriers and screening as well as quieter

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Section 3.2.6 *Predicted Noise Levels – Construction Plant and Equipment* has been updated to state:

"Received noise produced by anticipated construction activities is shown in Table 14 below, for a variety of distances to a typical receiver, <u>with no special acoustic strategies in place</u> (i.e. noise barriers or acoustic shielding) and with each item of plant operating at full power…".

Table 14 demonstrates that all construction noise (without mitigation) are predicted to archive compliance with the relevant criteria, with the exception of bull dozer activities. However, these levels are likely to be greater than real conditions as: *"the machines will typically be spread over the site, and noise at any receiver is typically dominated by the few closest machines, such as an excavator loading a truck, while a second truck reverses into position to be loaded by an excavator. With a combined acoustic power level of 108 dB(A) for 3 typical machines operating at full*

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MATTERS RAISED	APPLICANT'S RESPONSE
equipment selection (refer Section 4.2.2 and Section 4.2.4). It is not clear if these measures have been assumed as being in place when undertaking the noise predictions, given that the contractor has indicated that these are not possible. *If the contractor is unable to use quieter methods of construction, then the EPA recommends that management of construction noise prioritise community engagement and management rather than physical noise controls.* ***Additional Information:** Clarification of mitigation measures to be implemented during construction phase.*	*power, 40dB(A) is expected at the closest residence during peak activity."* As identified in Section 4.2.2 and 4.2.3 of the Noise Assessment, a consultation / complaints handling procedure will be adopted during construction to manage potential noise complaints. In the event that validated complaints are received, possible mitigation in the form of barriers (e.g. earthen mounds) could be implemented to reduced noise emissions. It is expected that a detailed Noise Management Plan will be prepared as part of the Construction Management Plan for the site and can be submitted as part of a Construction Certificate Application. This can be conditioned accordingly.
d) Noise Mitigation – Night-Time Collection of Poultry *The EPA acknowledges that the section of the Noise Policy for Industry (EPA, 2017) – 'Noise mitigation for the night time collection of poultry' does not specifically apply to this development given it relates specifically to the collection of poultry from the farm. However the recommendations contained within that section would be relevant and beneficial to noise control at the Baiada facility and should be considered where possible.*	With consideration of the noise mitigation measures for night-time collection of poultry identified in the NPfI, the operation of the live bird shed will adopt and implement the following strategies: - A controlled, low speed environment will be maintained across the entire site to ensure that no harsh acceleration or braking is required on the premises. - Internal driveways and manoeuvring areas will be constructed and maintained so they are smooth and free of deformities (such as pot holes) to avoid impact noises. - Gates will be well maintained and opened/closed by site personnel to avoid unnecessary stopping or accelerating, or vehicle doors slamming at the access point. - Raised voices and amplified music should not occur during night-time periods. - The design of the facility will allow all manoeuvring associated with live bird operations to be undertaken in forward gear, negating the need to reversing beepers. - Non-tonal reversing beepers should be used on site plant and equipment where determined to be safe. - A Drive-through, enclosed, unloading area is proposed with the live bird shed.
e) Clarification of Relevant Road Traffic Noise Policy *RNIA – Section 3.1.1 states that the US Environmental Protection Agency's Intermittent Traffic Noise Guidelines are "approved by the EPA". This is not correct.* *The NSW Road Noise Policy sets out the approach to managing road traffic noise in NSW. However, the predicted road traffic noise levels from the development are considered to be appropriate.*	This section of the report has been revised to read "*Due to the non-continuous nature of traffic flow to and from the site, noise generated by traffic associated with the rendering plant site, on public roads, is assessed using the US Environment Protection Agency's Intermittent Traffic Noise guidelines*." (refer to updated Revised Noise Impact Assessment in **Attachment 1**).

MATTERS RAISED	APPLICANT'S RESPONSE
2. Waste Management	
a) Concentrated Brine Waste from Accelerated Evaporation Ponds *The response to submissions proposes three accelerated evaporation ponds to minimise the volume of reverse osmosis brine for off-site disposal. Limited information has been provided on the management and disposal of the concentrated brine waste generated when pond de-sludging is required.* *The response states 'the concentrated salt waste will be disposed of via a licenced disposal facility' but does not identify the licensed facility of facilities where it will be taken. The response also fails to identify how the sale waste will be classified in accordance with the EPA's Waste Classification Guidelines.* *Limited disposal options are available regionally if the waste is classified as 'liquid waste'. The EPA is also concerned there may be limited opportunities for disposal of the quantity of concentrated salt waste at local landfills. The EPA recommends that the proponent engage with local councils and identify which facilities are to be used to dispose of the concentrated brine waste.* ***Additional Information:*** *The proponent provides a waste management plan including, but not limited to, the following information:* - *Classification of the salt waste in accordance with the EPA's Waste Classification Guidelines.* - *The concentration and quantities of salt waste generated including the anticipated frequency of pond de-sludging.* - *The licenced facilities where the sale waste will be taken to for disposal, including information demonstrating that those facilities have the capacity as well as suitable infrastructure and environmental controls to manage the waste.* - *A contingency plan for the disposal of the concentrated salt waste should local landfills be unsuitable disposal facilities.*	***1. Classification of the salt waste in accordance with the EPA's Waste Classification Guidelines*** The salt waste would be classified as general solid waste in accordance with the EPA's Waste Classification Guidelines. ***2. Identification of the concentration and quantities of salt waste generated including the anticipated frequency of pond desludging*** The advanced water treatment plant will discharge 800kL of brine per day at full capacity. The brine will be concentrated in an accelerated evaporation process reducing the volume by 90% to 80kL/day. The brine will be retained in the evaporation ponds in liquid form until they are dried out and de-sludged. Each of the 3 evaporation ponds will be dried out periodically (approximately once every 1 – 2 years), the remaining solid waste will collected and taken offsite to a licensed disposal facility. ***3. Identify the licenced waste facilities where the salt waste will be taken for disposal, including information demonstrating those facilities have the capacity as well as suitable infrastructure and environmental controls to manage the waste*** The proponent has commenced discussions to the provision of waste disposal with major waste management operators whom are appropriately licensed to accept general solid waste in accordance with the EPA's Waste Classification Guidelines. Commercial arrangements have not been entered into at this stage. Further discussions would commence prior to the construction certificate phase of the development and formal application made in accordance with regulatory requirements. ***4. Outline contingencies for the disposal of salt waste should landfills be unsuitable disposal facilities.*** Landfills are suitable disposal facilities as outlined above and a number of suitable facilities exist. Appropriate onsite storage facilities can be provided if required as additional contingency.

MATTERS RAISED	APPLICANT'S RESPONSE
b) Mining for Minerals from Brine Stream The response to submissions states that 'efforts will be made to mine the remaining material for minerals as the technology becomes available' but there is no information or details how this will be implemented. Given the limited technology and information available, the EPA recommends this be considered in more detail as a separate matter, if/when the technology becomes available.	Noted. This may be pursued at such time that this technology becomes available.
3. Odour Impact Assessment	
The revised Odour Impact Assessment and revised Odour Management Plan provided as part of the response to submissions adequately addressed eight of the nine issues raised in the EPA's submission. However, the design of some aspects of the proposed has changed significantly and additional information is needed to assess the odour impacts associated with these changes.	Noted. See responses below. The latest Odour Impact Assessment (OIA) report (Version 2.3) (**Attachment 2**) should be read in conjunction with Version 0 of the Odour Management Plan (OMP) for the proposed Poultry Processing Facility (PPF). However, The Odour Unit (TOU) has consolidated key details of the OMP to ensure that an adequate level of clarity and context is provided in the OIA report as a stand-alone document. Furthermore, it is noted that the latest OIA report (Revision 2.3 dated 18 August 2020) supersedes all previously issued report versions. As such, previous OIA versions by TOU should be disregarded. TOU has also provided a separate appendices document to enhance clarity and context surrounding the determination of the modelling predictions contained in the latest OIA report. It is important to note that all TOU documents supplied to the NSW EPA contain information that is classified as commercially sensitive and should be treated as commercial in confidence.
a) Uncertainty of Odour Risk and Applicable Mitigation Measures *There is uncertainty regarding the robustness of the odour dispersion modelling due to unvalidated or unjustified emissions data for the loading bay and the WWTP and the overall change in facility design. Additionally, the proponent has not identified additional feasible odour mitigation measures that could be implemented should odour impacts occur once operational.* *Section 6.2 of the Technical framework – Assessment and management of odour from stationary sources in NSW lists the information to be included in an odour impact assessment report and this includes such information that informs the odour risk of an activity. The*	The modelling is a risk assessment tool that is set up to be reflective of the PPF with industry best practice odour management measures in place. This is balanced with conservative assumptions including: ▪ Live bird receival hall odour emissions based upon a peak capacity of 90,000 birds, 20 hours per day, 7 days per week where the average capacity equates to approximately 21,500 birds 20 hours per day, 7 days per week; ▪ The proposed PPF waste water treatment plant (WWTP) area sources modelled with odour emissions from an sequencing batch reactor (SBR)-based WWTP system despite using advanced membrane bioreactor (MBR) technology that will most likely result in lower odour emissions; and ▪ Including treated air from biofilters and other proven odour control systems as part of the modelled odour impact. Despite the conservatism, the overall finding of the modelling is that the proposed PPF has a low-risk profile when industry best practice odour management measures are in place. In addition, as indicated above, the modelling impacts have <u>not</u> distinguished

MATTERS RAISED	APPLICANT'S RESPONSE
evaluation of odour risk must, as a minimum, consider the following: • *Level of compliance with the odour assessment criterion;* • *Level of uncertainty in odour dispersion modelling results;* • *Results of any sensitivity analysis;* • *Reliability of any odour mitigation measures; and* • *Additional feasible mitigation measures that could be implemented if the facility emits offensive odour after it is operational.* *The EPA uses this information, together with the results of the odour assessment, to evaluate the risk of impact associated with the activity. This information is used to develop recommended conditions of approval or licence conditions for the activity. It also indicates to the EPA the proponents' level of understanding regarding the odour risk of their activity and their obligation to comply with section 129 of the POEO Act.* ***Additional Information:*** *The proponent needs to re-evaluate the odour risk of the project, specifically addressing uncertainty in the modelling, and identifying additional feasible odour mitigation measures that could be implemented if required, should the facility become operational.*	between different odour source types such as livestock handling and processing, by-product protein recovery, wastewater sources, and treated quality emissions (such as that from the biofilter system). This further enhances the conservatism built into the cumulative modelling predictions provided in the latest OIA report. With the above in mind, the model for the proposed PPF was iteratively used over many years to determine the most reasonably effective odour mitigation measures. This includes maintaining effective point capture and containment of odour within the PRP (including loading bay) as observed in August 2018. As concluded in the OIA report, modelling is not an ideal tool to address uncertainty with operational odour impacts or to adequately predict the real-world impacts from measures designed to avoid, mitigate, manage and/or offset impacts. The OMP is the best tool to significantly minimise residual odour impact risks for the proposed PPF operations. Notwithstanding this, the hierarchy of controls documented in the OMP have been included in the latest OIA Report to enhance clarity and context regarding the management of the odour emission risks associated with the proposed PPF (see *Section 6.2* of the latest OIA report).
b) Odour Emissions – Loading Bay *The outstanding issue from our previous advice to be addressed relates to the Protein Recovery Plant (PRP) increased production assessment.* *A more realistic odour emission rate estimate and justification for the raw materials loading bay has been provided consistent with measurements and observations made by The Odour Unit in August 2018, reflecting the excellent odour capture at the Protein Recovery Plant.* *However, the revised odour impact assessment has not provided additional information to address the increased PRP throughput or odour sampling report, including operations when*	The theoretical maximum production rates have been used for 24 hours, 7 days per week (refer to *Section 3.3.1* of the OIA report). Previously, hours of operation were 24 hours per day, typically five days a week (Monday to Friday) with the flexibility to operate 24 hours per day on weekends. It is understood that the proposed increased rendering capacity is solely achieved by extending the production time to take full advantage of 24 hours per day 7 days per week production with no restrictions; <u>not</u> by an increased rate of throughput. This is reflected by the modelling of sources that emit odour constantly 24 hours, 7 days per week. The Loading Bay was originally estimated by MWH in 2016 to emit only between 5 pm and 6 pm seven days a week. TOU had changed MWH's assumption to 24 hours per day 7 days per week based on 2.5% fugitive factor from biofilter inlet 100,000 ou at 30,000 m3/h (i.e. 4,562 ou.m^3/s). It was decided for the latest OIA report to refine the loading bay OER to be consistent with the August 2018 observations, which showed excellent odour capture at the Protein

MATTERS RAISED	APPLICANT'S RESPONSE
monitoring was undertaken, to validate the revised odour emissions rates for the loading bay. *Appendix C of the original odour impact assessment reported the loading bay had an odour emission rate of 10,943 OU.m3/s based on sampling on 2018. The revised Odour Impact Assessment states the loading bay has an odour emission rate of 334 OU.m3/s based on estimation from the processing and storage areas.*	Recovery Plant (PRP). Subsequently all measured volume sources had their odour emission rates (OERs) updated. Appendix C of original report contains a typographic error where the peak odour emission value for the loading bay was incorrectly input into the odour emission rate, instead Table 2.4 of original OIA report should be referred to for the valid figures. Also, the comment is incorrect, i.e. loading bay not based on measurements and observations in August 2018. This is of no consequence to the findings and outcomes made in the latest OIA report.
c) Odour Emissions – Wastewater Treatment Plant (WWTP) *Emissions from the wastewater treatment plant (WWTP) are significantly different from the initial 2019 assessment. This is due to the redesigned WWTP having only one sequential batch reactor (SBR), with half the footprint area. There is no discussion regarding the differences in design between June 2020 and June 2019 and the resulting changes to odour emissions. Further, footprints for the WWTP for 2019 and 2020 presented in revised Odour Impact Assessment are consistent with footprints presented in Table 1 of the Response to Submissions report.* ***Additional Information:*** *Justification and provisions of any supporting information for the odour emission rates used in the June 2020 assessment to explain the significant discrepancies between emission rates in the June 2019 and June 2020 assessments for both the loading bay and the WWTP.* *The proponent should include discussion of the changes in WWTP design, and clarification of footprint areas presented in the Response to Submissions report should be provided.*	Refer to Section 3.2.1 of the latest OIA report (refer to **Attachment 2**). The June 2020 assessment is based upon the following: ▪ PRP Stage 1 WWTP as constructed; and ▪ Proposed PPF WWTP and AWTP design information made available to TOU. This was supplemented by the best available and most representative emission inventory determinations. It is understood that previously outlined Stage Two WWTP plan documented in the original OIA report will not proceed in favour of a stand-alone WWTP and AWTP for the proposed PPF, with the current Stage One WWTP solely servicing the PRP. A high-resolution of the proposed PPF site layout (i.e. Figure 2.2 of the latest OIA Report) is provided in Appendix A of the appendices document for enhanced clarity.
d) Odour Impacts – On-site Childcare Centre *The EPA previously sought clarification on the actual hours of operation of the proposed onsite childcare facility. The EPA recommended the assessment be revised to incorporate mitigation strategies to reduce odour over the full*	Noted. TOU agrees with NSW EPA's position regarding the assessment of the on-site childcare centre in the context of the proposed PPF and the latest OIA report. However, as part of good practice design, TOU has applied the precautionary principle and recommended conventional and well-established engineered control measures to maintain the general amenity of the childcare centre to a high-quality at all times.

MATTERS RAISED	APPLICANT'S RESPONSE
operational hours or the childcare centre. *In the revised Odour Impact Assessment, both 24 hours per day operation and 14 hours per day operation (nominally from 5am to 7pm) are considered. The actual childcare operating hours will be 7am-6pm. The results shown in Table 5.1 of the revised Odour Impact Assessment consider recommended odour risk reduction as part of an Odour Management Plan, which is not quantifiable by odour dispersion modelling.* *The EPA notes the following will be adopted as part of the Odour Management Plan with respect to the on-site childcare centre:* *i) Adaption of a hybrid high efficiency particulate air and carbon filter system to protect the indoor airspace environment of the childcare activities during the atypical or upset conditions. During normal operating conditions, odour impact risks are very unlikely under the odour management protocol adopted for the Poultry Processing Facility (PPF) operations; and* *ii) Vegetative landscaping for the outdoor areas to provide a level of screening attenuation and visual disconnection for the PPF operations.* ***EPA Comment:*** *The predicted odour impacts at the childcare centre have increased from the initial Odour Impact Assessment (from 4.8 OU to 7.0 OU during daytime operation) and now exceed the appropriate odour impact assessment criterion.* *The revised Odour Impact Assessment has stated that the proponent will employ odour mitigation measures as part of the odour management plant, resulting in a low risk of odour impacts. These odour mitigation measures have not been included in the modelling of impacts.* *While the odour impacts at the childcare centre are predicted to exceed criteria, it is located onsite and within the premises boundary. The EPA relies on section 129*	

MATTERS RAISED	APPLICANT'S RESPONSE
of the Protection of the Environment Operations Act 1997 for the regulation of odour. Section 129 states that the occupier of any premises at which scheduled activities are carried on under the authority of an environmental protection licence must not cause or permit the emission of any offensive odour from the premises to which the licence applies. Accordingly, our assessment of offensive odour, and application of associated odour criteria, is considered to those receivers outside the premises boundary.	
4. Wastewater Assessment	
The EPA notes there has been changes made to the design of the wastewater treatment plant for the proposal. The EPA also notes there are no proposed controlled discharges of process wastewater to surface waters. *We understand the wastewater treatment plant will be designed for relevant industrial re-use water quality standards for the food industry. This aspect of the wastewater treatment process is not regulated by the EPA.* *The EPA's submission on the EIS recommended that the fate of the brine waste stream be considered as part of the development assessment process. This information has largely been provide through an assessment of:* • *A redesigned wastewater treatment plant making 90% of the water suitable for re-use on site and negating the need to discharge trade waste to Council's wastewater treatment plant; and* • *Newly proposed accelerated evaporation ponds to manage (on-site) the concentrated brine stream.* *The three 10,000m^2 lagoons appear to be adequately sized by providing a minimum freeboard of 500mm and a minimum depth of 1.5m, to accommodate the 7-day RDRD (rare design rainfall depth) for a 1 in 2000 year event (approximately 480mm). The ponds are proposed to have raised banks to avoid ingress of stormwater which fall outside the pond footprint.*	It is not the intention for any brine material to be discharged to sewer. The brine water is designed to be evaporated leaving behind a post treated dry, spreadable material (being a solid) which will be disposed of at a suitably licenced landfill site. Discussions are ongoing in this regard with the Tamworth Regional Council. Reasonable and relevant conditions are expected in this regard.

MATTERS RAISED	APPLICANT'S RESPONSE
a) Design and Management of Evaporation Ponds *The potential for managed overflows from the effluent evaporation system appears to be low, however, the procedures and timing to restore and maintain the freeboard capacity in a timely manner, or, if there is cumulative storage above the freeboard, then there are risks of managed overflows of highly saline water from the site from subsequent or cumulative rainfall events.* ***Additional Information:** The proponent is to provide the following:* *An evaporation pond management plan that includes, but is not limited to:* • *An updated water balance and risk mitigation measures to demonstrate that the design freeboard capacity of the evaporation ponds is restored as soon as practical after significant rainfall events and there is no cumulative storage above the freeboard; and* • *Contingency measures to prevent managed overflows are identified, e.g. if freeboard is not available and further significant rainfall is predicted; and* • *Operational measure to be implemented for salt removal, maintaining liner integrity and maintaining the leak detection system performance*	The evaporation ponds will be managed to ensure any risk of managed overflows of highly saline water is appropriately managed. The ponds have been designed with a freeboard of 500mm, accommodating the 7-day rare deign rainfall depth (RDRD) for a 1 in 2000 year event of approximately 480mm. The freeboard will be restored as soon as practical after significant rainfall events to ensure there is no cumulative storage above the freeboard. Further contingency measures will be considered at the detailed design stage to cater for any further significant rainfall events to avoid cumulative storage. Operational and maintenance management measures for salt removal, maintaining liner integrity and maintaining the leak detection system performance will be designed as part of the construction certificate detailed design phase and implemented by the proponent.
b) Pond Linings *The EPA submission recommended that the adequacy of liners for processing and treatment systems be confirmed through the response to submissions.* *The Response to Submissions states that the newly proposed wastewater treatment plant will negate the need for additional sequential batch reactors (SBR) and covered aerobic lagoons (CALs) to be constructed on site. The adequacy/permeability of the liners for the evaporation ponds is now a key issue for the site due to the high salinity wastewater that these ponds will store and the potential mobility of salts in groundwater.*	The pond liners will be selected based on the adequacy of the liners to prevent the mobility of salts in groundwater. This will be verified via on-site destructive testing and off-site independent testing through an approved NATA laboratory. The pond liner selection will consider the risks of high salinity effluent reacting with the liner as well as appropriate permeability to ensure groundwater is protected. Mitigation measures for removing dried salt without damaging the liner, leak detection systems and testing liner integrity prior to further use will be addressed at the detailed design construction certificate stage of the application. Further, the proponent commits to: i) Installing liners for evaporation ponds that will achieve a hydraulic conductivity of $1x10^{-9}$ meters per second or less via a constructed clay liner of at least 1000mm (or a geosynthetic liner providing equivalent or better protection).

MATTERS RAISED	APPLICANT'S RESPONSE
The Response to Submissions states that: *"With respect to the adequacy of the liners, Australis does not have specific standards which need to be met. The Applicant's preferred supplier uses industry GRI-GM Standards from the United States of America. The supplier is also an active member of the "International Association of Geosynthetic Installers (IAGI) which means that they follow the GRI-GM standards. The supplier ensures that for all Baiada projects, the relevant materials are subject to on-site destructive testing and off-site independent testing through an approved NATA laboratory" (p18 – RTS).* The response to submission does not specify liner permeability or consider the risk of high salinity effluent reacting with the liner. Mitigation measures for removing dried salt without damaging the liner, leak detection systems and testing liner integrity prior to further use are also not addressed. **Additional Information:** The proponent is to provide the following: i) A commitment to install liners for evaporation ponds that will achieve a hydraulic conductivity of $1x10^{-9}$ meters per second or less via a constructed clay liner of at least 1000mm (or a geosynthetic liner providing equivalent or better protection). ii) Consideration of the risk of high salinity effluent reacting with the evaporation pond liner system and how this risk will be managed. iii) Details of the quality assurance/quality control (QA/QC) measures that will be adopted to demonstrate all wastewater ponds approved under any development application	ii) Consideration of the risk of high salinity effluent reacting with the evaporation pond liner system and providing details on how this risk will be managed. iii) Provide details of the quality assurance/quality control (QA/QC) measures that will be adopted to demonstrate all wastewater ponds will be constructed to achieve the above specified hydraulic conductivity. iv) Outlining the QA/QC process to be followed to minimise the increased risk of high salinity wastewater to ground and potential reaction with the liner. v) Detailing the QA/QC process to address leak detection systems and groundwater monitoring for potential pond leakage. Procedures for removing dried salt without damaging the liner and procedures for testing liner integrity prior to further use, including relevant QA/QC procedures, following removal of dried salt or other invasive maintenance works within the evaporation ponds will also be provided at the detailed design/construction certificate stage. This can be reasonably and relevantly conditioned as part of a development approval.

MATTERS RAISED	APPLICANT'S RESPONSE
for the proposal will be constructed to achieve the above specified hydraulic conductivity. iv) The QA/QC process to be followed to minimise the increased risk of high salinity wastewater to ground and potential reaction with the liner. v) The QA/QC process to address leak detection systems and groundwater monitoring for potential pond leakage. vi) Procedures for removing dried salt without damaging the liner and procedures for testing liner integrity prior to further use, including relevant QA/QC procedures, following removal of dried salt or other invasive maintenance works within the evaporation ponds.	
c) WTP sludge management *The EPA submission recommended that the management of any sludge that is not returned into the treatment process is adequately described in the response to submissions. This has been addressed by the proponent.*	Noted.
d) Stormwater and discharges to waters *The EPA submission identified a potential risk of handling live birds in uncovered areas that could generate polluted stormwater. The Response to Submissions confirms that unloading of live birds will occur undercover.* *It is recommended that:* • *Standard approval conditions for construction stage and operation stage stormwater controls are applied, including construction stage controls in accordance with Managing Urban Stormwater, Volume 1; and* • *A consent condition of approval be considered to require that*	Noted.

MATTERS RAISED	APPLICANT'S RESPONSE
all birds handling and associated cleaning activities are contained indoors.	
e) Truck wash *The EPA submission requested further details on the extent or type of truck wash facilities including whether the insides of trucks, that may contain feathers and manure, will be washed and treated in a system that discharges offsite.* *The RtS indicated that wastewater from live bird washing and distribution truck washing will be either directed to trade waste or advanced wastewater treatment plant.*	Noted.

I trust this information provides a full response to the matters raised by the EPA. Please do not hesitate to contact either myself or Nicole Boulton on telephone number (07) 3220 0288 should you have any questions or wish to discuss.

Regards,

David Ireland
Director - Planning
PSA Consulting (Australia) Pty Ltd

VERSION	DATE	DETAILS	AUTHOR	AUTHORISATION
V2	31 August 2020	FINAL	Nicole Boulton	David Ireland

ATTACHMENT 1: REVISED NOISE IMPACT ASSESSMENT (V5)

ATT01

REVERB ACOUSTICS
Noise and Vibration Consultants

Oakburn Processing Facility & Rendering Plant 1154 Gunnedah Road Westdale NSW

August 2020

Prepared for PSA Consulting Pty Ltd
Report No. 18-2187-R5

Building Acoustics-Council/EPA Submissions-Modelling-Compliance-Certification

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TABLE OF CONTENTS

SECTION 1
Introduction

1.1 INTRODUCTION

Reverb Acoustics has been commissioned to conduct a revised noise impact assessment for relocation of Baiada's Out Street, Tamworth Processing Plant to 1154 Gunnedah Road, Westdale. The new Processing Plant will be capable of processing up to 3 million birds per week and will be located directly south of the existing Rendering Plant, which will also increase production from 120 tonnes to 240 tonnes of finished product per day.

The purpose of the assessment is to determine the noise impact, operation of the site would have on the surrounding rural environment, and to ensure any noise control measures required are incorporated during the design stages. The assessment is to accompany and forms part of an Environmental Impact Statement (EIS) to support Development Consent to the Department of Planning, Industry and Environment (DPIE).

1.2 TECHNICAL REFERENCE / DOCUMENTS

Beranek, L.L and Istvan, L.V. (1992). *Noise and Vibration Control Engineering.* John Wiley and Sons, Inc.

Bies, D.A. and Hansen, C.H. (1996). *Engineering Noise Control: Theory and Practice*. London, E & F.N. Spon.

Hassall, J.R. and Zaveri, K. (1988) *Brüel & Kjaer – Acoustic Noise Measurements.* Denmark, K. Larson and Son.

Harris, C.M. (ed) (1957). *Handbook of Noise Control.* New York, McGraw-Hill.

Peterson, A.P.G. (1980). *Handbook of Noise Measurement*. Massachusetts, Genrad Inc.

Sharland, I. (1998). *Woods Practical Guide to Noise Control.* England, Woods Acoustics

AS 1055.1.2.3-1997 *"Acoustics – Description and measurement of environmental noise"*.

NSW Environment Protection Authority (2017). *Noise Policy for Industry.*

NSW Environment Protection Authority (1999). *Environmental Criteria for Road Traffic Noise*

NSW Roads and Traffic Authority (2001). *Environmental Noise Management Manual*

HK Clarke & Associates Pty Ltd (1997). *A Noise Impact Assessment for the Proposed Poultry Processing Plant on the Oxley Highway, Tamworth.*

Reverb Acoustics Pty Ltd (October 2018). *Noise Impact Assessment. Increase in Production. Oakburn Rendering Plant. Oxley Highway, Tamworth, NSW (ref: 16-1990-R2)*

A Glossary of commonly used acoustical terms is presented in Appendix A to aid the reader in understanding the Report.

SECTION 2

Project Description
Existing Acoustic Environment
Assessment Criteria

2.1 PROJECT DESCRIPTION

The proposal includes relocation of Baiada's Out Street, Tamworth, Processing Plant to 1154 Gunnedah Road, Westdale, in conjunction with an increase in production to 3 million birds per week, with an increase from 120 tonnes to 240 tonnes of finished product per day at the existing rendering plant. It should be noted that current approved operating hours are 24 hours/day 7 days/week.

Noise sources at the site that must be considered as part of the assessment include fixed and mobile plant and equipment, and truck movements. Other noise sources include general site noise such as employee vehicle movements, delivery vehicles, mechanical equipment and other maintenance machinery. All vehicles and trucks will enter and leave the site via the dedicated access road connecting to Workshop Lane within the Glen Artney industrial estate.

The assessment includes measurement of the existing acoustic environment by Reverb Acoustics to provide baseline data and enable establishment of noise assessment criteria. Noise impacts from trucks are assessed at typical residences along the transport route.

2.2 EXISTING ACOUSTIC ENVIRONMENT

Consideration must be given to the extent of the existing acoustic environment and whether such levels are appropriate for the land use of the receiver area. Nearest residential receivers identified during our site visits are as follows:

R1. Girrawheen: Old Winton Road, 1700m west of the site.
R2. Abbeylands: Bowler's Lane, 1100m north of the site.
R3. The Billabong: Wallamore Road, 1600m east of the site.
R4. Various Residences: New Winton Road (south of airport), 2500m south of the site.

Background noise level surveys were conducted previously for the original assessment at the site in 2007. The data is relatively old therefore, attended background noise level monitoring was conducted at residential receivers during our site visits on 28-29 August 2016 and July 2018 to update the data. To formalise background data long-term monitoring was conducted in July 2018 in Bowlers Lane approximately 600 metres from the Oxley Highway near Girrawheen R1 (Logger Location 1) and at the intersection of Bowlers Lane and Wallamore Road near Abbeylands R2 and The Billabong R3 (Logger Location 2). Table 1 shows a summary of results, with high wind/rain periods excluded prior to analysis, including the Rating Background Level's (RBL's) which were calculated from Assessment Background Levels (ABL's), for the day, evening and night periods, according to the procedures described in the EPA's NPfI and as detailed in Australian Standard AS1055-1997, "Acoustics - Description and Measurement of Environmental Noise, Part 1 General Procedures".

Table 1: Summary of Noise Monitoring Results, dB(A)

Background L90			Ambient Leq		
Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
Logger Location 1					
31.3	25.1	20.6	57.1	53.0	49.5
Logger Location 2					
29.7	28.5	25.5	51.6	46.3	46.4

The above background (L90) noise levels are below the minimum assumed RBL's specified in Table 2.1 of the NPfI. Therefore, for assessment purposes the minimum RBL's have been adopted in all receiver areas for assessment purposes, i.e. 35dB(A),L90 for day (7am-6pm) and 30dB(A) for the evening and night (6pm -10pm and 10pm-7am).

Figure 1: Site Plan

2.3 CRITERIA

2.3.1 Road Traffic Noise

The Roads and Maritime Services (RMS) base their assessment criteria on those outlined by EPA. Noise reduction measures for new and existing developments should endeavour to meet the noise level targets set out in the EPA's NSW Road Noise Policy (RNP) which contains a number of criteria applied to a variety of road categories (freeway, arterial, sub-arterial and local roads) and situations (new, upgraded roads and new developments affected by road traffic). Table 2 shows the relevant categories, taken from Table 3 of the RNP:

Table 2: - Extract from Table 3 of RNP Showing Relevant Criteria.

Road Category	Day	Night
Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments.	60 LAeq,15hr (external)	55 LAeq,9hr (external)
Existing residences affected by additional traffic on existing local roads generated by land use developments.	55 LAeq,1hr (external)	50 LAeq,1hr (external)

In addition to the assessment criteria detailed above, the increase in total traffic noise must also be considered. Reproduced below in Table 3 are the relative increase criteria that trigger consideration of mitigation measures:

Table 3: - Reproduced Table 6 of RNP
Relative Increase Criteria for Residential Land Uses

Road Category	Type of Project/Development	Total Traffic Noise Level Increase–dB(A)	
		Day (7am-10pm)	Night (10pm-7am)
Freeway/arterial/sub-arterial roads & transitways	New road corridor / redevelopment of existing road/land use development with the potential to generate additional traffic on existing road	Existing traffic LAeq,(15hr)+12dB	Existing traffic LAeq,(9hr)+12dB

Road categories are defined in the RNP are as follows:

Freeway/arterial — Support major regional and inter-regional traffic movement. Freeways and motorways usually feature strict access control via grade separated interchanges.

Sub-arterial — Provide connection between arterial roads and local roads. May provide a support role to arterial roads during peak periods. May have been designed as local streets but can serve major traffic generators or non-local traffic functions. Previously designated as "collector" roads in ECRTN.

Local Road — Provide vehicular access to abutting property and surrounding streets. Provide a network for the movement of pedestrians and cyclists, and enable social interaction in a neighbourhood. Should connect, where practicable, only to sub-arterial roads.

Based on the above definitions, the Oxley Highway is classified as an arterial road.

2.3.2 Site Operation (Planning Noise Levels)

Noise from industrial noise sources scheduled under the Protection of Environment Operations Act is assessed using the EPA's NPfI. However, local Councils may also apply the criteria for land use planning, compliance and complaints management. The NPfI specifies two separate criteria designed to ensure existing and future developments meet environmental noise objectives. The first limits intrusive noise to 5dB(A) above the background noise level and the other applies to protection of amenity of particular land uses based on the existing (Leq) noise level from industrial and commercial noise sources. Project Specific Noise Levels are established for new developments by applying both criteria to the situation and adopting the more stringent of the two.

The existing L(A)eq for the receiver area is dominated by traffic on nearby roads and natural noise sources and some industrial activity. Reference to Table 2.2 of the NPfI shows that the area is classified as rural, i.e. an area generally characterised by low background noise levels (except in the immediate vicinity of industrial noise sources The Project Amenity Level is derived by subtracting 5dB(A) from the recommended amenity level shown in Table 2.2. A further +3dB(A) adjustment is required to standardise the time periods to LAeq,15 minute. The adjustments are carried out as follows:

Recommended Amenity Noise Level (Table 2.2) – 5dB(A) +3dB(A)

Table 4 below specifies the applicable project intrusiveness and amenity noise trigger levels for the proposed redevelopment.

Table 4: - Base Noise Level Objectives

Period	Intrusiveness Criterion	Amenity Criterion
Day	40 (35+5) #	48 (50-5+3)
Evening	35 (30+5) #	43 (45-5+3)
Night	35 (30+5) #	38 (40-5+3)
Receiver Type: Rural (See EPA's NPfI - Table 2.2)		

Minimum assumed RBL's EPA's NPfI Table 2.1

Project specific noise levels, determined as the more stringent of the intrusiveness criterion and the amenity / high traffic criterion, are as follows:

Day **40dB LAeq,15 Minute** 7am to 6pm Mon to Sat or 8am to 6pm Sun and Pub Hol.
Evening **35dB LAeq,15 Minute** 6pm to 10pm.
Night **35dB LAeq,15 Minute** 10pm to 7am Mon to Sat or 10pm to 8am Sun and Pub Hol.

2.3.3 Child Care Centre

The Association of Australian Acoustic Consultant's (AAAC's) document, *"Technical Guideline. Child Care Centre Noise Assessment"* recommends assessment of the noise impact within indoor play areas and sleeping areas, and outdoor play areas, when the development may be impacted upon by road and, rail traffic and industry . The document specifies the following:

External Noise	Outdoor Play Areas	55dB(A)
Indoor Noise	Play/Sleeping Areas	40dB(A)

2.3.4 Maximum Noise Level Event Assessment - Sleep Arousal

Section 2.5 of EPA's NPfI requires a detailed maximum noise level event assessment to be undertaken where the subject development/premises night-time noise levels (10pm-7am) exceed the following:

- LAeq (15 minute) 40dB(A) or the prevailing RBL plus 5dB whichever is greater, and/or
- LAFmax 52dB(A) or the prevailing RBL plus 15dB, whichever is greater.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL, and the number of times this happens during the night period.

2.3.5 Modifying Factors - Tonality

Fact Sheet C of the NPfI defines tonal noise as follows:

Level of 1/3 octave band exceeds the level of the adjacent bands on both sides by:
- 5dB or more if the centre frequency of the band containing the tone is in the range 500-10,000Hz
- 8dB or more if the centre frequency of the band containing the tone is in the range 160-400Hz
- 15B or more if the centre frequency of the band containing the tone is in the range 25-125Hz

2.3.6 Construction Noise

Various authorities have set maximum limits on allowable levels of construction noise in different situations. Arguably the most universally acceptable criteria, and those which will be used in this Report, are taken from the NSW Environment Protection Authority's (EPA's) Interim NSW Construction Noise Guideline (ICNG). Since the project involves a significant period of construction activity, a "quantitative assessment" is required, i.e. comparison of predicted construction noise levels with relevant criteria. For assessment of noise impacts at residential receivers Table 3 of the ICNG is reproduced below in Table 5:

Table 5: - Table 3 of ICNG Showing Relevant Criteria at Residences

Time of Day	Management Level Leq (15min)	How to Apply
Recommended Standard Hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public holidays	Noise affected RBL +10dB(A) i.e**. 45dB(A) day**	- The noise affected level represents the point above which there may be some community reaction to noise. - Where the predicted or measured LAEQ (15min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. - The proponent should also inform all potentially impacted residents of the nature of works to be carried out, expected noise levels, duration, and contact details
	Highly noise affected 75dB(A)	- The highly noise affected level represents the point above which there may be strong community reaction to noise. - Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. - If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining duration and noise level of the works, and by describing any respite periods that will be provided.
Outside recommended Standard hours	Noise affected RBL +5dB(A)	- A strong justification would typically be required for works outside the recommended standard hours. - Proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating see Sec 7.2.2

Section 4.2 of the ICNG also specifies the following external noise level limits for commercial and industrial premises.

Industrial premises	**75dB(A),Leq (15 min)**
Offices, retail outlets	**70dB(A),Leq (15 min)**

Construction will only occur during standard construction hours, i.e. 7am to 6pm Monday to Friday and 8am to 1pm on Saturday, with no construction permitted on Sundays or public holidays, unless otherwise agreed with Council. Table 6 relevant for potentially affected existing receivers (also see Figure 1).

Table 6: Criteria Summary

Assessment Location	Standard Construction Hours		Outside Standard Hours
	Noise Affected	Highly Noise Affected	
R3 – Residential Dev'p	45	75	35#
R1,R2 – Commercial Dev'p	70	75	70

#Evening and night periods.

SECTION 3
Noise Impact Assessment

3.1 METHODOLOGY

3.1.1 Road Traffic

Due to the non-continuous nature of traffic flow to and from the site, noise generated by traffic associated with the rendering plant site, on public roads, is assessed using the US Environment Protection Agency's Intermittent Traffic Noise guidelines.

Equation 1 outlines the mathematical formula used in calculating the Leq,T noise level for intermittent traffic noise.

Equation 1:

$$L_{eq},T = L_b + 10\log\left[1 + \frac{ND}{T}\left(\frac{10^{(L\max - Lb)/10} - 1}{2.3} - \frac{(L_{\max} - L_b)}{10}\right)\right]$$

Where L_b background noise level (dB(A))
T is the time for each group of vehicles (min)
D is duration of noise of each vehicle (min)
L_{MAX} is vehicle noise (dB(A))
N is number of vehicle trips

Typical vehicle noise levels were sourced from our library of technical data, while background noise levels are those described in Section 2.2. The Lmax vehicle noise levels used in Equation 1 are the maximum predicted noise levels produced at the facade of a typical residence by vehicles entering and departing the site.

3.1.2 Site Activities

Noise levels produced by activities/equipment associated with the existing rendering plant were measured during our site visit on 20 July 2016 and/or sourced from our library of technical data. Noise levels produced by the proposed Processing Plant were measured at Baiada's existing processing plant facilities in Tamworth and Griffith. These noise level measurements were taken with a Svan 912AE Sound and Vibration Analyser. The instrument is Class 1 accuracy, in accordance with the requirements of IEC 61672, and has the capability to measure steady, fluctuating, intermittent and/or impulsive sound, and to compute and display percentile noise levels for the measuring period. A calibration signal was used to align the instrument train prior to measuring and checked at the conclusion. Difference in the two measurements was less than 0.5dB. Each measurement was taken over a representative time period to include all aspects of machine operation, including additional start-up noise where applicable. Items of equipment, which produced a brief burst of noise, such as a truck, were measured for a similarly brief time period to ensure the results were not influenced by long periods of inactivity between operations.

Sound measurements were generally made around all sides of each machine/activity, to enable the acoustic sound power (dB re 1pW) to be calculated. The sound power level of each item is then theoretically propagated to each receiver with allowances made for geometric spreading, directivity, molecular absorption, intervening topography or barriers and ground effects giving the received noise level at the receiver from that particular plant item.

Addition of the received Sound Pressure Level (SPL) for each of the individual operating sources gives the total SPL at each receiver, which is then compared to the relevant criteria. Where noise impacts above the criteria are identified, suitable noise control measures are implemented and reassessed to demonstrate satisfactory received noise levels.

Calculations were performed with RTA Technology Environmental Noise Model computer software, which accepts information on ground type and topography, source and receiver locations, weather details and source sound power spectra. Ground contours were obtained from topographical maps of the site and surrounds. All noise sources at the site were input into our model as point sources using the point calculation mode to determine the noise level at each receiver. Results from the noise model are presented for various scenarios in later Sections of this report.

3.1.3 Atmospheric Conditions

In the Tamworth region atmospheric conditions can exacerbate received noise levels for a percentage of the time. Temperature inversions may be expected in the area during the night and early morning at a frequency of greater than 30% of the time during winter and to a lesser degree in the warmer months. Inversion effects are strongest in the early hours of the morning but tend to weaken rapidly and may be considered to have completely dissipated by 9am or earlier. The ENM model was prepared for the following operating scenarios, as shown below (ref: NPfI Fact Sheet D):

1. Standard meteorological conditions for day/evening/night, i.e. 0.5m/s wind 10m AGL.
2. 3m/sec wind source to receiver (day/evening).
3. F-class temperature inversion of 3°C/100m and 2m/sec source to downhill receiver wind for night. (See Table C2, Appendix C-EPA's INP)

An F-class inversion, i.e. 3°C/100m, is typical in the Tamworth area and slightly weaker inversions are generally expected for coastal areas. Therefore, we have modelled this default inversion strength.

Wind in a particular direction causes increased received noise levels at downwind receivers, therefore the effect of noise enhancement due to wind has been considered. Wind will occur more often in the colder months just before dawn, implying the cause is from inversion build-up at night. The NPfI suggests a 3° inversion with 2m/sec wind downhill for an area with rainfall greater than 500mm/year (See Table C2, Appendix C). Therefore, modelled conditions for night are 3° inversion with 2m/sec wind in each direction. Alternatively, a 3m/sec wind could have been modelled, however, less noise enhancement is given for a wind of this strength in all directions, hence the preferred modelling scenario is the former.

3.1.4 Construction Activities

Future noise and vibration sources on the site cannot be measured at this time, consequently noise and vibration levels produced by plant and machinery to be used on the site have been sourced from manufacturers' data and/or our library of technical data, which has been accumulated from measurements taken in many similar situations on other sites for others.

All noise level measurements were taken with a Svan 912A Sound & Vibration Analyser. This instrument has the capability to measure steady, fluctuating, intermittent and/or impulsive sound, and to compute and display percentile noise levels for the measuring period. A calibration signal was used to align the instrument train prior to measuring and checked at the conclusion. Difference in the two measurements was less than 0.5dB. Each measurement was taken over a representative time period to include all aspects of machine/process operation, including additional start-up noise where applicable. Sound measurements were generally made around all sides of each machine, to enable the acoustic sound power (dB re 1pW) to be calculated. The sound power level is then theoretically propagated to the receiver, with allowances made for spherical spreading.

Atmospheric absorption, directivity and ground absorption have been ignored in the calculations. As a result, predicted received noise levels are expected to slightly overstate actual received levels, thus providing a measure of conservatism. Addition of the received Sound Pressure Level (SPL) for each of the individual operating sources gives the total SPL at each receiver, which is then compared to the criteria. Where noise impacts above the criterion are identified, suitable noise control measures are implemented and reassessed to demonstrate satisfactory received noise levels.

This theoretical assessment is based on a worst-case scenario, where all plant items are operating simultaneously in locations most exposed to the receiver. In reality, most plant will be located in shielded areas, so actual received noise is expected to be less than the predictions shown in this report, or at worst equal to the predicted noise levels for only part of the time.

3.2 ANALYSIS AND DISCUSSION

3.2.1 Received Noise Levels – Road Traffic

Traffic due to the proposal travelling on nearby public roads is assessed separate to site noise and is subject to the criteria described in Section 2.3.1 of this report. Trucks will approach and depart the site from the both directions along the Oxley Highway, however, to provide a measure of conservatism, this assessment assumes all trucks and vehicles will approach and depart the site from the same direction.

Reproduced are traffic data supplied by Transport Planning Pty Ltd for the existing and anticipated vehicle movements for the site.

Table 7: - Oakburn Processing Plant & Render Plant Vehicle Movements

Trip Generator	RENDERING PLANT						PROCESSING PLANT		
	Existing Situation			Interim Modification					
	Light	Heavy	TOTAL	Light	Heavy	TOTAL	Light	Heavy	TOTAL
Staff	30	-	30	30	-	30	1966	-	1966
Render Plant Raw Material	-	58	58	-	70	70	-	40	40
Render Plant Finished Material	-	8	8	-	12	12	-	20	20
General Deliveries & Waste Collection	-	4	4	-	10	10	-	40	40
Live Birds	-	-	-	-	-	-	-	168	168
Finished Product	-	-	-	-	-	-	-	140	140
Daily Total	**30**	**70**	**100**	**30**	**92**	**122**	**1966**	**408**	**2374**
Day (7am-10pm)	**15**	**52**	**67**	**15**	**69**	**84**	**1019**	**290**	**1309**
Night (10pm-7am)	**15**	**18**	**33**	**15**	**23**	**38**	**947**	**118**	**1065**

Truck noise varies from one machine to another, with more modern larger trucks consistently producing a sound power in the range 104 to 108 dB(A) at full power. This assessment assumes a typical truck sound power of 106dB(A), as full engine power is not typically required to approach and depart the site at low speed.

Cars typically produce an average sound power of 92dB(A), however wide variations are noted particularly with smaller modern cars and larger V8 or diesel powered vehicles. Our calculations present the worst case for the situation, as the noise produced by a typical car accelerating at full power is used to determine the received noise level. In reality, many people will not leave the site at full acceleration but will depart more sedately.

Traffic Noise Calculations

The following Tables show results of traffic noise calculations, propagated to a theoretical facade at varying distances from the Oxley Highway (100km/hr zone) for existing and proposed situations. Received noise is the combined noise impact from cars and trucks at the facade of the residence.

Table 8: Traffic Noise Calc's – Oxley Highway, dB(A),Leq
EXISTING OPERATIONS – Rendering Plant

Traffic and Receiver	Day (7am-10pm)		Night (10pm-7am)	
Vehicle Type	Trucks	Cars	Trucks	Cars
Movements per period	69	15	23	15
Vehicle Sound Power	106	92	106	92
Distance to Rec, m	20			
Received Noise Level	45.0	26.3	42.6	28.1
Total Received	**45.1**		**42.8**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	
Distance to Rec, m	50			
Received Noise Level	41.1	23.6	38.7	25.0
Total Received	**41.1**		**38.9**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	
Distance to Rec, m	100			
Received Noise Level	38.1	22.1	35.7	23.1
Total Received	**38.2**		**36.0**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	

Table 9: Traffic Noise Calc's – Oxley Highway, dB(A),Leq
PROPOSED OPERATIONS – Upgraded Rendering Plant + New Processing plant

Traffic and Receiver	Day (7am-10pm)		Night (10pm-7am)	
Vehicle Type	Trucks	Cars	Trucks	Cars
Movements per period	359	1034	141	962
Vehicle Sound Power	106	92	106	92
Distance to Rec, m	20			
Received Noise Level	53.4	43.6	51.6	45.4
Total Received	**53.8**		**52.5**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	
Distance to Rec, m	50			
Received Noise Level	49.4	39.6	47.6	41.5
Total Received	**49.9**		**48.5**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	
Distance to Rec, m	100			
Received Noise Level	46.4	36.5	44.6	38.4
Total Received	**46.8**		**45.5**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	

Results in the above Tables show that noise levels from cars and trucks travelling to and from the site, for existing and proposed operations, along the Oxley Highway are compliant with the RNP day and night criteria for all residences.

The RNP also recommends that the increase in road traffic noise levels due to redevelopment of an existing land use development not exceed 12dB(A) during the day and night for freeways and arterial roads. As can be seen by the results in the above Tables, the relative increase due to the development is not expected to be more than 8.8dB(A) during the day and 9.7dB(A) at night and considered acceptable.

3.2.2 Received Noise Levels – Site Noise

The Sound Power Levels (Lw's) of plant and equipment operating at the site during the day, evening and night for proposed operations, which were input into our computer model, are shown in the following Tables. The Tables give the A-weighted sound power levels for each listed plant item, principally based on our site measurements. Also shown is the number of plant operating at each location on the site for a worst-case situation (see Appendix B).

Table 10: Plant and Equipment – Day/Evening (PROPOSED OPERATIONS)

Machine/Process	Lw dB(A)	Render Plant & Dams	Main Access Rd	Processing Plant	Loop Road
Render Plant South	**100**	1 (S1)			
Render Plant East	**89**	1 (S2)			
Render Plant North	**103**	1 (S3)			
Render Plant West	**104**	1 (S4)			
Truck Driving	**102**		1 (S5)	1 (S15)	3 (S7,S8)
Truck Idling	**90**				1 (S6)
Fork Lift	**98**			1 (S17)	1 (S9)
WWTW Pumps	**94/86**	2 (S10,S22)			
Fork lifts, Trucks, Cooling Fans	**106**			2 (S11)	
Fork Lifts, Trucks, Unload	**104**			2 (S12)	
Processing Plant North	**95**			1 (S13)	
Truck Reverse/Idle	**94**			2 (S14,S15)	
Cold Storage Blg East	**95**			1 (S16)	
Refrig Truck Units x4	**95**			4 ((S18)	
Refrig Truck Reverse	**104**			1 (S19)	
Cold Storage Blg North	**95**			1 (S20)	
Trucks Access Rd/W'bridge	**102**		2 (S21)		
Cars in Carpark	**82**			200(S23,S24)	
Secondary processing pl east	**95**			1 (S25)	
Plant, cooling towers	**108**			2 (S26)	

Table 11: Plant and Equipment – Night (PROPOSED OPERATIONS)

Machine/Process	Lw dB(A)	Render Plant & Dams	Main Access Rd	Processing Plant	Loop Road
Render Plant South	**100**	1 (S1)			
Render Plant East	**89**	1 (S2)			
Render Plant North	**103**	1 (S3)			
Render Plant West	**104**	1 (S4)			
Truck Driving	**102**		1 (S5)	1 (S15)	2 (S7,S8)
Truck Idling	**90**				1 (S6)
Fork Lift	**98**			1 (S17)	
WWTW Pumps	**94/86**	2 (S10,S22)			
Fork lifts, Trucks, Cooling Fans	**106**			2 (S11)	
Fork Lifts, Trucks, Unload	**102**			2 (S12)	
Processing Plant North	**95**			1 (S13)	
Truck Reverse/Idle	**98**			2 (S14,S15)	
Cold Storage Blg East	**95**			1 (S16)	
Refrig Truck Units x4	**95**			4 ((S18)	
Refrig Truck Reverse	**104**			1 (S19)	
Cold Storage Blg North	**95**			1 (S20)	
Trucks Access Rd/W'bridge	**102**		2 (S21)		
Surge Dam Pumps S22	**93**	2 (S22)			
Cars in Carpark	**82**			150 (S23,S24)	
Secondary processing pl east	**95**			1 (S25)	
Plant, cooling towers	**108**			2 (S26)	

Legend of assessed noise sources (see Figure 2):

S1-S4	Render plant operating at full capacity.
S5	Truck driving on main access road
S6	Truck idling in bay
S7	Truck driving on loop road (north)
S8	Truck driving on loop road (south)
S9	Fork lift operating
S10A/B	WWTP operating at full capacity
S11	Live bird fans, trucks, fork lifts
S12	Trucks idling, fork lifts unloading at Live Bird
S13	Processing plant (north)
S14,S15	Truck reverse, idle driving on loop road (south)
S16	Cold storage building (east)
S17	Fork lift operating north side processing plant
S18	Refrigerated truck units at Cold Storage
S19	Refrigerated truck reverse at Cold Storage
S20	Cold storage building (north)
S21	Trucks on main access rd & at weighbridge
S22	Pumps at dams (north)
S23,S24	Cars in main carpark
S25	Secondary processing plant east
S26	Plant, cooling towers

Additional plant and noise sources encountered on the site include split system air conditioners, small pumps, etc, all of which produce a sound power less than 75dB. Collectively, with up to 3 or 4 sources operating simultaneously on occasions, the sum could be as high as 80dB. This overall sum is at least 10dB below significant sources shown in the above Tables, therefore they will not contribute or raise the sound level at nearby receivers.

The following Table shows predicted received noise levels at nearest residential receivers under neutral and noise enhancing atmospheric conditions. Allowances have been made for intervening structures, topographical features in the calculations. Exceedances of the criteria are shown in bold.

Table 12: Received Noise Levels – Render Plant (PROPOSED OPERATIONS) Propagated to Nearest Residential Receivers – No Noise Control

Residential Receiver	Received Noise Levels, dB(A),Leq Neutral Conditions (Day)	 3m/sec Wind Source to Rec (Day/Evening)	 3°C/100m Inversion (Night)
Girrawheen R1	32	34	35
Abbeylands R2	38	**41**	**40**
The Billabong R3	33	**38**	**37**
Airport South R4	20	25	23

Criteria: All Receivers Day=40, Evening=35, Night=35.

Reference to theoretical results in the above Table shows that site operations are predicted to be compliant with the criteria at Girrawheen, and residences along New Winton Road (airport south). However, under adverse weather conditions exceedances of 2-6dB(A) are predicted at Abbeylands and The Billabong during the night and evening.

Reference to our acoustic model reveals that activities and equipment associated with the Live Bird area (trucks, fork lifts, ventilation fans) are responsible for the exceedances. Several noise control options were investigated with the most economical option detailed below (also see Appendix B):

- Erect acoustic mound or wall 3000mm above FGL along the west side of the Live Bird Module and Hardstand.
- Erect acoustic mound or wall 2100mm above FGL along the north side Rendering Building loop road.
- Erect acoustic barrier 2100mm above FGL adjacent to Cooling towers and associated pumps, etc, on the north side processing plant.
- Erect acoustic barrier 2400mm above "truck" FGL north side of Cold Store distribution dock.

The following Table shows recalculation of the predicted received noise levels at nearest residential receivers under neutral and noise enhancing atmospheric conditions with the above noise control modifications and strategies in place.

Table 13: Received Noise Levels – Render Plant (PROPOSED OPERATIONS) Propagated to Nearest Residential Receivers – Noise Control in Place

	Received Noise Levels, dB(A),Leq		
Residential Receiver	**Neutral Conditions (Day)**	**3m/sec Wind Source to Rec (Day/Evening)**	**3°C/100m Inversion (Night)**
Girrawheen	32	34	35
Abbeylands	32	34	34
The Billabong	28	33	32
Airport South	20	25	23

Criteria: All Receivers Day=40, Evening=35, Night=35.

The above Table shows that compliance with the criteria is predicted at all nearby receivers. It is highly unlikely that all items included in our acoustic model will be operating simultaneously. Therefore, actual received noise levels are expected to be less than the predictions shown in this report, or at worst equal to the predicted noise levels for only part of the time. In saying this, we do recommended that a noise monitoring program is commissioned in the early life of the site to verify our theoretical calculations.

3.2.3 Received Noise Levels – Short-Term Events

Noise levels from short term events such as truck movements have the potential to interrupt the sleep of nearby neighbours in the early hours of the morning. Nearest residential receivers are approximately 1100 metres from the site, with loudest events producing <40dB(A), Lmax at the residential facade, which is below the maximum noise level event limit of 52dB(A),max. Noise from short-term noise events are therefore acceptable and no further noise control is required for these sources.

It should be acknowledged that mobile plant is generally well shielded from residential receivers by intervening structures and buildings on the site and received noise from short-term events is expected to be substantially lower than our predictions indicate.

3.2.4 Tonal Noise Assessment

Reverb Acoustics has completed detailed noise monitoring assessments over many years at Baiada's Processing Plant in Griffith NSW. Noise monitoring results taken at residences exposed to the sites loudest items, i.e. live bird area and processing plant have been sourced to determine the tonal content or otherwise. Shown below is our assessment of noise tonality for Baiada's plant and activities.

Tonality Assessment – Baiada's Griffith NSW Processing Plant

TONALITY ASSESSMENT																									
Data Input																									
Frequency, Hz	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.3k	1.6k	2k	2.5k	3.2k	4k	5k	6.3k	8k	10k	dB
Measured Spectrum	7.4	11.5	14.3	24.4	24.8	23.7	27.3	25.3	27.2	29.2	29.7	30.3	28.2	27.3	29.7	32.8	29.6	27.5	26.1	26	26.7	25.7	21.7	19.1	41.0
NSW EPA, Noise Policy for Industry 2017																									
Frequency, Hz	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.3k	1.6k	2k	2.5k	3.2k	4k	5k	6.3k	8k	10k	
Spectrum	7.4	11.5	14.3	24.4	24.8	23.7	27.3	25.3	27.2	29.2	29.7	30.3	28.2	27.3	29.7	32.8	29.6	27.5	26.1	26	26.7	25.7	21.7	19.1	41.0
Tonality	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Adjusted Level																									41.0

As can be seen by the above results, noise emissions at nearest receivers are not expected to contain any significant tonal components, in accordance with the requirements of Fact Sheet C of the NPfI. No further adjustments or penalties are therefore required for noise predictions at residential receivers.

3.2.5 Site Child Care Centre

The proposed child care centre will be located on the south side of the processing building. The centre will include indoor areas (i.e. play areas, cot rooms, amenities, etc) and an outdoor play area. Potential noise sources that may impact upon the child care centre are dominated by the closest items of equipment or activity. In this case, only vehicle movements in the carpark (cars driving, reversing, car doors) are noise sources of concern. Long-term monitoring conducted by Reverb Acoustics at the entrance to busy carparks, reveals that average noise levels are as high as 62dB(A),Leq, which is 7dB(A) above the criteria for child care centre outdoor play areas. As such, an acoustic fence will be required at the perimeter of the outdoor area.

The acoustic fence will provide the added advantage of shielding internal areas of the child care centre from intruding industrial noise. The difference between external and internal noise levels is typically 15dB(A) when windows are open for ventilation, for masonry structures. Therefore, based on an external noise level of <55dB(A) with the acoustic fence in place, satisfactory noise levels are expected within indoor areas of the child care centre. In saying this we do recommend that acoustic windows are installed in cot rooms.

We understand that internal areas will be air conditioned, although windows may be open to provide natural ventilation. Consideration should be given to installing ceiling fans to provide additional ventilation when windows are open.

See Section 4 for required acoustic modifications.

3.2.6 Predicted Noise levels - Construction Plant and Equipment

Received noise produced by anticipated construction activities is shown in Table 13 below, for a variety of distances to a typical receiver, with no special acoustic strategies in place (i.e. noise barriers or acoustic shielding) and with each item of plant operating at full power. Entries in bold type highlight exceedances of the day Noise Affected criteria of **45dB(A),Leq**.

Table 14: Predicted Plant Item Noise Levels, dB(A)Leq

Plant/Activity	(Lw)	Distance to Residence			
		1km	1.5km	2km	3km
Mobile crane	(104)	36	32	30	28
Hammering	(98)	30	26	24	22
Angle grinder	(106)	38	34	32	30
Air wrench (silenced)	(98)	30	26	24	22
Vibrating roller	(108)	40	36	34	32
Road truck	(104)	36	32	30	28
Grader	(106)	38	34	32	30
Air compressor	(98)	30	26	24	22
Concrete Agitator	(112)	44	40	38	36
Concrete Pump	(110)	42	38	36	34
Water cart	(112)	44	40	38	36
Excavator	(102)	34	30	28	26
Bull dozer	(116)	**48**	44	42	40
Rendering plant	(104)	36	32	30	28
Positrack	(106)	38	34	32	30
Circular Saw	(111)	43	39	37	35

Residential receivers are within 1 km of the site and some construction activities are may exceed the criteria, particularly mobile plant. Noise levels above 45dB(A) are possible at closest locations.

The ICNG recommends that as a first course of action, consideration should be given as to whether any alternate feasible or reasonable method of construction is possible. The ICNG further recommends that when alternate feasible and reasonable options have been considered the proponent then should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and any respite periods that will be provided. These strategies will be discussed in more detail in Section 4.

When earthworks occur noise levels in the order of 48-50dB(A) are possible at nearest locations. To reduce noise levels any appreciable amount a physical barrier would be required to intercept the line of site between the source and receivers. We suggest that temporary earthen mounds utilising available fill on site may be considered. The above strategies may reduce noise levels at residential locations by 5dB(A) or more.

It should be noted that calculations are based on plant items operating in exposed locations and at full power, with no allowances made for intervening topography or shielding provided by intervening structures. Cumulative impacts, from several machines operating simultaneously, may be reduced when machines are operating in shielded areas not wholly visible to receivers. In saying this, if two or more machines were to operate simultaneously on the site, received noise levels would be raised and higher exceedances may occur.

Initial earthworks are expected to employ a bull dozer, excavator, and 1-2 dump trucks. The combined acoustic power level of these machines, assuming normal contractor's machines up to 10 years old in reasonably good condition, is expected to be in the range 108 to 116B(A),Leq.

However, the machines will typically be spread over the site, and noise at any receiver is typically dominated by the few closest machines, such as an excavator loading a truck, while a second truck reverses into position to be loaded by an excavator. With a combined acoustic power level of 108 dB(A) for 3 typical machines operating at full power, 40dB(A) is expected at the closest residence during peak activity.

As previously mentioned, constructing temporary barriers of excess fill, etc, at least 2m high, at the perimeter of the construction site (or at least adjacent to noisy plant items) may be considered for mitigating some of the construction noise at nearest receivers. These barriers will offer the additional benefit of securing the site from unwanted visitors. With barriers in place, worst case construction will reduce by up more than 5dB(A), although, as previously stated, these noise levels are expected to occur for a relatively short time and reduce as work progresses to a new area.

It should be acknowledged that construction activities that produce higher noise for a shorter period are often more desirable than alternate construction techniques that produce lower noise for a much longer period. This combined with noise control strategies discussed in Section 4 will ensure that minimum disruption occurs.

SECTION 4
Summary of Recommended Noise Control

4.1 NOISE CONTROL RECOMMENDATIONS - OPERATION

4.1.1 Noise Mound/Barrier

1. Acoustic mounds or barriers are to be erected at the following locations:

Location	*Height Above FGL (mm)*
West side Live Bird Area and Hardstand	3000
North side Rendering Building loop road	2100
North side Cooling towers & associated plant	2100
North side Cold Store distribution dock	2400 (above truck FGL)

An acoustic barrier is one which is impervious from the ground to the recommended height, and is typically constructed from lapped and capped timber, Hebel Power Panel, earthen mound, or a combination of the above. No significant gaps should remain in the barrier to allow the passage of sound below the recommended height. Other construction options are available if desired, providing the mound or wall is impervious and of equivalent or greater surface mass than the above construction options. Also see Appendix B for mound/wall location.

4.1.2 General Noise Control Recommendations

2. The site may operate 24 hours day. Monday to Sunday

3. All access roads should be kept in good condition, i.e. no potholes, etc.

4. Trucks and other machines should not be left idling for extended periods unnecessarily. Machines found to produce excessive noise compared to industry best practice should be removed from the site or stood down until repairs or modifications can be made.

5. A regular maintenance schedule should be adopted for all mobile and fixed plant items. Items found producing high noise should be stood down until repairs are completed.

6. A noise monitoring program, during commissioning, or in the early life of the site is recommended. This program will verify our predictions and in the unlikely event that complaints may arise, enable noise control strategies to be implemented, where required.

A typical noise monitoring program may consist of the following:
- Initial commissioning attended monitoring during the day, evening and night at potentially affected residential receivers, i.e. Girrawheen, Abbeylands, The Billabong, New Winton Road.
- Subsequent bi-annual monitoring at the above locations.
- In the event of any non-compliance(s), provide Noise Reduction Program for the site and additional compliance monitoring at completion of works, or
- If compliance is verified reduce to annual monitoring at receivers.

4.1.3 Site Child Care Centre

7. An acoustic fence 1800mm above FGL is to be erected at the perimeter of the child care centre outdoor area. Acceptable forms of construction include Colorbond, lapped and capped timber, Hebel Powerpanel, , masonry, or a combination of the above. No significant gaps should remain in the fence to allow the passage of sound below the recommended height. Other construction options are available if desired, providing the fence or wall is impervious and of equivalent or greater surface mass than the above construction options.

8. Windows to the Cot Rooms must be upgraded to achieve an acoustic rating of Rw32. This can typically be achieved with the use of laminated glass and Q-Lon seals at sliders.

9. Consideration should be given to installing ceiling fans to supplement air conditioning.

4.2 NOISE CONTROL RECOMMENDATIONS - CONSTRUCTION

4.2.1 Noise Monitoring Program

We recommend that attended noise monitoring should be carried out at commencement of each process/activity that has the potential to produce excessive noise. Attended monitoring offers the advantage of immediate identification of noise exceedances at the receiver and ameliorative action required to minimise the duration of exposure. Unattended long-term monitoring only identifies a problem at a later date and is not recommended.

4.2.2 Acoustic Barriers/Screening

To minimise noise impacts during construction, early work should concentrate on grading and levelling the areas in unshielded locations. In the event of complaints arising from residents, we offer the following additional strategies for consideration:

- Place acoustic enclosures or screens directly adjacent to stationary noise sources such as compressors, generators, etc. Expected noise reductions for individual items ≥5dB(A).

4.2.3 Consultation/Complaints Handling Procedure

The construction contractor should analyse proposed noise control strategies in consultation with the Acoustic Consultant as part of project pre-planning. This will identify potential noise problems and eliminate them in the planning phase prior to site works commencing.

Occupants of adjacent properties should be notified of the intended construction timetable and kept up to date as work progresses, particularly as work changes from one set of machines and processes to another. In particular, occupants should understand how long they will be exposed to each source of noise and be given the opportunity to inspect plans of the completed development. Encouraging resident understanding and "participation" gives the local community a sense of ownership in the development and promotes a good working relationship with construction staff. Programming noisy activities (such as earthworks) outside critical times should be considered.

We recommend that construction noise management strategies should be implemented to ensure disruption to the occupants of nearby buildings is kept to a minimum. Noise control strategies include co-ordination between the construction team and residents to ensure the timetable for noisy activities does not coincide with sensitive activities.

The site manager/environmental officer and construction contractor should take responsibility and be available to consult with community representatives, perhaps only during working hours. Response to complaints or comments should be made in a timely manner and action reported to the concerned party.

All staff and employees directly involved with the construction project should receive informal training with regard to noise control procedures. Additional ongoing on the job environmental training should be incorporated with the introduction of any new process or procedure. This training should flow down contractually to all sub-contractors.

4.2.4 Equipment Selection

All combustion engine plant, such as generators, compressors and welders, should be carefully checked to ensure they produce minimal noise, with particular attention to residential grade exhaust silencers and shielding around motors.

Trucks and other machines should not be left idling unnecessarily, particularly when close to residences. Machines found to produce excessive noise compared to industry best practice should be removed from the site or stood down until repairs or modifications can be made. Framing guns and impact wrenches should be used sparingly, particularly in elevated locations, with assembly of modules on the ground preferred. Table 15 shows some common construction equipment, together with noise control options and possible alternatives.

Table 15- Noise Control, Common Noise Sources

Equipment / Process	Noise Source	Noise Control	Possible Alternatives
Compressor Generator	Engine	Fit residential muffler. Acoustic enclosure.	Electric in preference to petrol/diesel. Plant to be Located outside building Centralised system.
	Casing	Shielding around motor.	
Concrete breaking Drilling Core Holing	Hand piece	Fit silencer, reduces noise but not efficiency Enclosure / Screening	Use rotary drill or thermic lance (used to burn holes in and cut concrete) Laser cutting technology
	Bit	Dampened bit to eliminate ringing. Once surface broken, noise reduces. Enclosure / Screening.	
	Air line	Seal air leaks, lag joints	
	Motor	Fit residential mufflers.	
Drop/Circular saw Brick saw	Vibration of blade/product.	Use sharp saws. Dampen blade. Clamp product.	Use handsaws where possible. Retro-fitting.
Hammering	Impact on nail		Screws
Brick bolster	Impact on brick	Rubber matting under brick	Shielded area.
Explosive tools (i.e. ramset gun)	Cartridge explosion	Use silenced gun	Drill fixing.
Material handling	Material impact	Cushioning by placing mattresses, foam, waffle matting on floor. Acoustic screening.	
Waste disposal	Dropping material in bin, trolley wheels.	Internally line bins/chutes with insertion rubber, conveyor belting, or similar.	
Dozer, Excavator, Truck, Grader, Crane	Engine, track noise	Residential mufflers, shielding around engine, rubber tyred machinery.	
Pile driving/boring	Hammer impact engine	Shipping containers between pile & receiver	Manual boring techniques

Note: Generally, noise reductions of 7-10dB will be achieved with the use of barriers, 15-30dB by enclosures, 5-10dB from silencers and up to 20-25dB by substitution with an alternate process.

4.2.5 Risk Assessment

A risk assessment should be undertaken for all noisy activities and at the change of each process. This will help identify the degree of noise and/or vibration impact at nearby receivers and ameliorative action necessary. A sample Risk Assessment Check Sheet is included in Appendix C as a guide.

SECTION 5
Conclusion

5 CONCLUSION

A revised noise impact assessment for Baiada's Oakburn Processing Facility and Rendering Plant, has been completed. The report has shown that providing recommendations detailed in this report are implemented, noise levels from the upgraded site will be compliant with the EPA's NPfI requirements at all nearby residential receivers during the day, evening and night, for neutral and worst-case atmospheric conditions. Noise emissions from activities associated with the site will be either within the criteria or generally below the existing background noise level in the area for the majority of the time.

Considering the abundance of industrial/commercial premises already in the area and relatively constant traffic on nearby roads, noise generated by the site may be audible at times but not intrusive at any nearby residence. Since the character and amplitude of activities associated with the site will be similar to those already impacting the area, it will be less intrusive than an unfamiliar introduced source.

During construction the total impact at each receiver is related to the received noise level and the duration of excessive noise. Generally, construction noise will comply with the criteria, however, during major construction activities some exceedances may occur. However, nearby neighbours should accept some periods of high noise, considering the relatively short-term nature of louder construction activities.

To reduce the impact in the area during construction, we recommend that louder construction activities, should be completed with the minimum of undue delay. In any case, all reasonable attempts should be made to complete significant noisy activities within as short a time as possible.

As previously stated, construction activities that produce higher noise for a shorter period are often more desirable than alternate construction techniques that produce lower noise for a much longer period

Construction activities should generally be restricted to the nominated hours. If construction does occur outside the standard hours, it is vital that the local community be informed of the construction timetable with letter drops, meetings, etc.

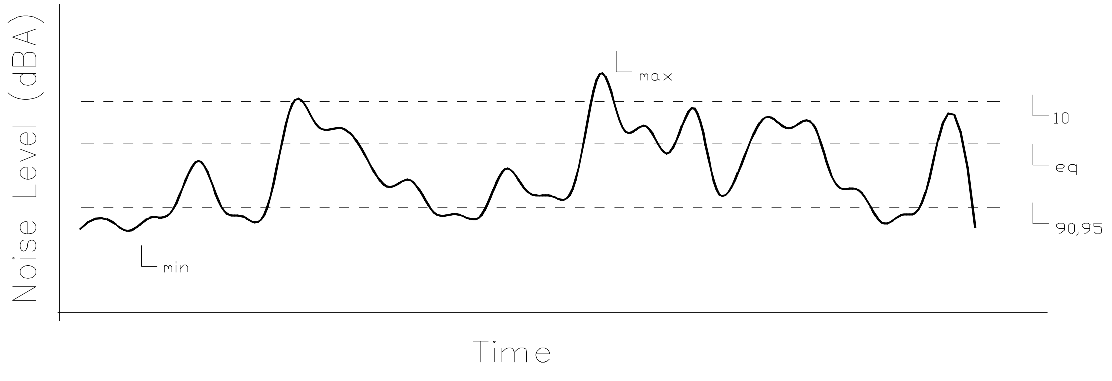
In conclusion, operation and construction of the Oakburn site will not cause any long term excessive environmental noise at any residential properties. We therefore see no acoustic reason why the proposal should be denied.

Steve Brady M.A.S.A. A.A.A.S.
Principal Consultant

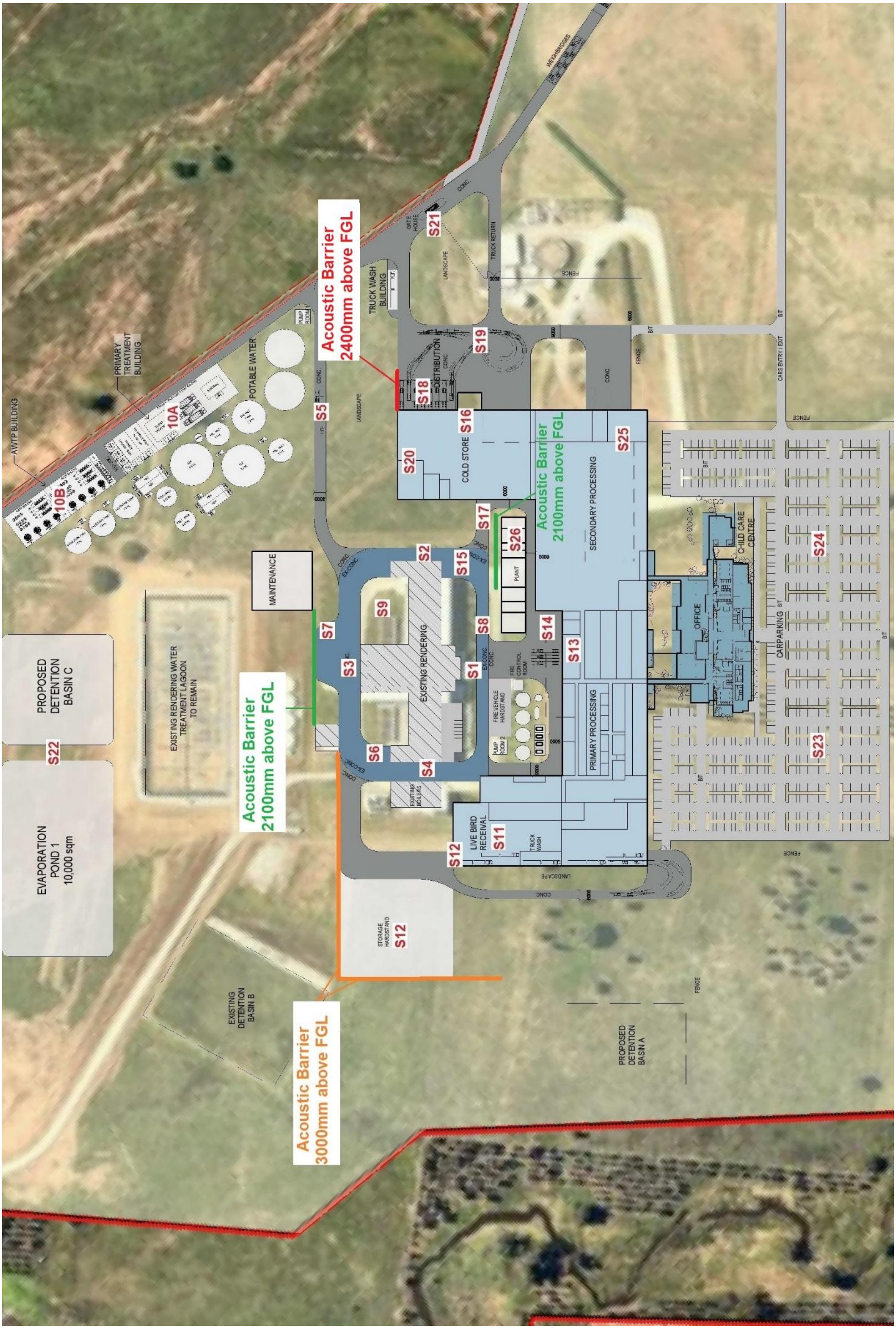
APPENDIX A
Definition of Acoustic Terms

Definition of Acoustic Terms

Term	Definition
dB(A)	A unit of measurement in decibels (A), of sound pressure level which has its frequency characteristics modified by a filter ("A-weighted") so as to more closely approximate the frequency response of the human ear.
ABL	*Assessment Background Level* – A single figure representing each individual assessment period (day, evening, night). Determined as the L90 of the L90's for each separate period.
RBL	*Rating Background Level* – The overall single figure background level for each assessment period (day, evening, night) over the entire monitoring period.
Leq	Equivalent Continuous Noise Level - which, lasting for as long as a given noise event has the same amount of acoustic energy as the given event.
L90	The noise level which is equalled or exceeded for 90% of the measurement period. An indicator of the mean minimum noise level, and is used in Australia as the descriptor for background or ambient noise (usually in dBA).
L10	The noise level which is equalled or exceeded for 10% of the measurement period. L_{10} is an indicator of the mean maximum noise level, and was previously used in Australia as the descriptor for intrusive noise (usually in dBA).



APPENDIX B
Noise Source Locations
Acoustic Mound/Barrier


Acoustic Barrier
2400mm above FGL
Acoustic Barrier
2100mm above FGL
Acoustic Barrier
2100mm above FGL
Acoustic Barrier
3000mm above FGL
AWTP BUILDING
PRIMARY TREATMENT BUILDING
POTABLE WATER
TRUCK WASH BUILDING
GATE HOUSE
COLD STORE
SECONDARY PROCESSING
PRIMARY PROCESSING
EXISTING RENDERING
MAINTENANCE
LIVE BIRD RECEIVAL
CHILD CARE CENTRE
OFFICE
CARPARKING
PROPOSED DETENTION BASIN C
EXISTING RENDERING WATER TREATMENT LAGOON TO REMAIN
EVAPORATION POND 1 10,000 sqm
EXISTING DETENTION BASIN B
PROPOSED DETENTION BASIN A
STORAGE HARDSTAND
10A
10B
S1
S2
S3
S4
S5
S6
S7
S8
S9
S11
S12
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S26

APPENDIX C
Risk Assessment Checklist

Risk Assessment Checklist

Item/Date	Risk Identified (Yes/No)	Risk Level (H/M/L)	Noise Control Required (Yes/No)	Noise Control Strategy

ATTACHMENT 2: REVISED ODOUR IMPACT INFORMATION

ATT02

PSA CONSULTING

Baiada Poultry Pty Ltd –

Proposed Poultry Processing Facility Odour Impact Assessment

Oakburn, NSW

Final Report

Version 2

August 2020

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Report Preparation		
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Report Title: Baiada Poultry, Oakburn - Proposed Poultry Processing Facility Odour Impact Assessment		

EXECUTIVE SUMMARY

The Odour Unit Pty Ltd (**TOU**) was commissioned by PSA Consulting (Australia) Pty Ltd (**PSA**) on behalf of Baiada Poultry Pty Ltd (**Baiada**) to carry out an odour impact assessment (**OIA**) for the proposed integrated Poultry Processing Facility (**PPF**) to be sited adjacent to the Oakburn Protein Recovery Plant (**PRP**) near Oxley Highway, Westdale, New South Wales (Lot 100 on DP1097471). The proposed PPF is to replace the existing abattoir located at Out Street, Tamworth, New South Wales.

Odour Dispersion Modelling Approach

The OIA assessment was carried out using the CALPUFF Modelling System with use of odour emissions estimates based upon measurements collected by TOU at Oakburn PRP, Baiada Hanwood Processing Plant and at the Out Street, Tamworth abattoir. All Oakburn odour sources have been assessed as a combined impact and separately grouped by origin: PRP, PPF and wastewater treatment plant (**WWTP**) (i.e. inclusive of the advanced wastewater treatment plant (**AWTP**)). The odour impact from the PRP biofilters was included for conservatism despite being a treated emission source. All modelling was undertaken in accordance with the New South Wales Environment Protection Authority guidelines (**NSW EPA**).

It should be noted that the meteorology developed for the modelling overpredicted calm and light wind conditions, particularly from the south-south-westerly direction. This would have a conservative effect on the results, that is overpredicting the extent and magnitude of odour concentration projections, especially north-north-westwards from the site.

Odour Dispersion Modelling Findings

The OIA modelling findings indicating the following:

- The addition of the proposed PPF modelled alone shows predicted odour impact does not largely exceed the NSW EPA odour IAC of 5 ou beyond the Oakburn site boundary;
- The results show that the predicted odour impact for PRP and PPF WWTPs is below the NSW EPA odour IAC under the assumption that SBR night-time filling would be avoided and the PTB is mechanically ventilated by roof fans;
- Overall, the results are below the odour IAC at the nearest sensitive receptor. The cumulative 5 ou contour encroaches beyond the site boundary marginally to the north and marginally to the south. Therefore, it has been found that the proposed PPF is unlikely to cause adverse odour impacts under normal conditions; and
- The results for the proposed childcare centre show that for both a 24 hour per day operation and a long-day operation, the odour IAC is predicted to be exceeded. The perceived sensitivity of the ancillary childcare centre to odour from the proposed PPF is debateable. Based upon the context and function of the proposal (i.e. employee family welfare), community expectations and

recommended odour risk reduction measures for the ancillary childcare centre as part of an Odour Management Plan (**OMP**), the residual odour annoyance risk at this location could be reduced significantly compared with a nearby stand-alone childcare facility without the recommended odour risk reduction measures implemented and having no commercial or functional relationship with Baiada. With due consideration to the information provided associated OMP, the residual odour impact risk rating for the ancillary childcare is considered to be low.

Sensitive Analysis Findings

A sensitivity modelling analysis for the proposed PPF indicated the following:

- Cumulative odour effects from the proposed PPF with three poultry farms located to the northwest demonstrates that there the model is sensitive to the presence of these sources; and

- However, prediction of cumulative effects is almost certainly overstated as it considers all Oakburn sources including treated odours (e.g. biofilter, etc) and odours of different characters (e.g. rendering, wastewater, etc) that do not combine in the atmosphere and tend to be observed as individually identifiable odour characters in the field.

Other Air Quality Impact Findings

For the proposed PPF, other air quality impact findings are as follows:

- The composition of the natural gas to be used by the boilers will contain negligible levels of sulphur and other contaminants that may affect efficient combustion performance and emissions discharge to air from the boiler stacks. As such, air quality impact from the boiler operations at the proposed PPF are assessed to be negligible; and

- With due consideration to the operational analysis for the proposed PPF, it is TOU's assessment that the risk level of adverse dust impact is of very low potential; and that a refined quantitative assessment is not required.

Commentary on Odour Emission Risks and Management

In operating the proposed PPF, there are several mitigation measures and management practices, both preventative and remedial, that will be incorporated into the Standard Operating Procedures (**SOPs**) upon commissioning and handover by the principal contractor to Baiada. These SOPs will be managed through Baiada's operational management system for the PPF, and reference is to be made to these as required. The details contained in the SOPs will be included in an updated version of the existing OMP. With this in mind, the OIA has provided detailed commentary on the odour emission risks posed by the process operations to be conducted at the proposed PPF and corresponding hierarchy of controls designed to minimise, management and/or prevent odour emission release, both under normal and abnormal operating conditions, such that the modelled predictions and findings in the OIA can be realised in practice.

Concluding Remarks

Given the complexity and scale of the proposed PPF operations, a modelling based OIA is not an ideal tool to help form a contingency plan for unpredicted operational odour impacts or adequately predict the real-world impacts from measures designed to avoid, mitigate, manage and/or offset impacts (typical examples that support this position are the characteristics associated with treated quality emissions from a biofilter or aerobic wastewater treatment source, which in the OIA have been modelled and contributed to the cumulative odour impact prediction profile). These matters are best addressed by sufficient odour separation distances (i.e. odour buffers, when possible) and a site-specific OMP. A site-specific OMP is an important tool that facilitates in contextualising the modelling findings and give due consideration to the residual odour risk rating from the proposed engineered controls, monitoring and management protocols, and standard operating procedures that will support the proposed PPF operations. As such, on the basis that the proposed management practices and controls are implemented to that documented in the associated OMP, the residual odour impact risks for the proposed PPF operations will be significantly minimised to the degree that odour impacts in practice are unlikely.

CONTENTS

FIGURES & TABLES

FIGURES

TABLES

LIST OF ABBREVIATIONS & DEFINITIONS

AWTP	Advanced Water Treatment Plant
Baiada	Baiada Poultry Pty Ltd
BOM	Bureau of Meteorology
BPIP	Building Profile Input Program
CAL	covered anaerobic lagoon
CW	clear wells
DAF	dissolved air flotation
DEM	digital elevation model
DPE	Department of Planning & Environment
HTR	High-Temperature Rendering
Hydroflux	Hydroflux Industrial Pty Ltd
IAC	impact assessment criteria
LBR	live bird reception
LTR	Low-Temperature Rendering
MBR	membrane bioreactor
NSW EPA	New South Wales Environment Protection Authority
OER	odour emission rate
OIA	Odour Impact Assessment
OMP	Odour Management Plan
P/M	peak-to-mean ratio
POEO Act	Protection of the Environment Operations Act 1997
PPF	Poultry Processing Facility
PRP	Protein Recovery Plant
PSA	PSA Consulting (Australia) Pty Ltd
PTB	Primary Treatment Building

RDC	Research and Development Corporation
RMS	risk management strategy
SBR	sequencing batch reactor
SCADA	supervisory control and data acquisition
SEARs	Secretary's Environmental Assessment Requirements
SOER	specific odour emission rate
SOPs	Standard Operating Procedures
SRTM	Shuttle Radar Topography Mission
TAPM	The Air Pollution Model
TOU	The Odour Unit Pty Ltd
USGS	United States Geological Survey
WWTP	Wastewater Treatment Plant
YSTW	Tamworth Airport AWS

UNITS OF MEASUREMENTS

km	Kilometres
m	metres
m/s	metres per second
m^3/h	cubic metres per hour
m^3/s	cubic metres per second
ML	megalitres
MW	megawatts
^oC	degrees Celsius
ou	odour units
ou.m^3/m^2.s	odour units by cubic metre per square metre by second
ou.m^3/s	odour units cubic metre per second
Pa	Pascals

ppm	parts per million, by volume

AIR POLLUTANTS & CHEMICAL NOMENCLATURE

CO	carbon monoxide
CO_2	carbon dioxide
NO_X	oxides of nitrogen
SO_2	sulphur dioxide

1 INTRODUCTION

1.1 BACKGROUND

The Odour Unit Pty Ltd (**TOU**) was commissioned by PSA Consulting (Australia) Pty Ltd (**PSA**) on behalf of Baiada Poultry Pty Ltd (**Baiada**) to carry out an odour impact assessment (**OIA**) for the proposed integrated Poultry Processing Facility (**PPF**) to be sited adjacent to the existing Oakburn Protein Recovery Plant (**PRP**) near Oxley Highway, Westdale, New South Wales (Lot 100 on DP1097471), as shown in **Figure 2.1**. The proposed PPF is to replace the existing abattoir located at Out Street, Tamworth, New South Wales.

1.2 PURPOSE OF OIA

The aim of OIA for the proposed PPF is to address key issues raised in the Department of Planning & Environment (**DPE**) Secretary's Environmental Assessment Requirements (**SEARs**) Baiada Oakburn Poultry Processing Facility (SSD 9394) document. The key issues in the SEARs were related to potential impacts of the proposed PPF and measures to avoid, mitigate, manage and/or offset impacts.

The matters to be addressed specific to odour impacts in the SEARs include:

- *"a quantitative odour and air quality impact assessment in accordance with the relevant Environment Protection Authority (EPA) guidelines. This assessment must include:*
    - *an investigation and assessment of odour impacts on all identified and potential receivers including, but not limited to, the adjacent rural residences and the Tamworth Regional Airport;*
    - *an assessment of the cumulative air quality and odour impacts of the development, taking into account existing and proposed livestock intensive industries in the surrounding area;*
    - *evidence of appropriate meteorological data for use in air dispersion modelling, using real meteorological data where possible;*
    - *inclusion of 'worst case' emission scenarios and sensitivity analyses;*
    - *a contingency plan to address unpredicted operational odour impacts;*
    - *a description and appraisal of air quality and odour impact monitoring, emission control techniques and mitigation measures."*

It is proposed to operate a childcare centre on-site. Odour impacts have been considered as recommended by *Child Care Planning Guideline – Delivering quality child care for NSW, 2017*. As such, the OIA has given due consideration to C28 of this guideline document, which states that:

> *"A suitably qualified air quality professional should prepare an air quality assessment report to demonstrate that proposed child care facilities close to*

> *major roads or industrial developments can meet air quality standards in accordance with relevant legislation and guidelines".*

Furthermore, the New South Wales Environment Protection Authority (**NSW EPA**) key information requirements (notice number 1566238) also include:

> *"an adequate assessment of dust generated and management of potential impacts on adjacent rural residences during the construction and operational phases"*

The dust impact potential is addressed in **Section 2.4**. The boiler air quality impact is addressed in **Section 2.5**.

In September 2019, TOU was provided with comments and feedback on the first version of the OIA report dated 6 June 2019, which was received during the notification period of the PPF for response and addressed in this second version of the OIA report.

The OIA report contains the methodology, results and findings for the proposed PPF as conducted by TOU.

1.3 RELEVANT DOCUMENTATION

A site-specific Odour Management Plan (**OMP**) has been prepared TOU to supplement the OIA conducted for the proposed PPF. An OMP is a documented operational management system and a 'live' manual that is changed as required, to reflect the current practices and odour controls prevalent at a facility. The sole purpose of an OMP is to eliminate, prevent or minimise the potential for odour generation through a hierarchy of controls, in the form of, but not limited to, engineered, administration and/or management practices. An OMP seeks to find a reasonably practical balance between maintaining the quality of process operations designed to yield a high-quality end-product and the ability to control odour emission generation. Put simply, the OMP describes the measures that will facilitate in preventing, mitigating, managing and/or offsetting odour impacts risks from the proposed PPF. As such, the OMP should be read in conjunction with the OIA report prepared for the proposed PPF.

2 SITE DESCRIPTION

2.1 SITE SURROUNDS

An aerial map of the PPF and its surroundings is shown in **Figure 2.1**.

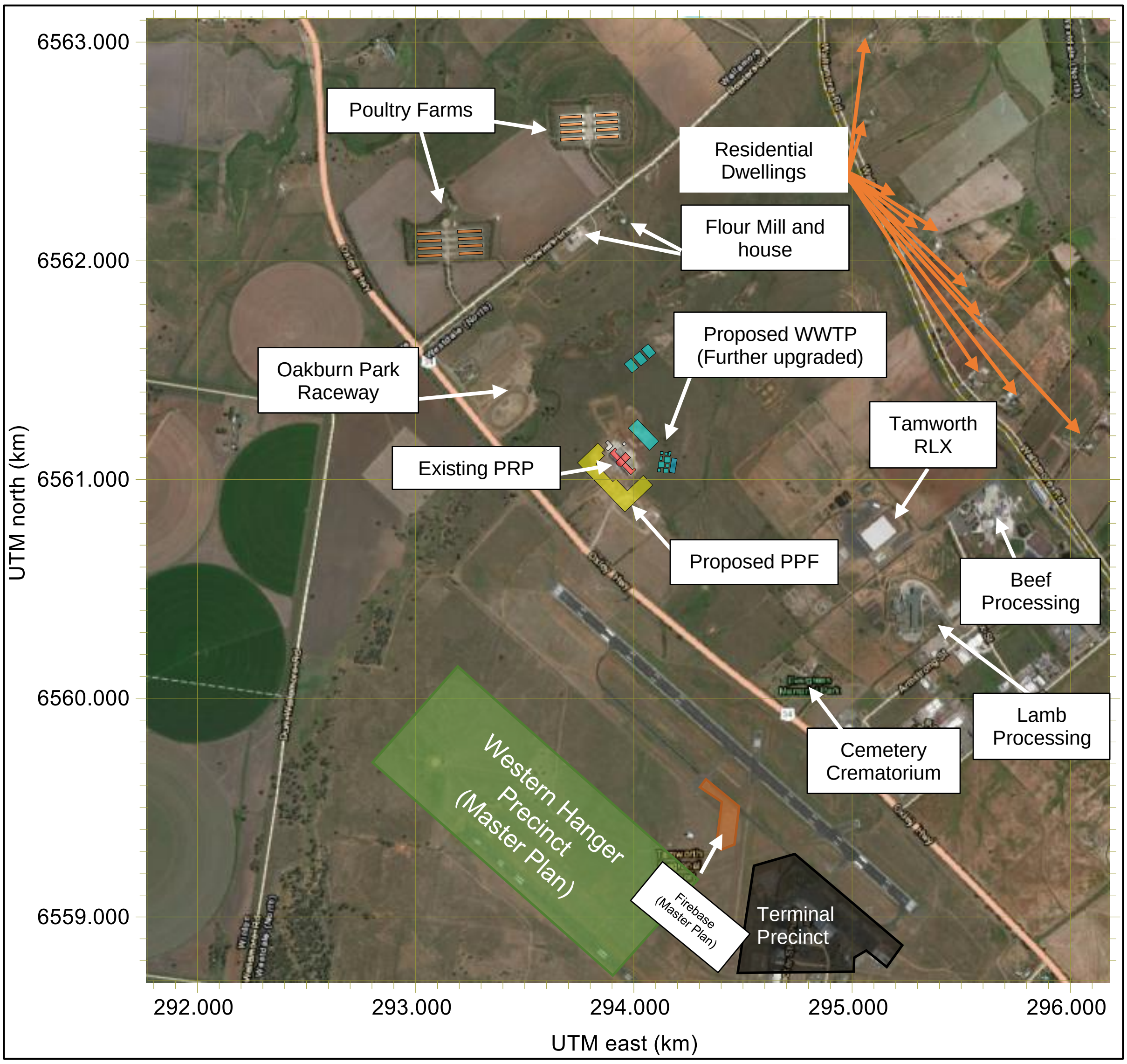


Figure 2.1 – Site location and surrounds

From an odour viewpoint, the surrounding features of interest to the proposed PPF include:

- Oakburn Park Raceway;
- Tamworth Regional Livestock Exchange;
- Tamworth Regional Airport;
- Sensitive places including eleven dwellings along Wallamore Road and Bowlers Lane;

- The dwelling on Bowlers Lane is understood to be owned by Tamworth Regional Council and will be removed as part of the proposed PPF; and
- The other land uses include beef processing, lamb processing, poultry farming, flour milling and a cemetery-crematorium.

The near-field topography surrounding the proposed PPF could be described as a flat rural floodplain. Further afield there is a slightly elevated ridgeline that runs along Bowlers Lane from the north to the southwest. The Peel River valley is to the northeast.

2.2 OAKBURN PROPOSED POULTRY PROCESSING FACILITY DESCRIPTION

The proposed PPF has been described by Baiada in their request for SEARs (Boulton & Ireland, 2018):

> *"Baiada is proposing a new, integrated poultry processing plant on the site consisting of the following items:*
>
> - *Construction of an integrated poultry processing plant consisting of:*
>   - *36,000 m^2 of Gross Floor Area providing for live bird storage, processing, chilling, cold store and distribution facilities;*
>   - *1,600 m^2 workshop and store building;*
>   - *4,100 m^2 of ancillary administration, staff amenities and childcare space;*
>   - *Wastewater Treatment Plant (**WWTP**) and Advanced Water Treatment Plant (**AWTP**); and*
>   - *Installation of ancillary infrastructure, landscaping and services.*
> - *Increase the approved level of poultry processing on the site to a maximum of 3 million birds per week;*
> - *Increase production at the existing rendering plant to a maximum of 1,680 tonnes of finished product per week (240 tonnes / day 7 days a week); and*
> - *Operation of all aspects of the site facility up to 24 hours per day, 7 days a week with no restrictions."*

Since lodgement of the OIA and Environmental Impact Statement, and receipt of submissions, Baiada proceeded with further detailed design and planning of the proposed PPF, which has resulted in an amended development layout, as follows:

- Total ground floor area: 39,810 m^2;
- Processing area: 30,273 m^2;
- Office area: 4,848 m^2;

- Childcare area: 346 m^2;
- Maintenance 1,118 m^2; and
- Wastewater Treatment area: 3,225 m^2.

While the design of the facility has been amended, the operational aspects of the proposed PPF operations (i.e. production volumes and processes, etc.) generally remain consistent with the previously submitted OIA and Environmental Impact Statement.

The potential key odour emission sources from the proposed PPF and an on-site sensitive receiver have been described in **Section 2.3**.

2.3 PROPOSED PPF ODOUR SOURCES

Based on the ground floor plan shown in **Figure 2.3**, the key odour sources derived for the proposed PPF are as follows:

- Receival of live birds into the reception hall ventilation comprising of five roof fans; and
- Processing Lines 1 & 2, which consist of seventeen roof fans, ventilating process areas including but not limited to:
    - Receival of live birds into the reception hall via trucks;
    - Livestock preparation including stunning, shackling and kill;
    - Scalding and de-feathering;
    - Evisceration and inspection;
    - Removal and transport of offal, co-products and by-products to the PRP; and
    - Primary treatment, processing pumps, waste staging and crate wash.

2.3.1 Ancillary Childcare Centre

It is proposed to operate a childcare centre on-site at the location indicated in **Figure 2.2.**

2.3.2 WWTP Odour Sources

A WWTP and AWTP concept process design for the PPF was completed by Hydroflux Industrial Pty Ltd (**Hydroflux**) that proposed to treat up to 8 million litres (**ML**) of wastewater from the PPF and allow recovery for up to 7.2 ML for reuse as potable water per day. All wastewater from the PRP will be treated separately by the operational WWTP, which is designed to accommodate up to 3 million birds per week with a contingency buffer (Hydroflux Industrial, 2020).

The PRP wastewater would continue to be screened within the PRP where it is sent to be treated in a 25 ML Covered Anaerobic Lagoon (**CAL**) before being polished in a 5 ML Sequencing Batch Reactor (**SBR**). The liquid is discharged into two 5 ML Clear Wells (**CW**) before discharge to sewer. All wastewater from the PRP is currently operational and has been designed to accommodate additional volumes associated with the proposed increase in production. The treated wastewater from the PRP based operations will continue to be discharged to the sewer. An odour impact assessment for the PRP WWTP upgrade was completed by TOU in March 2018 (Hayes & Munro, 2018) and have been included as odour sources in this OIA report.

The wastewater from the proposed PPF will be treated with primary and secondary treatment processes by the WWTP involving dissolved air floatation (**DAF**) and a membrane bioreactor (**MBR**). The 8 ML/day design is expected to contain five membrane train. The effluent from the MBR is then further treated by the AWTP for reuse at the PPF by reverse osmosis, chlorination, ultraviolet light and remineralisation processes designed to exceed reuse water quality standards set out by various authorities (Hydroflux Industrial, 2020). The layout of the WWTP and AWTP is illustrated in **Figure 2.3**, and process flow diagram is available in **Figure 2.4**.

For this OIA report, the primary and secondary treatment stages of the WWTP process are considered to contribute significantly to the odour emission profile for the proposed PPF. The tertiary treatment process, including the AWTP process units, will be negligible odour emission contributors and have not been given any further consideration. The key odour sources from the WWTP to service the proposed PPF include:

- Primary Treatment Building (**PTB**) comprising of grit removal, screening, DAF and sludge treatment;
- A balance tank;
- Two pre-anoxic tanks;
- Two aerobic tanks;
- Two post-anoxic tanks; and
- Two MBR trains.

Figure 2.2 – Site plan for the proposed PPF

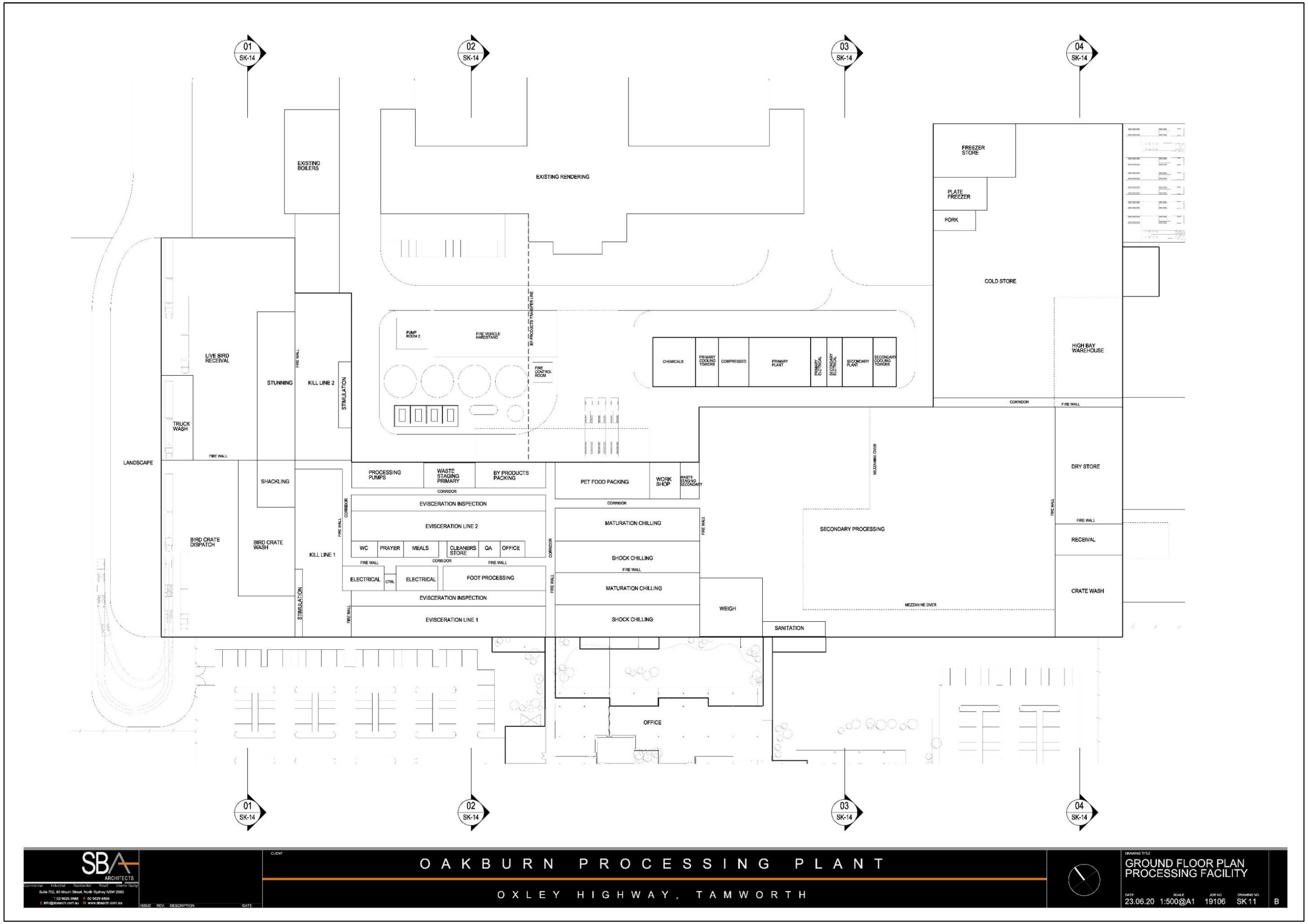
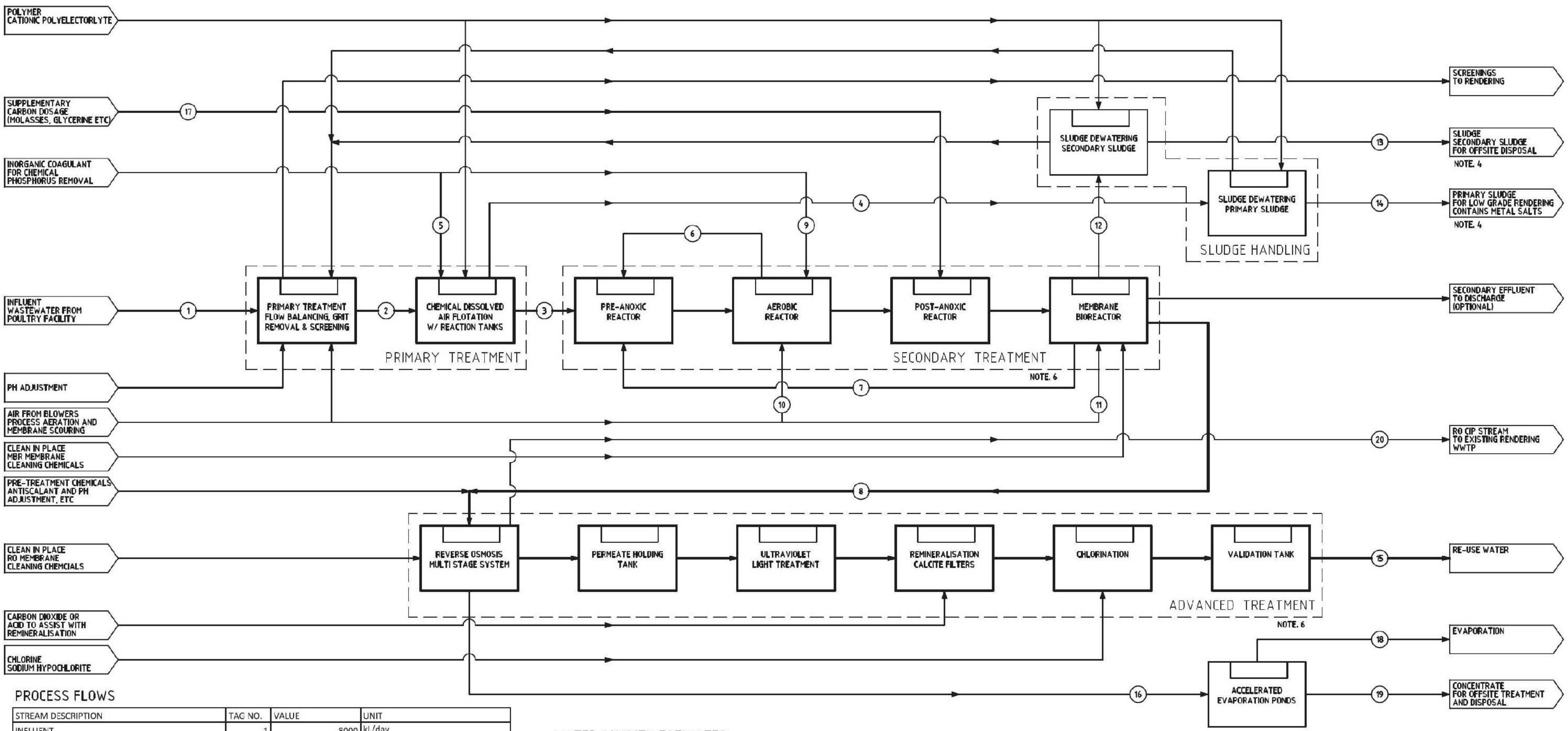


Figure 2.3 – Ground floor layout of the integrated PPF operations



PROCESS FLOWS

STREAM DESCRIPTION	TAG NO.	VALUE	UNIT
INFLUENT	1	8000	kL/day
BALANCED FEED TO DAF	2	8000	kL/day
FEED TO SECONDARY TREATMENT	3	8000	kL/day
PRIMARY SLUDGE TO DEWATERING - NOTE 1	4	10502.4	kg TSS/day
COAGULANT TO DAF - NOTE. 2	5	4998.2	kg/day Ferric Chloride 42%
MIXED LIQUOR RETURN	6	32,000 - 64,000	kL/day
RETURN ACTIVATED SLUDGE	7	8000	kL/day
MEMBRANE BIOREACTOR EFFLUENT	8	7943.2	kL/day
COAGULANT TO SECONDARY TREATMENT - NOTE. 2	9	1249.6	kg/day Ferric Chloride 42%
AERATION FOR AEROBIC REACTOR	10	31960	Nm3/hr @ 620 mBar.g
AERATION FOR MEMBRANE SCOUR	11	13000	Nm3/hr @ 570 mBar.g
WASTE ACTIVATED SLUDGE - NOTE. 1	12	3077.6	kg TSS/day
DEWATERED SECONDARY SLUDGE	13	2923.7	kg TSS/day
DEWATED PRIMARY SLUDGE	14	9977.3	kg TSS/day
TREATED WATER FOR RECYCLING	15	7200	kL/day
RESERVE OSMOSIS CONCENTRATE	16	800	kL/day
SUPPLEMENTARY CARBON - NOTE 3.	17	AS REQUIRED FOR DENITRIFICATION PERFORMANCE.	
EVAPORATION OF CONCENTRATE	18	720	kL/day
CONCENTRATE POST EVAPORATION	19	80	kL/day
REVERSE OSMOSIS CIP STREAM TO EXISTING WWTP	20	40	kL/month

WATER QUALITY ESTIMATES

STREAM DESCRIPTION	TAG NO.	VOLUMETRIC FLOW	COD	BOD	TN	TKN	TP	PO4-P	TS	TSS	TDS
-	#	kL/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
INFLUENT	1	8000	3970	2380	210	210	40	36	2700	1300	1400
FEED TO SECONDARY TREATMENT	3	8000	1500	899	210	210	10	10	1600	200	1400
MEMBRANE BIOREACTOR EFFLUENT	8	8000	50	20	21	15	1	1	1405	5	1400
TREATED WATER FOR RECYCLING	15	7200	-	-	-	-	-	-	50 - 200	-	50 - 200
RESERVE OSMOSIS CONCENTRATE	16	800	250	200	210	150	312	272	13600	50	13550
CONCENTRATE POST EVAPORATION	19	80	2500	2000	2100	1500	3120	2720	136000	500	135500

NOTE. 5

NOTES:

1. PRELIMINARY CALCULATIONS SUGGEST 1,041 KG TSS IS PRECIPITATED DUE TO CHEMICAL P REMOVAL. FOR DESIGN PURPOSES IT HAS BEEN ASSUMED THAT 80% OF THIS SLUDGE IS PRODUCED DURING PRIMARY TREATMENT, WITH THE RESIDUAL PRODUCED IN THE SECONDARY TREATMENT PROCESS.
2. ESTIMATED FERRIC CHLORIDE DOSAGE IS 3,123.9 KG/DAY AS 42% SOLUTION. ASSUMPTION HAS BEEN MADE THAT THIS IS DOSED 4:1 INTO PRIMARY AND SECONDARY TREATMENT STAGES. MOLAR RATIO OF 2:1 [METAL]:[PHOSPHATE] USED FOR CALCULATIONS.
3. SUPPLEMENTARY CARBON DOSAGE MAY BE REQUIRED TO ACHIEVE TARGET TOTAL NITROGEN VALUES IN THE EFFLUENT.
4. WATER CONTENT OF DEWATERED SLUDGE HAS NOT BEEN CONSIDERED IN THE MASS BALANCE.
5. IMPACT OF CHEMICAL DOSING FOR PH CORRECTION, DISINFECTION AND CLEANING HAS NOT BEEN CONSIDERED IN THIS MASS BALANCE.
6. SECONDARY AND ADVANCED TREATMENT SPLIT INTO TWO PARALLEL TREATMENT TRAINS

Figure 2.4 – Process flow diagram of PPF WWTP and AWTP

2.3.3 Existing Protein Recovery Plant Odour Sources

The odour sources assumed for the existing PRP are the same as those used for the previous TOU odour impact assessment report for the Stage One WWTP upgrade (Hayes & Munro, 2018). The PRP odour sources assessed were:

- High-Temperature Rendering (**HTR**), namely:
  - Processing, and
  - Storage/dispatch;
- Low-Temperature Rendering (**LTR**), namely:
  - Processing; and
  - Storage/dispatch;
- Raw materials receival area/loading bay;
- HTR processing biofilter system; and
- LTR processing biofilter system.

The fugitive (non-biofilter) odour emissions from the PRP building were updated from measurements taken by TOU on 8 August 2018.

2.4 POTENTIAL FOR DUST IMPACTS

Based on TOU's experience with poultry processing facilities across Australia, processing, rendering and wastewater sources are high in moisture and low in particulate emissions. Moreover, it is inferred from the low odour concentrations measured from live bird storage at the Out Street facility that the particulate levels will be correspondingly low given the accepted nexus between odour and dust across many industries. Consequently, TOU's analysis of dust impacts is as follows:

- the nature of all processing, rendering and wastewater sources of the proposed facility is not high risk (compared with, for example, feed mills);
- the site car-parks and roadways will be sealed; and
- there is a large separation distance to the nearest residential dwellings;

With due consideration to the above operational analysis for the proposed PPF, it is TOU's assessment that the risk level of adverse dust impact is of very low potential; and that a refined quantitative assessment is not required.

2.5 POTENTIAL FOR AIR QUALITY IMPACT FROM BOILERS

To satisfy the process demands of the operations for the proposed PPF, two existing 10 megawatts (**MW**) and one existing 15 MW natural gas-fired boilers will be employed. It is well established that the combustion of fuels in equipment such as boilers results in atmospheric emissions of substances. The volume and nature of emissions depend on several factors including fuel composition and consumption, boiler design and operation, as well as pollution control devices. It is understood that all previous tests and results commissioned by Baiada to date are well under the POEO (Clean Air) Regulation 2010, Group 6 emission standards for the three existing boilers. If required, any new boiler acquired for the new processing will also be natural gas-fired, sized similarly and with an equivalent emission performance specification.

It should be noted that emission factor for sulphur dioxide (**SO_2**) is dependent on the amount of sulphur in the fuel gases. For the proposed PPF, it is understood that the composition of the natural gas to be used by the boilers will contain negligible levels of sulphur and other contaminants that may affect efficient combustion performance and emissions discharge to air from the boiler stacks. This is supported by results of previous testing of the boilers completed in February 2016, shown in **Table 2.1**.

Table 2.1 – Boiler testing results: February 2016

Analyte	Boiler 1 Low fire	Boiler 1 High fire	Boiler 2 Low fire	Boiler 2 High fire	Boiler 3 Low Fire	Boiler 3 High fire
CO_2%	5.9	9.5	7.5	9.2	6.3	9.5
O_2	10.6	4.1	7.7	4.6	9.8	4.1
CO (ppm)	166	30	52	35	264	23
Temp (°C)	109	134	105	126	96	133
NO_x (ppm)	2	34	17	37	1	17

If secondary fuel such as biogas from the CAL (or an alternative energy source other than natural gas) is to be used, an on-site assessment will need to be conducted upon commissioning to validate the air emissions performance from the boiler stacks are complaint with under POEO (Clean Air) Regulation 2010, Group 6 emission standards. However, with regards to the large separation distances to nearest sensitive residences the boiler emissions are unlikely to cause adverse effects.

3 ODOUR SOURCES AND EMISSIONS INVENTORY

The odour emission rates (**OER**) used in the modelling scenarios are shown in the following sections. The odour concentration measurement reports upon which these OERs are derived can be provided upon request.

3.1 POINT SOURCES

The odour emission inventory for point sources was developed with a set of design parameters provided by Baiada and as outlined in **Table 3.1**.

Table 3.1 – Design parameters used for the calculation of OER

Parameter	Units	Value
Proposed PPF		
LBR capacity	birds	90,000
Ventilation rate	m^3/h.bird	10
Total flow discharged from LBR	m^3/h	900,000
Roof vent discharge velocity	m/s	15
Processing room air exchange rate	/h	15
Line 1 Scaling and Defeathering Room	m^3	4,929
Line 2 Scaling and Defeathering Room	m^3	4,929
Line 1 Evisceration Room	m^3	3,738
Line 2 Evisceration Room	m^3	3,738
Line 1 Offal Processing Room	m^3	1,122
Line 2 Offal Processing Room	m^3	1,122
Line 1 Foot Processing Room	m^3	781
Line 2 Foot Processing Room	m^3	781
By-products Prep & Pack Room	m^3	1,080
Pet Food Prep & Pack Room	m^3	2,080
Primary Plant Room	m^3	1,128
Primary Waste Staging Room	m^3	768
Secondary Waste Staging Room	m^3	720
Crate Washroom	m^3	3,270
Live bird odour emissions factor	ou.m^3/s.bird	0.35
Hanwood PP vents mean measured odour concentration	ou	240
Existing PRP		
Biofilter surface area	m^2	160
Biofilter design flowrate	m^3/h	30,000
Biofilter surface area per cell	m^2	53
Biofilter design flowrate per cell	m^3/h	10,000
Biofilter discharge odour concentration	ou	500
Proposed WWTP/AWTP to service PPF		
PTB	m^3	10,062
PTB air exchange rate	/h	15

3.1.1 PRP Biofilters

The biofilter cells were modelled as individual low exit velocity, wide diameter and wake-affected point sources. The locations of the point sources representing the biofilter cells are shown in **Figure 3.1**. The point source release parameters and OERs are given in **Table 3.2**.

The treated odour level exiting the PRP biofilters is expected to range from a mean of 200 odour units (**ou**) upon commissioning to a concentration discharge mean of 500 ou to a maximum of 500 ou as the medium degrades. The PRP biofilters were modelled based upon the concentration discharge mean of 500 ou for biofilters with medium near its end-of-life.

3.1.2 Live Bird Reception Ventilation

The live bird reception (**LBR**) point sources were modelled using an odour emission factor of 0.35 ou.m^3/s.bird. This factor is based on TOU's odour emissions database, compiled over many years of measurement and confirmed again on 8 August 2018 from the Baiada Out St live bird storage area. The ventilation rate used was 900,000 m^3/h, based upon a design factor of 10 m^3/h per bird and a maximum capacity of 90,000 birds per hour. The actual numbers are likely to be lower and fluctuate as trucks arrive and birds are processed over time. Birds were assumed to be present between 1 am and 9 pm. Three million birds a week equates to approximately 21,500 birds per hour over 20 hours per day, 7 days per week. Therefore, a ventilation rate based upon a peak capacity of 90,000 birds is considered conservative and worst-case under normal operations. The locations of the point sources representing the LBR ventilation are shown in **Figure 3.1**. The point source release parameters and OERs are given in **Table 3.2**.

3.1.3 PPF ventilation

The PPF processing line roof vents were modelled using OER data collected by TOU on 16 November 2011 from Baiada's Hanwood poultry processing facility. The ventilation rates were estimated by multiplying the volume of each process room by a nominal 15 air changes per hour. The discharge odour concentration used was the mean measured value of 220 ou based upon measurements from the Hanwood Processing Plant roof vents. For the modelling, each processing line was assumed to be under constant 24 hour per day operation. The locations of the point sources representing the PPF ventilation shown in **Figure 3.1**. The point source release parameters and OERs are given in **Table 3.2**.

3.1.4 PTB ventilation

The PTB ventilation point sources were modelled using OER data. TOU has assumed that the total OER discharged from the building is the same as that reported from the old PRP DAF building and reported in 2016 (Boddy, 2016, p. 31).

3.2 AREA SOURCES

3.2.1 Wastewater Treatment Plants

The operational PRP WWTP area sources, except for the CAL, have been modelled using data collected from the Baiada Hanwood WWTP.

For the CAL, an OER was derived from TOU's database. In the absence of relevant data from a poultry processing plant, a maximum emission rate from an uncovered anaerobic pond servicing a red meat abattoir was used for this application. The red meat abattoir utilised a similar wastewater process with an SBR and settling ponds downstream of the uncovered anaerobic pond. The biogas capture rate from the proposed CALs was assumed to be 99.9%.

The proposed phasing of the SBR cycles was modelled under the assumption that filling during night-time hours should be avoided. However, this practice can be reassessed following commissioning of the proposed PPF with the OMP updated to reflect the revised operating protocol. As a worst-case scenario, the SBR was set at the fill emission rate for day-time hours between 8 am and 5 pm with the aeration and settling emission rates set overnight. It is understood in practice that the fill phase should only take approximately one hour, followed by the aeration and settling phases.

The proposed PPF WWTP area sources, except for the balance tank has been modelled under a conservative assumption that SOERs through the treatment train would be similar to what was from the Baiada Hanwood SBR-based WWTP system. This is despite the advanced MBR technology that is proposed to be deployed that will most likely result in lower odour emissions.

For the balance tank, TOU has assumed that the SOER is the same as that reported from the old PRP WWTP measured and reported in 2016 (Boddy, 2016, p. 30).

The locations of the point sources representing the PRP and PPF WWTP odour sources are shown in **Figure 3.2**. The area source OERs are shown in **Table 3.3**.

3.3 VOLUME SOURCES

3.3.1 Protein Recovery Plant

Fugitive odour emissions from the PRP have been calculated from actual measurements collected from the PRP building by TOU on 8 August 2018. It has been estimated that there were approximately three air changes per hour of room air ventilation occurring at the time of measurement.

Five volume sources were input into the model to represent each major section of the structure with OERs proportionally assigned by the estimated volume of each section. The volume source settings within the model have considered that fugitive process emissions are released at a high level via vents that are either naturally or mechanically aided by roof fans. The theoretical maximum production rates have been used for 24 hours, 7 days per week. The locations of the volume sources representing the PRP fugitive emissions are shown in **Figure 3.1**. The volume source release parameters are available in **Table 3.4**.

The relatively low OER values for the Low-Temperature and High-Temperature Processing and Storage areas reflect the excellent odour capture experienced during the August 2018 testing, arising from the fully enclosed nature of the rendering processes. Consistent with measurement and observations made by TOU at the PRP, the raw material loading bay OER was estimated by multiplying the mean measured odour concentration from the Low-Temperature and High-Temperature Processing and Storage areas by a ventilation rate of three air changes per hour.

Figure 3.1 – Point and volume source locations

Figure 3.2 – Area source locations

Table 3.2 – Point source odour emissions inventory

Description	Source ID	UTM east (km)	UTM north (km)	Height (m)	Elevation (m)	Diameter (m)	Velocity (m/s)	Temperature (K)	Flowrate (m^3/h)	OER ($ou.m^3/s$)	OER P/M60 (2.3) ($ou.m^3/s$)	Derived Discharge Concentration (ou)
Proposed PPF												
Live Bird Reception Roof Vent 1	LB01	293.8332	6561.1371	13.0	388.0	2.06	15.0	293.15	180,000	6,300	14,490	126
Live Bird Reception Roof Vent 2	LB02	293.8213	6561.1249	13.0	388.0	2.06	15.0	293.15	180,000	6,300	14,490	126
Live Bird Reception Roof Vent 3	LB03	293.8090	6561.1118	13.0	388.0	2.06	15.0	293.15	180,000	6,300	14,490	126
Live Bird Reception Roof Vent 4	LB04	293.7831	6561.0935	13.0	388.0	2.06	15.0	293.15	180,000	6,300	14,490	126
Live Bird Reception Roof Vent 5	LB05	293.7666	6561.0759	13.0	388.0	2.06	15.0	293.15	180,000	6,300	14,490	126
Scalding and Defeather Roof Vent 1	DF01	293.8466	6561.1074	13.0	388.0	0.93	15.0	293.15	36,968	2,465	5,668	240
Scalding and Defeather Roof Vent 2	DF02	293.8249	6561.0866	13.0	388.0	0.93	15.0	293.15	36,968	2,465	5,668	240
Scalding and Defeather Roof Vent 3	DF03	293.8058	6561.0685	13.0	388.0	0.93	15.0	293.15	36,968	2,465	5,668	240
Scalding and Defeather Roof Vent 4	DF04	293.7845	6561.0476	13.0	388.0	0.93	15.0	293.15	36,968	2,465	5,668	240
Evisceration Roof Vent 1	EV01	293.8236	6561.0378	13.0	388.0	1.15	15.0	293.15	56,070	3,738	8,597	240
Evisceration Roof Vent 2	EV02	293.8074	6561.0189	13.0	388.0	1.15	15.0	293.15	56,070	3,738	8,597	240
Offal Processing Roof Vent 1	OF01	293.8455	6561.0141	13.0	388.0	0.63	15.0	293.15	16,830	1,122	2,581	240
Offal Processing Roof Vent 2	OF02	293.8301	6560.9976	13.0	388.0	0.63	15.0	293.15	16,830	1,122	2,581	240
Foot Processing Roof Vent 1	FT01	293.8414	6561.0096	13.0	388.0	0.53	15.0	293.15	11,715	781	1,796	240
Foot Processing Roof Vent 2	FT02	293.8363	6561.0038	13.0	388.0	0.53	15.0	293.15	11,715	781	1,796	240
By-products Roof Vent 1	BP01	293.8615	6561.0279	13.0	388.0	0.62	15.0	293.15	16,200	1,080	2,484	240
Pet Food Roof Vent 1	PF01	293.8816	6561.0054	13.0	388.0	0.86	15.0	293.15	31,200	2,080	4,784	240
Primary Plant Roof Vent 1	PP01	293.8324	6561.0580	13.0	388.0	0.63	15.0	293.15	16,920	1,128	2,594	240
Primary Waste Staging Roof Vent 1	PW01	293.8403	6561.0487	13.0	388.0	0.52	15.0	293.15	11,520	768	1,766	240
Secondary Waste Staging Roof Vent 1	SW01	293.8949	6560.9846	13.0	388.0	0.50	15.0	293.15	10,800	720	1,656	240
Crate Wash Roof Vent 1	CR01	293.9677	6560.8752	13.0	388.0	0.76	15.0	293.15	24,525	1,635	3,761	240
Crate Wash Roof Vent 2	CR02	293.9546	6560.8624	13.0	388.0	0.76	15.0	293.15	24,525	1,635	3,761	240
Existing PRP												
HTR Biofilter Cell 1	BF1C1	293.9443	6561.1196	2.0	385.0	8.24	0.052	313.15	10,000	1,389	3,194	500
HTR Biofilter Cell 2	BF1C2	293.9372	6561.1254	2.0	385.0	8.24	0.052	313.15	10,000	1,389	3,194	500
HTR Biofilter Cell 3	BF1C3	293.9322	6561.1313	2.0	385.0	8.24	0.052	313.15	10,000	1,389	3,194	500
LTR Biofilter Cell 1	BF2C1	293.9752	6561.0864	2.0	385.0	8.24	0.052	313.15	10,000	1,389	3,194	500
LTR Biofilter Cell 2	BF2C2	293.9802	6561.0805	2.0	385.0	8.24	0.052	313.15	10,000	1,389	3,194	500
LTR Biofilter Cell 3	BF2C3	293.9852	6561.0756	2.0	385.0	8.24	0.052	313.15	10,000	1,389	3,194	500
Proposed WWTP/AWTP to service PPF												
Primary Building (Screen Section)	SCR	294.1772	6561.0418	6.0	384.3	1.09	15.0	273.15	50,310	2,960	6,808	212
Primary Building (DAF Section)	DAF	294.1808	6561.0639	6.0	384.3	1.09	15.0	273.15	50,310	2,970	6,831	213
Primary Building (Sludge Section)	SLG	294.1844	6561.0860	6.0	384.3	1.09	15.0	273.15	50,310	2,960	6,808	212

Table 3.3 – Area source odour emissions inventory

Description	Source ID	Elevation (m)	Area (m^2)	UTM east (km)	UTM north (km)	SOER ($ou.m^3/m^2.s$)	SOER P/M60 (2.3) ($ou.m^3/m^2.s$)	SOER P/M60 (1.9) ($ou.m^3/m^2.s$)	OER ($ou.m^3/s$)	OER P/M60 (2.3) ($ou.m^3/s$)	OER P/M60 (1.9) ($ou.m^3/s$)
Existing WWTP servicing PRP											
Clear Well #1	CW1	380.8	2,167	294.0274 294.0624 294.0324 293.9964	6561.586 6561.544 6561.519 6561.56	0.141	0.324	0.268	306	703	581
Covered Anaerobic Lagoon	CAL1	385	8,242	294.0162 294.1141 294.0723 293.9744	6561.275 6561.174 6561.133 6561.234	0.0518	0.119	0.098	427	982	811
Clear Well #2	CW2	380.8	2,167	293.9868 294.0218 293.9918 293.9558	6561.554 6561.512 6561.487 6561.528	0.141	0.324	0.268	306	703	581
Sequential Batch Reactor (Fill)	SBR1	380.8	2,167	294.0657 294.1007 294.0707 294.0347	6561.62 6561.578 6561.553 6561.594	3.89	8.95	7.39	8,430	19,388	16,016
Sequential Batch Reactor (Start cycle)	SBR1	380.8	2,167	294.0657 294.1007 294.0707 294.0347	6561.62 6561.578 6561.553 6561.594	0.224	0.52	0.43	485	1,116	922
Sequential Batch Reactor (Mid cycle)	SBR1	380.8	2,167	294.0657 294.1007 294.0707 294.0347	6561.62 6561.578 6561.553 6561.594	0.082	0.19	0.16	178	409	338
Sequential Batch Reactor (End cycle)	SBR1	380.8	2,167	294.0657 294.1007 294.0707 294.0347	6561.62 6561.578 6561.553 6561.594	0.03	0.069	0.057	65	150	124
Sequential Batch Reactor (Settling/Decant)	SBR1	380.8	2,167	294.0657 294.1007 294.0707 294.0347	6561.62 6561.578 6561.553 6561.594	0.018	0.041	0.034	39	90	74
Proposed WWTP/AWTP to service PPF											
Balance Tank	BAL1	384.3	416	294.1366 294.157 294.157 294.1366	6561.05 6561.05 6561.03 6561.03	0.3	0.69	0.57	125	287	237
Pre-anoxic Tank #1	PRAX1	384.3	213	294.1464 294.161 294.161 294.1464	6561.071 6561.071 6561.056 6561.056	0.224	0.515	0.426	48	110	91

Table 3.3 (continued) – Area source odour emissions inventory

Description	Source ID	Elevation (m)	Area (m^2)	UTM east (km)	UTM north (km)	SOER ($ou.m^3/m^2.s$)	SOER P/M60 (2.3) ($ou.m^3/m^2.s$)	SOER P/M60 (1.9) ($ou.m^3/m^2.s$)	OER ($ou.m^3/s$)	OER P/M60 (2.3) ($ou.m^3/s$)	OER P/M60 (1.9) ($ou.m^3/s$)
Proposed WWTP/AWTP to service PPF											
Pre-anoxic Tank #2	PRAX2	384.3	213	294.1083	6561.049	0.224	0.515	0.426	48	110	91
				294.1229	6561.049						
				294.1229	6561.035						
				294.1083	6561.035						
Aerobic Tank #1	AER1	384.3	676	294.1394	6561.103	0.082	0.189	0.156	55	127	105
				294.1654	6561.103						
				294.1654	6561.077						
				294.1394	6561.077						
Aerobic Tank #2	AER2	384.3	676	294.1128	6561.08	0.082	0.189	0.156	55	127	105
				294.1388	6561.08						
				294.1388	6561.054						
				294.1128	6561.054						
Post-anoxic Tank #1	POAX1	384.3	161	294.1425	6561.124	0.03	0.069	0.057	5	11	9
				294.1552	6561.124						
				294.1552	6561.111						
				294.1425	6561.111						
Post-anoxic Tank #2	POAX2	384.3	161	294.1216	6561.127	0.03	0.069	0.057	5	11	9
				294.1343	6561.127						
				294.1343	6561.115						
				294.1216	6561.115						
Membrane Bioreactor #1	MBR1	384.3	210	294.1603	6561.128	0.018	0.0414	0.0342	4	9	7
				294.1706	6561.126						
				294.1674	6561.107						
				294.157	6561.108						
Membrane Bioreactor #2	MBR2	384.3	210	294.1211	6561.107	0.018	0.0414	0.0342	4	9	7
				294.1314	6561.106						
				294.1282	6561.086						
				294.1178	6561.088						

Table 3.4 – Volume source odour emissions inventory

Description	Source ID	UTM east (km)	UTM north (km)	Height (m)	Elevation (m)	Sigma Y (m)	Sigma Z (m)	OER ($ou.m^3/s$)	OER P/M60 (2.3) ($ou.m^3/s$)
Existing PRP									
HTR Storage	HST	293.905	6561.11	6.4	385	12.06	5.95	84	193
HTR Processing	HPR	293.922	6561.1	6.4	385	12.06	5.95	390	897
LTR Processing	LPR	293.96	6561.06	6.4	385	12.06	5.95	540	1,242
LTR Storage	LST	293.976	6561.04	6.4	385	12.06	5.95	100	230
Loading Bay	LOAD	293.959	6561.1	7.2	385	12.06	6.7	334	769

3.4 CUMULATIVE ODOUR EFFECTS

The cumulative odour effects from the proposed PPF have been assessed by combining all Oakburn odour sources into a single grouped impact and separately grouped by origin, namely: PRP, PPF and WWTP (i.e. inclusive of the AWTP). In TOU's experience, multiple odour plumes of distinctly different odour characters do not combine in the atmosphere and tend to be observed as individually identifiable odour characters in the field, even well downwind of the sources. Furthermore, treated odour emissions from an effective biofilter remove almost all process odour, having an 'earthy, musty' odour character. Moreover, in TOU's opinion, odour impacts from biofilters and other proven odour control systems should be modelled as a non-cumulative impact (or completely removed from the dispersion modelling process).

The cumulative odour effects from the proposed PPF with three poultry farms located to the northwest have been considered in the form of a sensitivity analysis. This is in response to comments received from NSW EPA during the notification phase of the proposed PPF development.

3.4.1 Bowlers Lane Poultry Farms

There are three poultry farms located along Bowlers Lane to the northwest of the proposed PPF development, as indicated in **Figure 2.1**. Each farm comprises of eight tunnel-ventilated, climate-controlled, metal structure sheds with side curtains. The key farm operational parameters are given in **Table 3.5**. The hourly varying odour emissions from the farms were estimated with the use of the 'K-factor' poultry farm odour emissions model (Ormerod & Holmes, 2005) based upon:

- Bird population;
- Stocking density as a function of the bird population, age and shed size;
- Ventilation rate as a function of bird age and ambient temperature; and
- Farm operational parameters.

Table 3.5 – Operational parameters of Bowlers Lane poultry farms			
Parameter	**BOWLERS 1**	**BOWLERS 2**	**BOWLERS 3**
No batches litter used	1	1	1
Drinking system	Nipple	Nipple	Nipple
Automated shed environmental control with alarm	Yes	Yes	Yes
Inspect and replace wet litter daily	Yes	Yes	Yes
Max shed WS > 2.5m/s	No	No	No
Externally accredited management system	Yes	Yes	Yes
Litter type	Shavings	Shavings	Shavings
Floor-type	Earth	Earth	Earth
Foggers installed	No	No	No
Sheds dimensions	Sheds 1,2,3 & 8: 105 m long, 14 m wide, 3m high, 4.8 apex. Sheds 4,5,6 & 7: 107 m long, 12.6 m wide, 3 m high, 3.8 m apex	100 m long, 13.85 m wide, 2.8 high. 4.5 m apex	110 m long, 13.5 m wide, 2.1 m high, 4.2 apex
Specifications of fans	4 Tunnel Fans / Shed (Running at ~22,000 CFM)	8 Tunnel Fans / Shed (Running at ~22,000 CFM)	6 Tunnel Fans / Shed (Running at ~27,000 CFM)
Number of birds placed per batch	171,000 birds	220,000 birds	220,000 birds
Typical annual batch cycle regime	52 days cycle with 8-10 days farm empty	52 days cycle with 8-10 days farm empty	52 days cycle with 8-10 days farm empty
Thin-out/ pick up regime	3 thin outs then empty days 31, 38, 44-49	3 thin outs then empty days 31, 38, 44-49	3 thin outs then empty days 31, 38, 44-49

3.4.2 Odour Emissions Estimation

Standardised hourly varying OERs were predicted by use of the following equation:

$$OERs = 0.025\, K\, V^{0.5}$$ **Equation 3.1**

where:

OER_S = standardised OER (ou.m³/s) per unit shed area (m²) per unit of bird density (in kg/m²);

V = ventilation rate (m^3/s); and

K = scaling factor between 1 and 5.

Based upon the operational parameters of the farms in **Table 3.5**, a scaling factor of 2 was selected plus an additional 10% (i.e. K = 2.2) to account for inherent uncertainties in the odour emission model predictions (PAEHolmes, 2011).

The hourly varying ventilation rates were estimated by *Fan Activity Prediction Model 2* with *Farm C* coefficients and Cobb500 chicken breed described in the Rural Industries Research and Development Corporation (**RIRDC**) report: *Monitoring mechanical ventilation rates in poultry buildings* (Dunlop & Duperouzel, 2014).

To complete the process, the standardised OER is multiplied by the shed live bird weight to produce a shed OER for every hour of the batch cycle. The performance objectives supplied by Baiada for the Cobb500 breed of chicken that is grown at the farms are shown in **Figure 3.3**. These were used to estimate the total shed live bird weight based on operational parameters described in **Table 3.5**. For conservatism, TOU has assumed that the batch cycle for each shed begins on the same day.

The locations of the points sources representing the tunnel fan discharges for each shed are shown in **Figure 3.1**. The point source release parameters are available in **Table 3.6**. Each point source was placed approximately 30 meters downstream of the tunnel fans, the diameter was set to represent the vertical cross-sectional area of each shed discharge end, and vertical momentum was set to zero to represent the horizontal discharge from the end of the sheds.

An example of hourly varying shed OER over the course of 2017 has been shown below in **Figure 3.5**. This shows the OER variation based on day-to-day conditions, bird age, thin-outs, clean-outs and between batches across different seasons of the year.

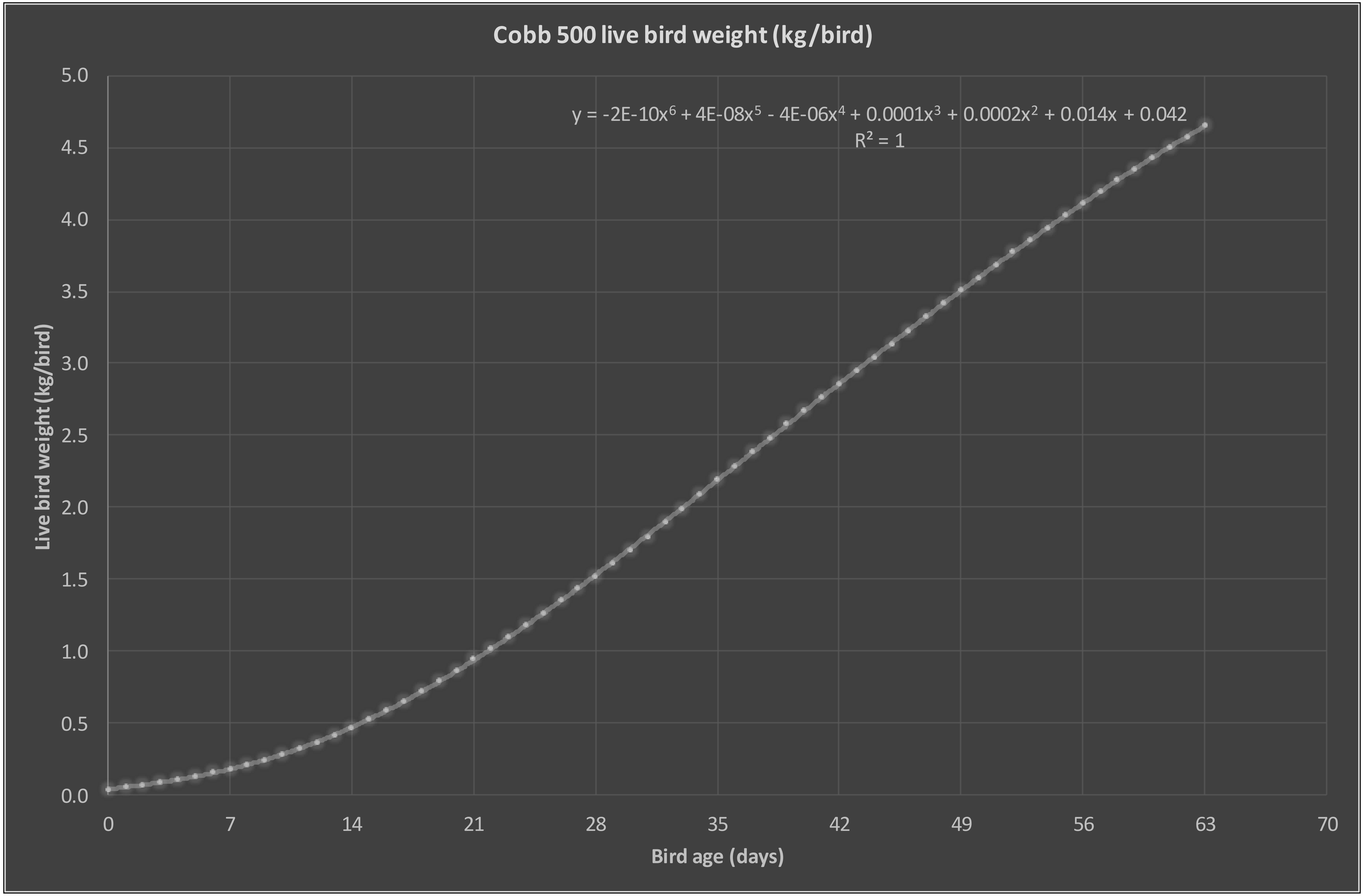


Figure 3.3 – Cobb 500 live bird weight performance objective (Source: supplied)

Figure 3.4 – Bowlers Lane poultry farms point source locations

Table 3.6 – Bowlers Lane poultry farm point source release parameters						
Description	**Source ID**	**UTM east (km)**	**UTM north (km)**	**Height (m)**	**Elevation (m)**	**Diameter (m)**
Bowlers Lane 1 Shed 1	F1S1	294.7517	6563.42	1	379	8.20
Bowlers Lane 1 Shed 2	F1S2	294.7145	6563.384	1	377.8	8.20
Bowlers Lane 1 Shed 3	F1S3	294.6755	6563.348	1	377.8	8.20
Bowlers Lane 1 Shed 4	F1S4	294.6329	6563.314	1	382.1	7.89
Bowlers Lane 1 Shed 5	F1S5	294.5943	6563.277	1	382.1	7.89
Bowlers Lane 1 Shed 6	F1S6	294.5453	6563.229	1	382.1	7.89
Bowlers Lane 1 Shed 7	F1S7	294.5063	6563.193	1	381.5	7.89
Bowlers Lane 1 Shed 8	F1S8	294.4728	6563.159	1	384.1	8.20
Bowlers Lane 2 Shed 1	F2S1	293.9604	6562.57	1	394.8	7.93
Bowlers Lane 2 Shed 2	F2S2	293.9577	6562.604	1	394.8	7.93
Bowlers Lane 2 Shed 3	F2S3	293.9567	6562.638	1	394.9	7.93
Bowlers Lane 2 Shed 4	F2S4	293.9547	6562.67	1	394.9	7.93
Bowlers Lane 2 Shed 5	F2S5	293.6332	6562.553	1	397.3	7.93
Bowlers Lane 2 Shed 6	F2S6	293.6322	6562.586	1	397.3	7.93
Bowlers Lane 2 Shed 7	F2S7	293.6322	6562.619	1	393	7.93
Bowlers Lane 2 Shed 8	F2S8	293.6307	6562.653	1	393	7.93
Bowlers Lane 3 Shed 1	F3S1	293.3382	6562.038	1	397.8	7.93
Bowlers Lane 3 Shed 2	F3S2	293.3355	6562.071	1	397.8	7.93
Bowlers Lane 3 Shed 3	F3S3	293.3345	6562.105	1	397.8	7.93
Bowlers Lane 3 Shed 4	F3S4	293.3318	6562.138	1	397.8	7.93
Bowlers Lane 3 Shed 5	F3S5	292.9815	6562.019	1	392.7	7.93
Bowlers Lane 3 Shed 6	F3S6	292.9799	6562.053	1	392.7	7.93
Bowlers Lane 3 Shed 7	F3S7	292.9783	6562.087	1	392.7	7.93
Bowlers Lane 3 Shed 8	F3S8	292.9762	6562.121	1	392.7	7.93

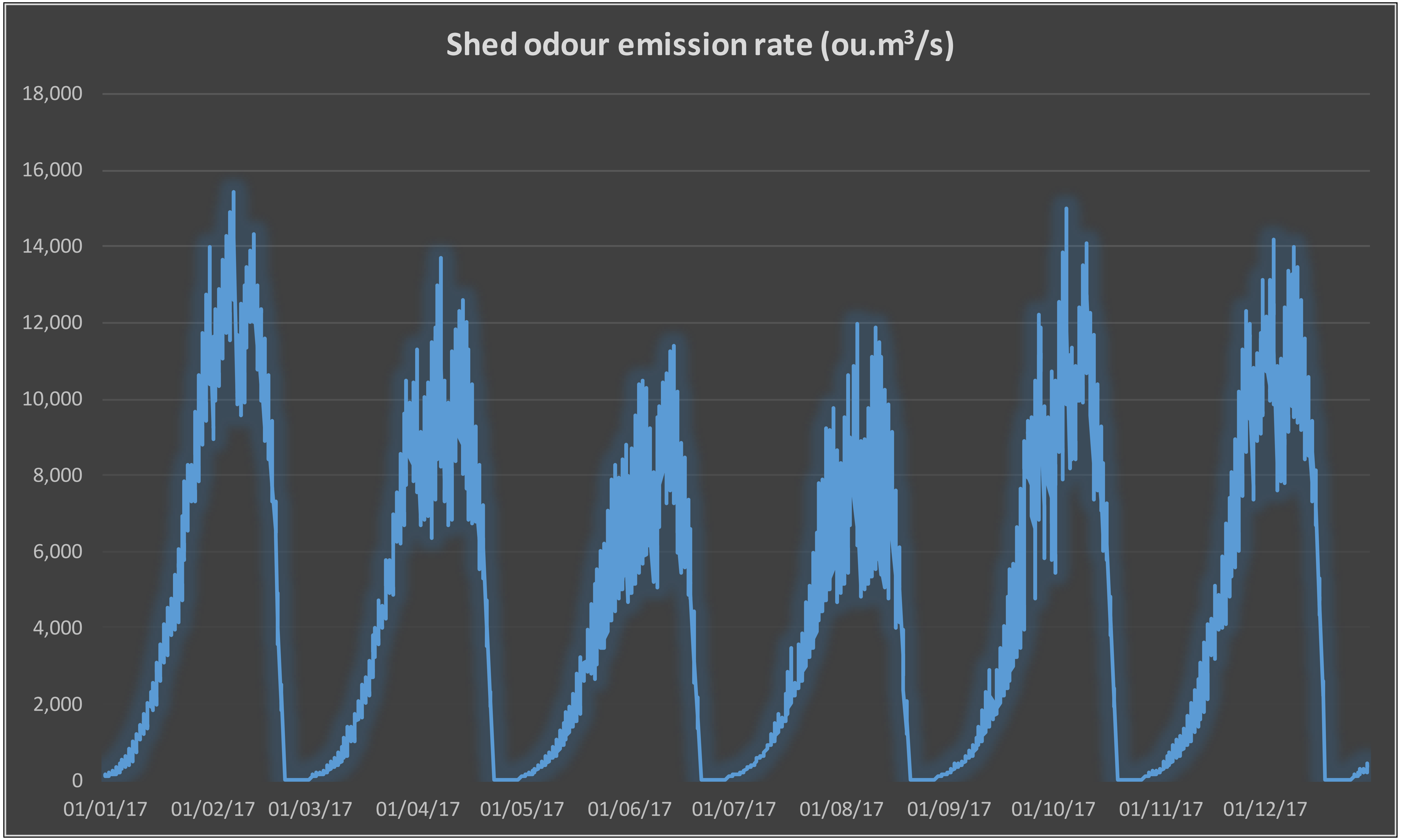


Figure 3.5 – Example of hourly varying shed OER for 2017

4 ODOUR DISPERSION MODELLING APPROACH

4.1 NSW ODOUR CRITERIA AND DISPERSION MODEL GUIDELINES

The applicable guidelines for the OIA report conducted for the proposed PPF operations include:

- NSW EPA, 2016, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Environment Protection Authority, 2017);
- NSW EPA, 2006, *Technical framework (and notes): assessment and management of odour from stationary sources in NSW* (Environment Protection Authority, 2006a & b)*;* and
- Barclay and Scire, 2011, Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia' (Barclay & Scire, 2011)

The documents specify that the odour modelling for Level 3 impact assessments upon which this study has been conducted be based on the use of:

- 99.0^{th} percentile dispersion model predictions;
- 1-hour averaging times with built-in peak-to-mean ratios to adjust the averaging time to a 1-second nose-response-time;
- The peak-to-mean ratios in the far-field for wake-affected point sources is 2.3;
- The peak-to-mean ratios in the far-field for volume sources is 2.3;
- The peak-to-mean ratios in the far-field for area sources is 2.3 for stability classes A to D and 1.9 for stability classes E and F; and
- The appropriate odour unit performance criterion based on the population of the affected community in the vicinity of the development.

The impact assessment criteria (**IAC**) for complex mixtures of odours are designed to include receptors with a range of sensitivities. Therefore, a statistical approach is used to determine the acceptable ground level concentration of odour at the nearest sensitive receptor. This criterion is determined by the following equation outlined on page 35 of NSW EPA Modelling Methods (Environment Protection Authority, 2017):

$$IAC = \frac{log_{10}(p) - 4.5}{-0.6}$$ **Equation 4.1**

where:

IAC **=** Impact Assessment Criterion (ou); and p **=** population.

Based on **Equation 4.1**, **Table 4.1** outlines the odour performance criteria for six different affected population density categories and is reproduced from NSW EPA Modelling Methods (Environment Protection Authority, 2017). It states that higher odour concentrations are permitted in lower population density applications.

Table 4.1 – Impact assessment criteria for complex mixtures of odorous air pollutants (nose response-time average, 99th percentile)

Population of affected community	Impact assessment criteria for complex mixtures of odorous air pollutants (OU)
Urban Area (≥ ~2000) and/or schools or hospitals	2.0
~500	3.0
~125	4.0
~30	5.0
~10	6.0
Single rural residence (≤ ~2)	7.0

Source: *Table 7.5* of the NSW EPA 2016 Methods

It is understood that there are up to 11 sensitive residences present along Wallamore Road, based upon Census 2016 (SA2) household size of 2.7 this equates to an approximate population of 30. Therefore, the preliminary IAC adopted for this odour impact assessment study is **5.0 ou** and is consistent with a long-standing criterion that has been successfully applied for the Westdale region. This will be discussed further from the population predicted to be affected by the results of the modelling.

4.2 DISPERSION MODELLING

4.2.1 The Odour Dispersion Model

The odour dispersion modelling assessment was carried out using the CALPUFF Modelling System. The main system programs used were:

- CALPUFF - Version 7.2.1 (Level 150618);
- CALMET - Version 6.5.0 (Level 150223); and
- CALPOST - Version 7.1.0 (Level 141010).

CALPUFF is a multi-layer, multi-species, non-steady-state puff dispersion model that can simulate the effects of time- and space-varying meteorological conditions on pollutant transport (Environment Protection Authority, 2017). CALMET is a meteorological model that produces three-dimensional gridded wind and temperature fields to be fed into CALPUFF. The primary output from CALPUFF is hourly pollutant concentrations evaluated at gridded and/or discrete receptor locations. CALPOST processes the hourly pollutant concentration output to produce tables at each receptor and contour plots across the modelling domain. The result is a summary of pollutant concentrations at various time averages and percentiles or a tally of hours where a pollutant has exceeded a pre-determined concentration. For further technical information about the CALPUFF modelling system refer to the document *CALPUFF Modeling System Version 6 User Instructions* (Atmospheric Studies Group, 2011).

The CALPUFF system can account for a variety of effects such as non-steady-state meteorological conditions, complex terrain, varying land uses, plume fumigation and low wind speed dispersion (Environment Protection Authority, 2017). CALPUFF is considered an appropriate dispersion model for air impact assessments, as outlined in the NSW EPA modelling methods, in one or more of the following applications:

- complex terrain, non-steady-state conditions,
- buoyant line plumes,
- coastal effects such as fumigation,
- high frequency of stable calm night-time conditions,
- high frequency of calm conditions, and
- inversion break-up fumigation conditions.

In the case of this assessment, CALPUFF was required in order to handle the moderate complexity of terrain surrounding Oakburn PRP. The terrain may induce deflection or channelling of odour plumes. Also, the high incidence of calm and very light winds (modelled 40.2% annual frequency < 2.0 m/s) and very stable night-time conditions (modelled 35.9% modelled F-class) were likely to induce non-steady-state conditions such as accumulation of odour and/or downslope movement with drainage airflow.

For the OIA for the proposed PPF, the air contaminant was **odour** and ground-level concentrations in ou have been projected.

4.2.2 Geophysical and Meteorological Configuration

A CALMET hybrid three-dimensional meteorological data file for Oakburn PRP was produced that incorporated gridded numerical meteorological data supplemented with surface observation data, topography and land use over the domain area.

4.2.3 Terrain Configuration

Terrain elevations were sourced from 1 Second Shuttle Radar Topography Mission (**SRTM**) Derived Smoothed Digital Elevation Model (DEM-S). The SRTM data has been treated with several processes including but not limited to removal of stripes, void filling, tree offset removal and adaptive smoothing (Gallant, et al., 2011). The DEM-S was used as input into TERREL processor to produce a 30 km by 30 km grid at 0.20 km resolution. A map of the terrain, including site and the meteorological station is shown in **Figure 4.1**.

4.2.4 Land Use Configuration

Land use was sourced from the United States Geological Survey (**USGS**) Global Land Cover Characteristics Data Base for the Australia-Pacific Region (United States

Geological Survey, 1997). The data was used as input into CTGPROC processor to produce a 30 km by 30 km grid at 0.20 km resolution. A map of the land, including the Oakburn site and the meteorological station, is shown in **Figure 4.2**.

4.2.5 Geophysical Configuration

The geophysical data file was created using the MAKEGEO processor. Land use data from CTGPROC and terrain data from TERREL was used as input to produce a 30 km by 30 km geophysical grid at 0.20 km resolution.

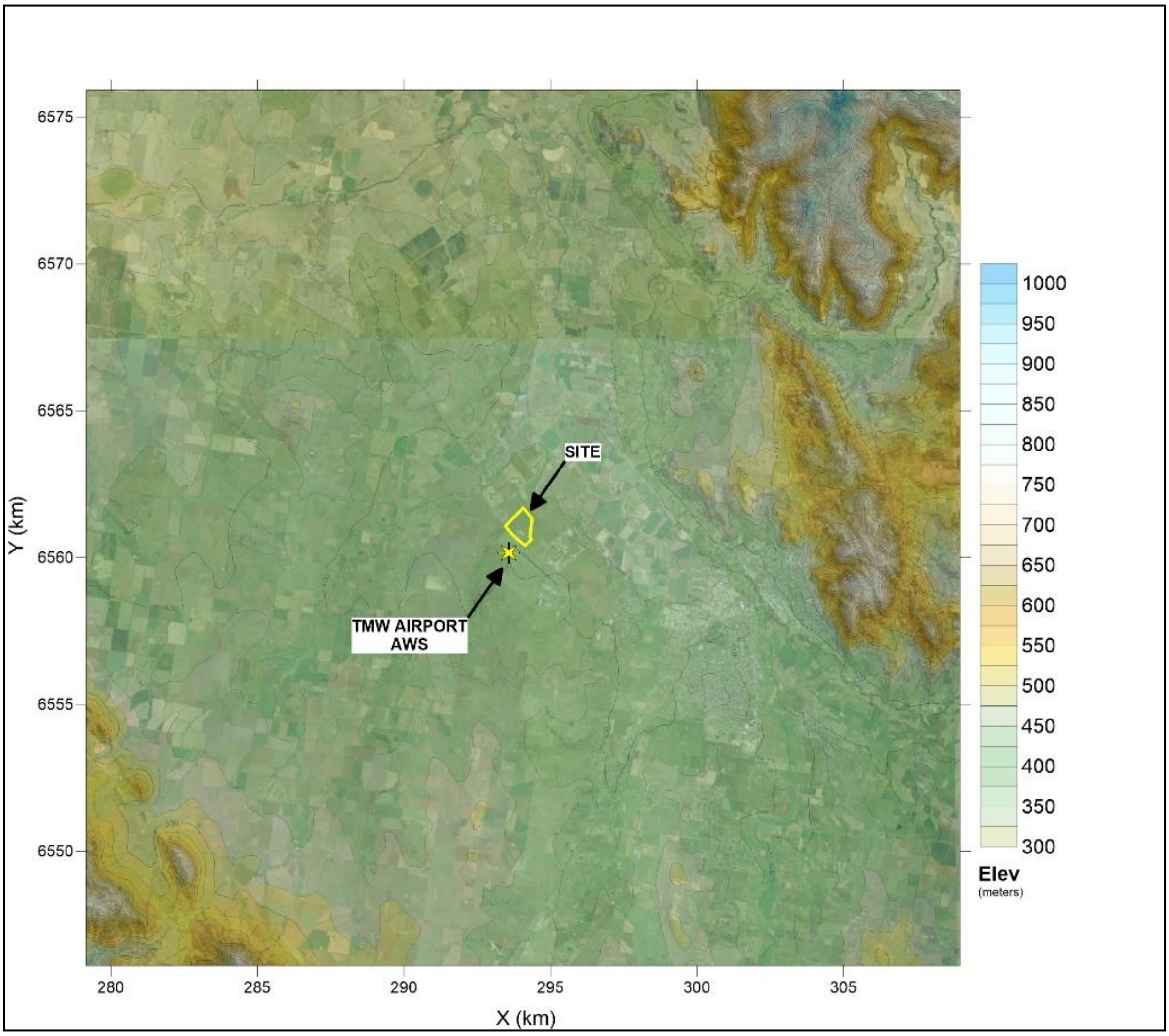


Figure 4.1 – Terrain dataset of Oakburn PRP and surrounds

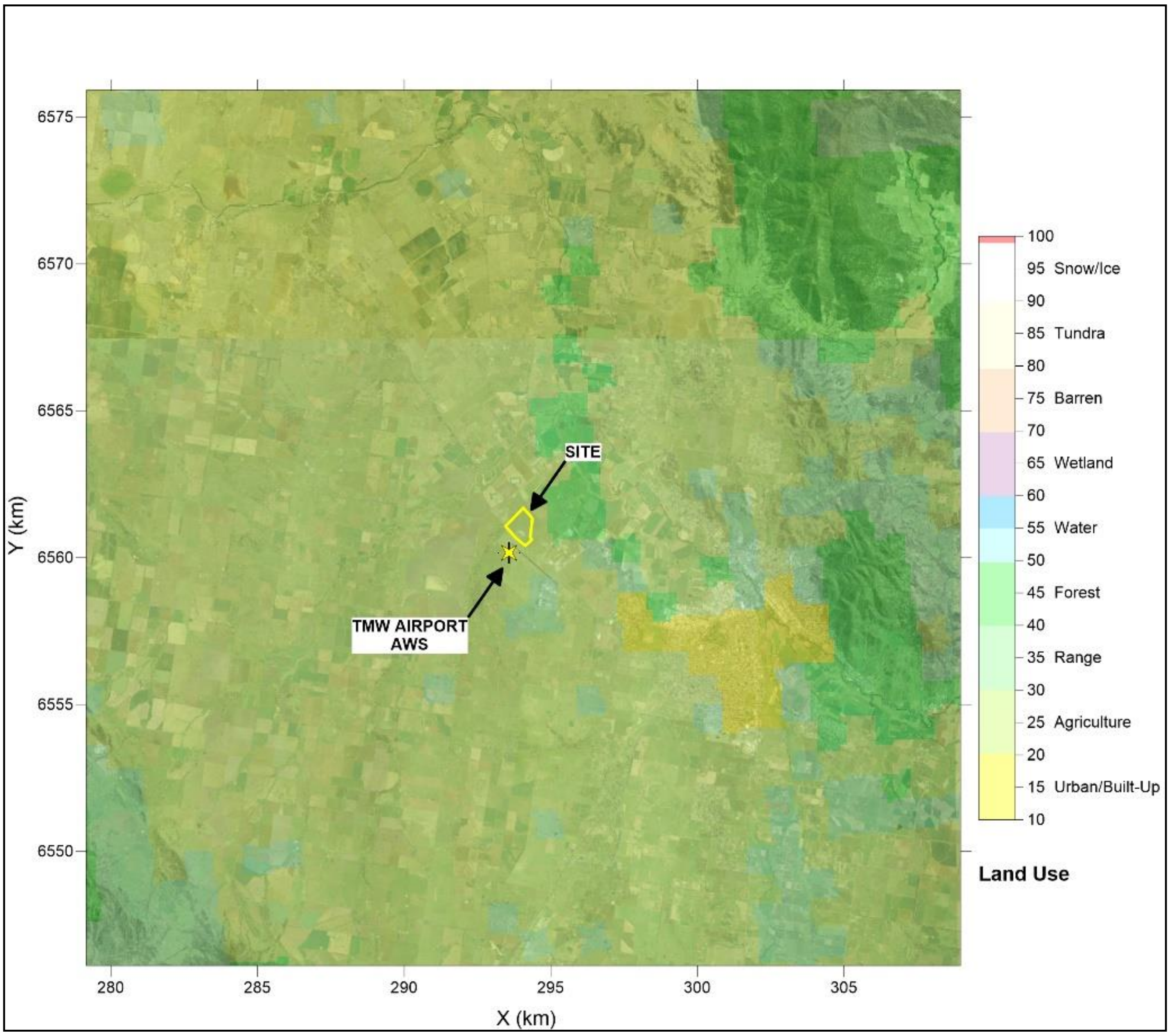


Figure 4.2 – Land use dataset of Oakburn PRP and surrounds

4.2.6 Meteorological Input Data

One-hour average observed meteorological surface data for 2017 was sourced from Tamworth Airport AWS (**YSTW**) maintained by the Bureau of Meteorology (**BOM**). The BOM data was formatted into a generic format and was processed with SMERGE to produce a surface meteorological data file. A small number of single hour gap-fills were carried out by interpolation.

Numerical meteorological data was produced as a 3D data tile from The Air Pollution Model (v4.0.5) and processed it with CALTAPM (v7.0.0) into a suitable format. TAPM was run using multiple nested grids—at least three nests and 35 vertical levels. The nested grid resolutions were close to a ratio of three as possible. The innermost nest was 33 km by 33 km at 1 km resolution.

4.2.7 Meteorological Model Configuration

CALMET was run with the hybrid option that uses geophysical data, surface station data and upper-air data. The data was used to initialise the diagnostic functions of the CALMET module to produce a full 3D meteorology data for input into CALPUFF. **Table 4.2** shows the key variables selected.

Table 4.2 – CALMET key variable fields

Grid Configuration (WGS-84 UTM Zone 56S)		
150		**NX Cells**
150		**NY Cells**
0.20		**Cell Size (km)**
279.073	6546.008	**SW Corner (km)**
11		**Vertical Layers**

ZFACE (m)	0	20	40	80	160	320	640	1000	1500	2000	2500	3000
LAYER	1	2	3	4	5	6	7	8	9	10	11	
MID-PT (m)	10	30	60	120	240	480	820	1250	1750	2250	2750	

Critical Wind Field Settings			
Value	**Found**	**Typical**	**Values**
TERRAD	2	None	Terrain scale (km) for terrain effects
IEXTRP	-4	4, -4	Similarity extrap. of wind (-4 ignore upper stn sfc)
ICALM	0	0	Do Not extrapolate calm winds
RMAX1	6	None	MAX radius of influence over land in layer 1 (km)
RMAX2	7	None	MAX radius of influence over land aloft (km)
R1	0.1	None	Distance (km) where OBS wt = IGF wt in layer 1
R2	0.1	None	Distance (km) where OBS wt = IGF wt aloft

4.2.8 Meteorological Data Analysis

Observed 2017 BOM surface data was compared with longer-term climate (2013 – 2017) from YSTW to gauge how representative and suitable the year is for air quality dispersion modelling. The annual wind roses (**Figure 4.3** and **Figure 4.4**) show very good agreement. The reported annual frequency of calms (< 0.5 m/s) was at 3.5% and 3.2% respectively and very light winds (0.5 – 2 m/s) occurred 22.1% and 22.8% of the time – a total frequency of 25.6% and 26.0% respectively.

The modelled meteorological surface data (**Figure 4.5**) was extracted from the nearest grid point to the YSTW location for comparison with the observed readings. The annual wind roses show acceptable correlations except for overprediction of winds from the south-south-easterly direction (20.6% compared with 15.6% recent climate) and underpredicted south-easterly direction (9.1% versus 15.5%). There was an overprediction of modelled annual frequency of calms at 4.4% and very light winds at 35.8% - a total of 40.2% (over predicted by 11 percentage points). This would have a conservative effect on the modelling, that is a positive bias towards the extent and magnitude of odour concentration projections, especially north-north-westwards from Oakburn PRP.

The monthly average (**Figure 4.6**) show that January and February were warmer in 2017 than usual, and April, July and November were cooler than the longer-term climate. The diurnal temperature (**Figure 4.7**) profile showed good agreement, but there are slightly warmer daytime temperatures indicated for 2017 than the longer-term climate. Diurnal mixing heights and stability class frequencies are shown in **Figure 4.8** and **Figure 4.9,** respectively. Poor for odour dispersion is stable calm night-time conditions, represented within the F-class, occurring 35.9% of the hours during 2017.

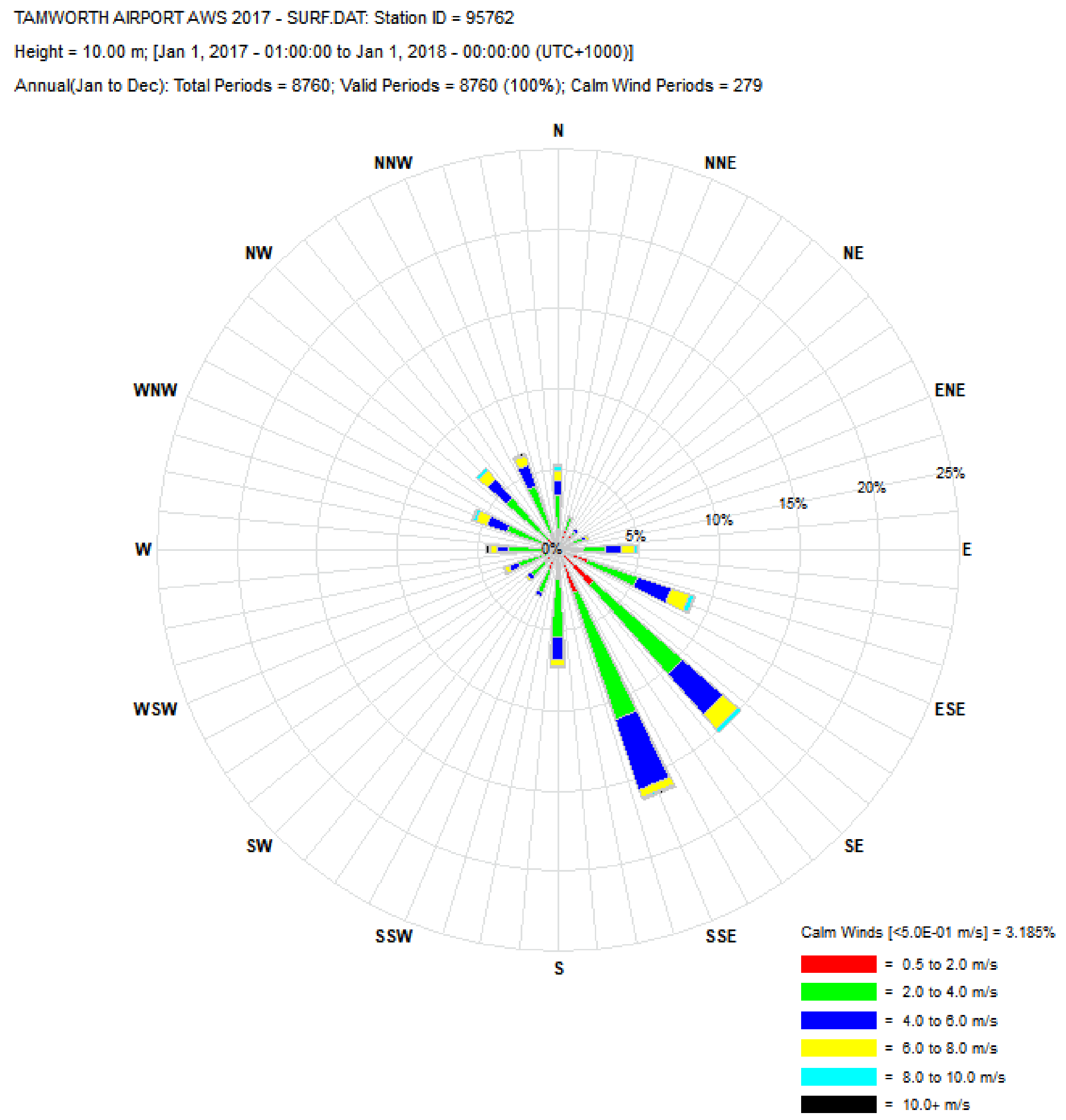


Figure 4.3 – Annual wind rose for YSTW 2017

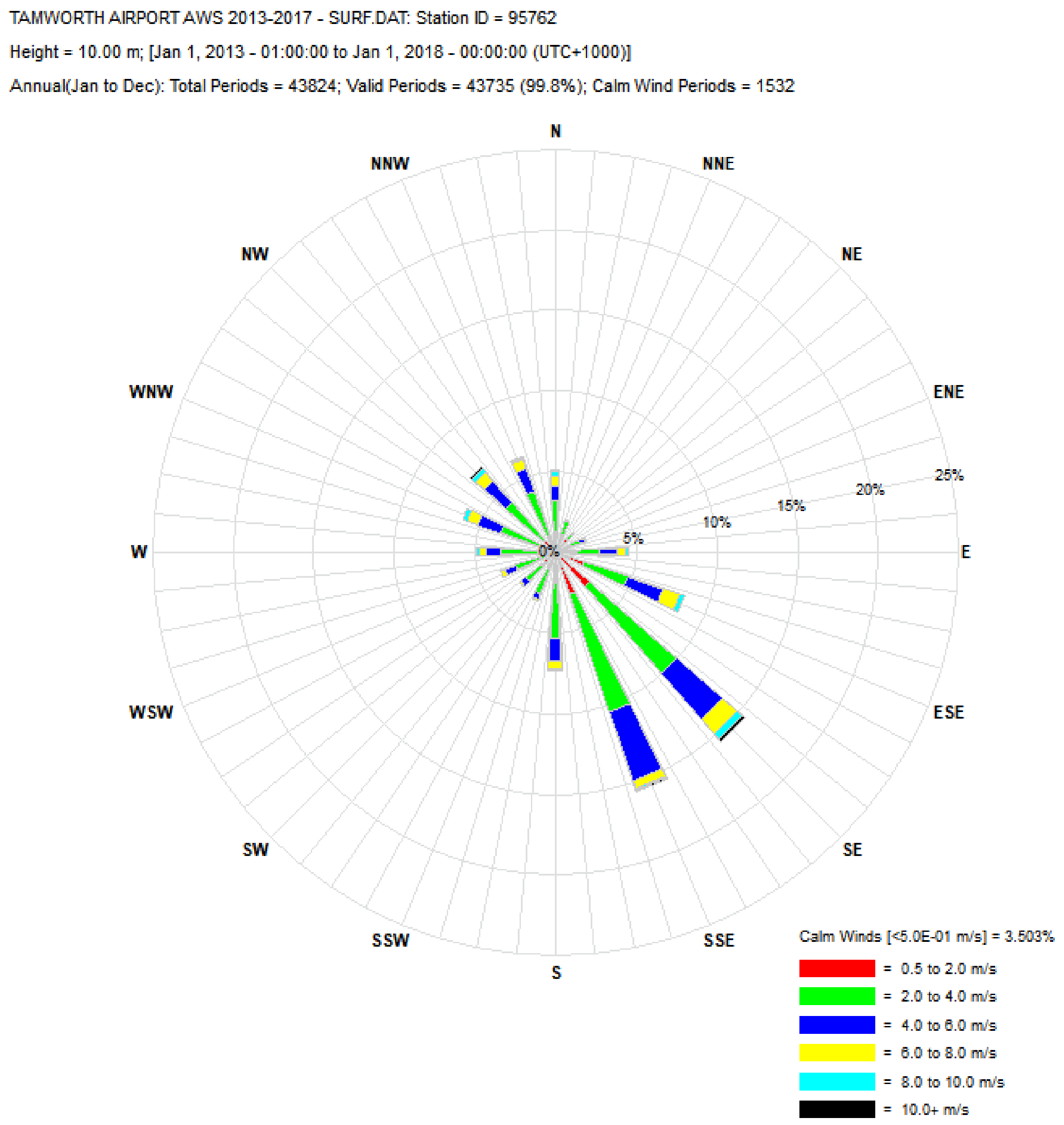


Figure 4.4 – Annual wind rose for YSTW 2013-2017

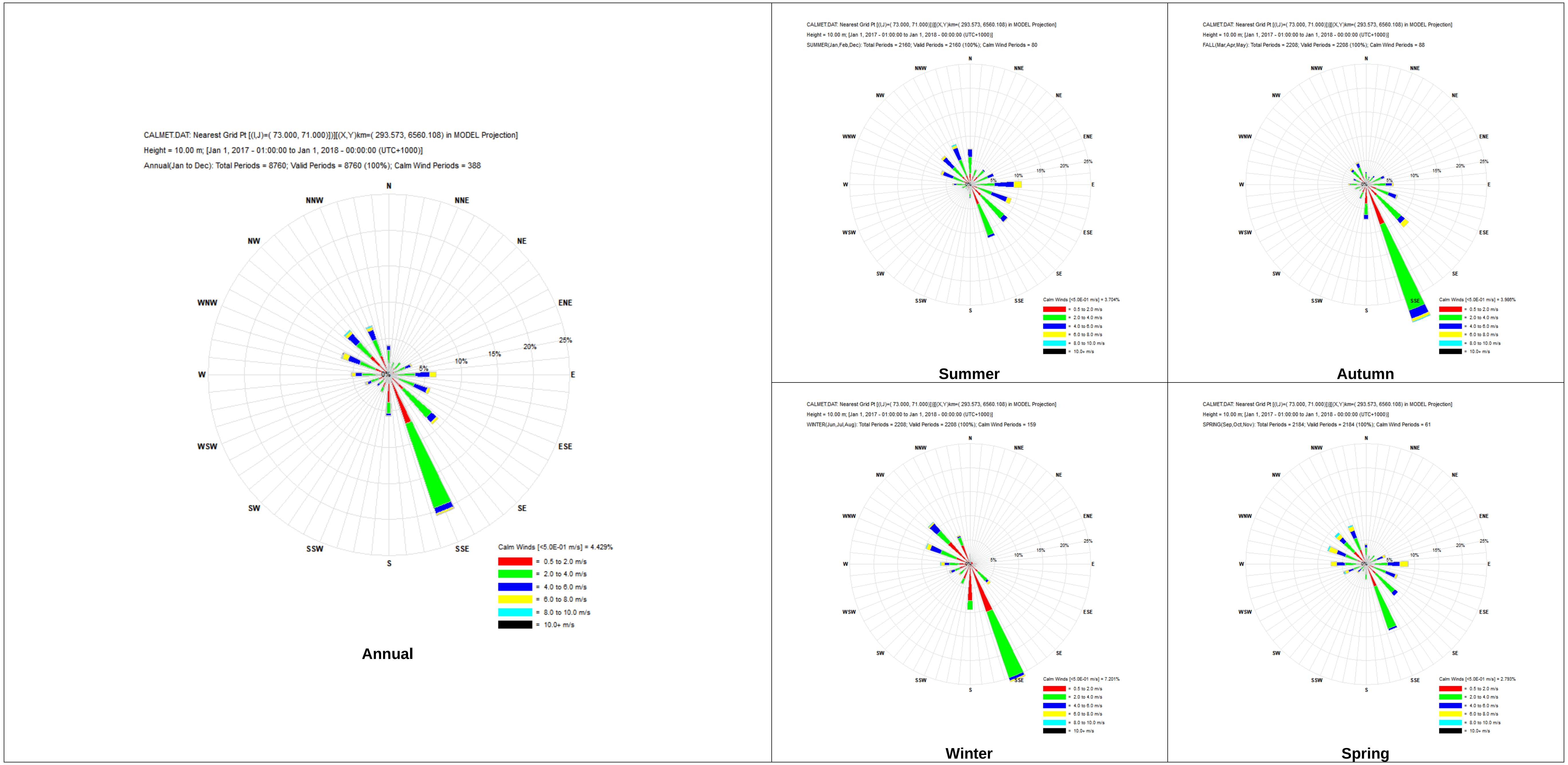


Figure 4.5 – Annual wind rose for nearest CALMET grid point to YSTW

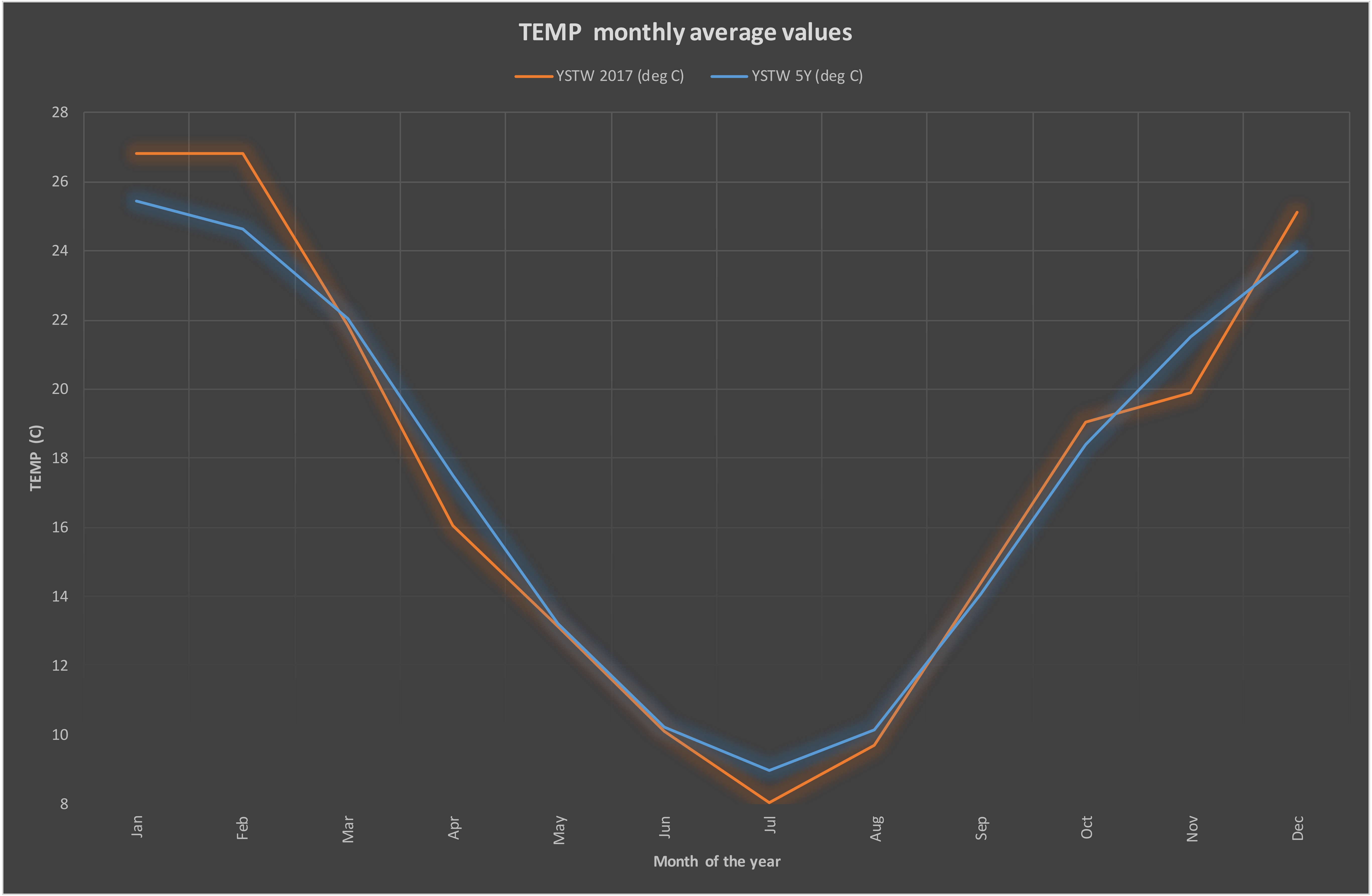


Figure 4.6 – Monthly average temperatures for YSTW 2017 and recent 5-years

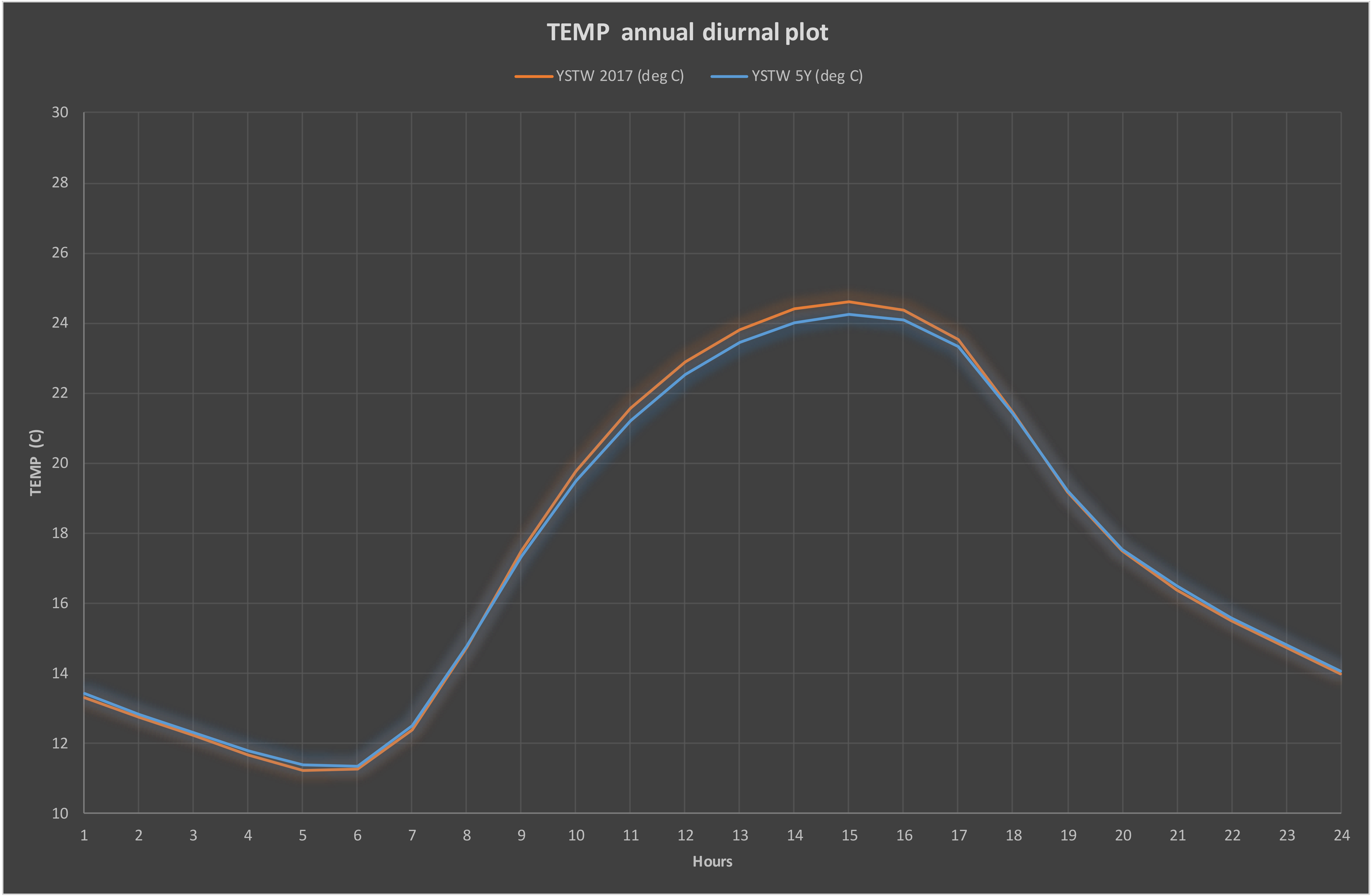


Figure 4.7 – Annual diurnal temperature for YSTW 2017 and 5-years

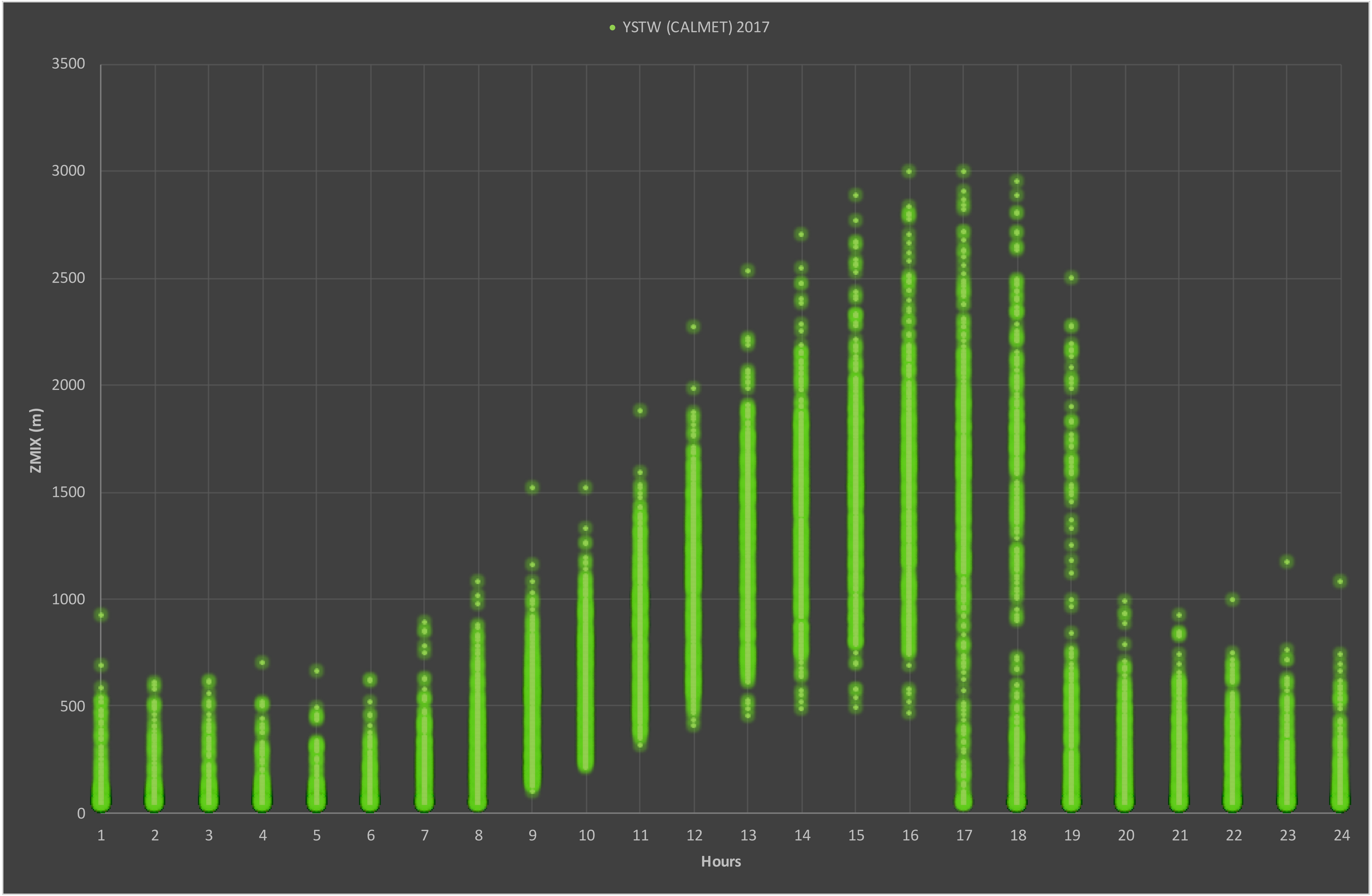


Figure 4.8 – Annual X-Y scatter plot diurnal mixing height for YSTW (CALMET) 2017

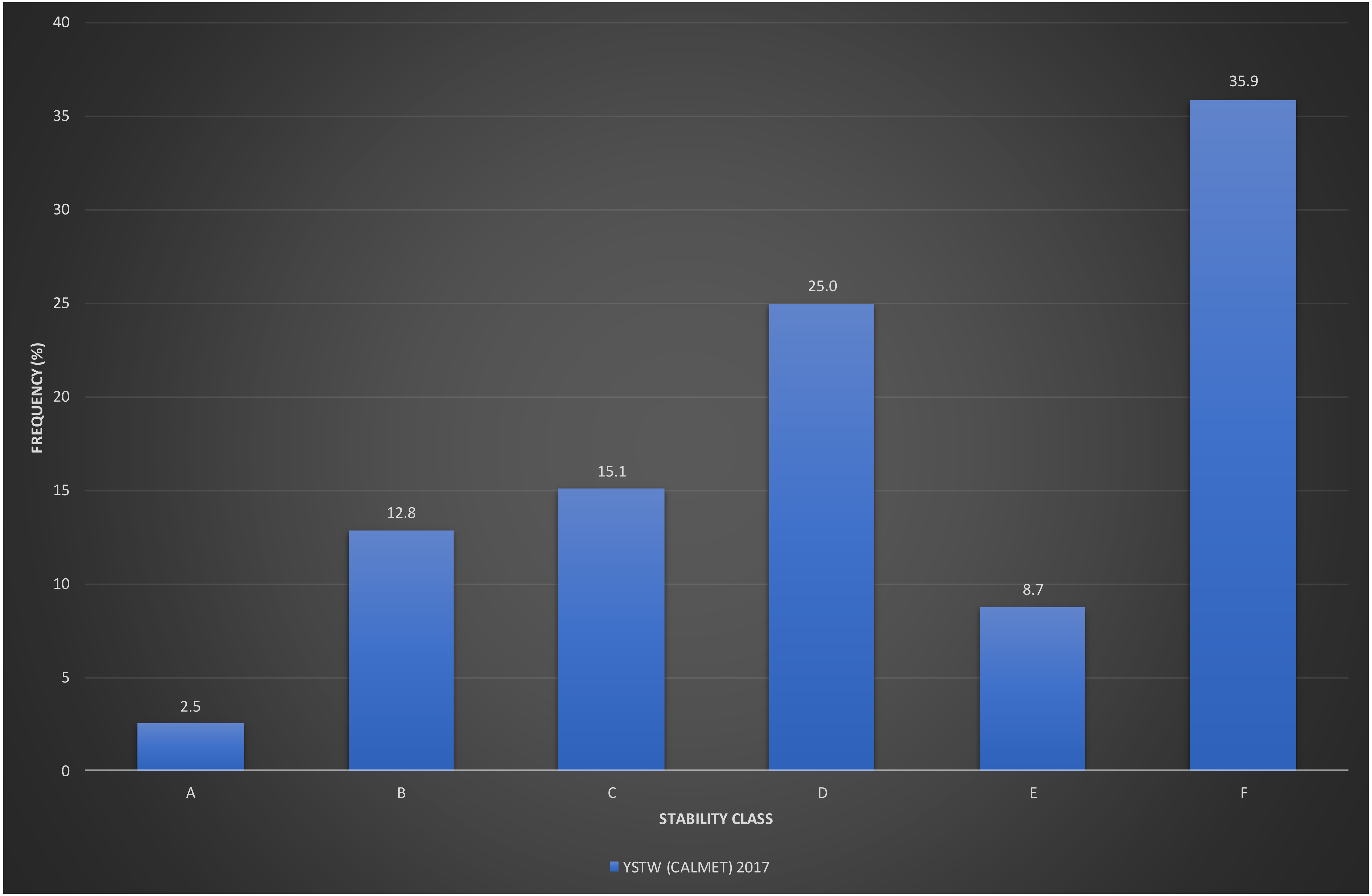


Figure 4.9 – Annual stability class frequency for YSTW (CALMET) 2017

4.2.9 CALPUFF Computational Domain and Receptor Configuration

The computational domain was set at 10 km by 10 km centred over Oakburn PRP. A receptor grid was created with a 4.4 km by 4.4 km by 0.05 km spacing centred over Oakburn PRP.

For the ancillary childcare centre, the 99th percentile odour concentrations were obtained from its location for both 24 hours per day operation and 14 hours per day operation (nominally from 5 am to 7 pm).

4.2.10 CALPUFF Source and Emission Configuration

Full odour source and emission configurations are available upon request.

4.2.11 CALPUFF Model Options

CALPUFF default model options were set except for the following as recommended in *Table A*-4 contained and explained within *Barclay & Scire, 2011*:

- Dispersion coefficients (MDISP) = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (2);
- Probability Density Function used for dispersion under convective conditions (MPDF) = Yes (1); and
- Minimum turbulence velocities sigma v for each stability class over land and water (SVMIN) = 0.2 m/s for A, B, C, D, E, F (0.200, 0.200, …, 0.200).

Further model configurations are available upon request.

4.3 ODOUR DISPERSION MODELLING SCENARIOS

The odour dispersion modelling scenario undertaken in the OIA are as follows:

- **Scenario 1** – Projected 5 ou (99%, 1-second) impact from all existing and proposed sources; and
- **Scenario 2** – Sensitivity Analysis: Cumulative odour effects from Oakburn and Bowlers Lane poultry farms.

5 ODOUR DISPERSION MODELLING RESULTS

5.1 ODOUR IAC

The procedure prescribed by NSW EPA during the notification phase of the proposed PPF to calculate the Odour IAC has been considered, namely:

> *"The AQR needs to be revised to include a 2 OU contour. The odour assessment criteria must then be based on the population within that 2 OU contour, including maximum capacity of the childcare centre. The maximum capacity of the Tamworth Regional Airport should be considered if it falls within the 2 OU contour."*

The predicted 2.0 ou (99%, P/M60) contour for the has been plotted in **Figure 5.1** It can be seen that the sensitive residences along Wallamore Road there were identified in the preliminary stages are not within the 2.0 ou contour and therefore unaffected according to NSW EPA procedure. The single rural residence to the north along Bowlers Lane is understood to be owned by TRC and will be removed and redeveloped into a compatible land use for the Westdale primary industry precinct. The remainder of the affected land uses intended for primary industry (i.e. agricultural/industrial) or non-passenger aviation, which are considered compatible.

The perceived sensitivity of the ancillary childcare centre to odour from the proposed PPF is debateable. Based upon the context and function of the proposal (i.e. employee family welfare), community expectations and recommended odour risk reduction measures for the ancillary childcare centre as part of an OMP, the residual odour annoyance risk at this location could be reduced significantly compared with a nearby stand-alone childcare facility without the recommended odour risk reduction measures implemented and having no commercial or functional relationship with Baiada.

Therefore, with all things considered including the history of IACs used for previous odour assessments for industries around the Westdale primary industry precinct, TOU considers that maintaining an odour IAC 5.0 ou (99%, P/M60) is the most appropriate and reasonable approach for this OIA and the proposed PPF.

5.2 RESULTS

The results in **Figure 5.1** reflect all sources at the 5.0 ou contour (99%, P/M60), specifically:

- Yellow contour – Proposed PPF including LBR and processing lines ventilation;
- Blue contour – Operational PRP WWTP and Proposed PPF WWTP sources;
- Red contour – Existing PRP fugitive and biofilter sources;
- White contour – All Oakburn (PRP, PPF and WWTP sources) combined;
- Dashed white contour – All PRP, PPF and WWTP sources combined (2 ou contour); and

- The results for the ancillary childcare centre location are shown in **Table 5.1** below. It should be noted the results do not consider the recommended odour risk reduction measures documented as part of the OMP for the proposed PPF, which is not quantifiable by odour dispersion modelling.

Table 5.1 – Projected ground level concentration at onsite childcare centre

UTM east coordinate (km)	UTM north coordinate (km)	24 hours operation (ou, 99%, P/M60)	5am to 7pm operation (ou, 99%, P/M60)
293.873	6560.858	9.2	7.0

The results in **Figure 3.2** reflects a sensitivity analysis for the 5.0 ou contour (99%, P/M60), where the cumulative odour effects are considered from Bowlers Lane poultry farms, namely:

- Solid white contour – All Oakburn site sources combined;
- Dashed yellow contour – Contribution from the LBR;
- Solid orange contour – Bowlers Lane Poultry Farms;
- Dashed contour – Cumulative effect of Oakburn site sources and poultry farms;
- It should be noted that the prediction of cumulative effects shown is almost certainly overstated as it considers all Oakburn sources including treated odours (e.g. biofilter, etc.) and odours of different characters (e.g. rendering, wastewater, etc.) that do not combine in the atmosphere and tend to be observed as individually identifiable odour characters in the field (as previously outlined in **Section 3.4**); and
- A more realistic analysis consistent with TOU's expectations of odour impact risk would consider the cumulative effect of the poultry farm (orange) contour with the LBR (dashed yellow) contour that has a similar live bird odour character.

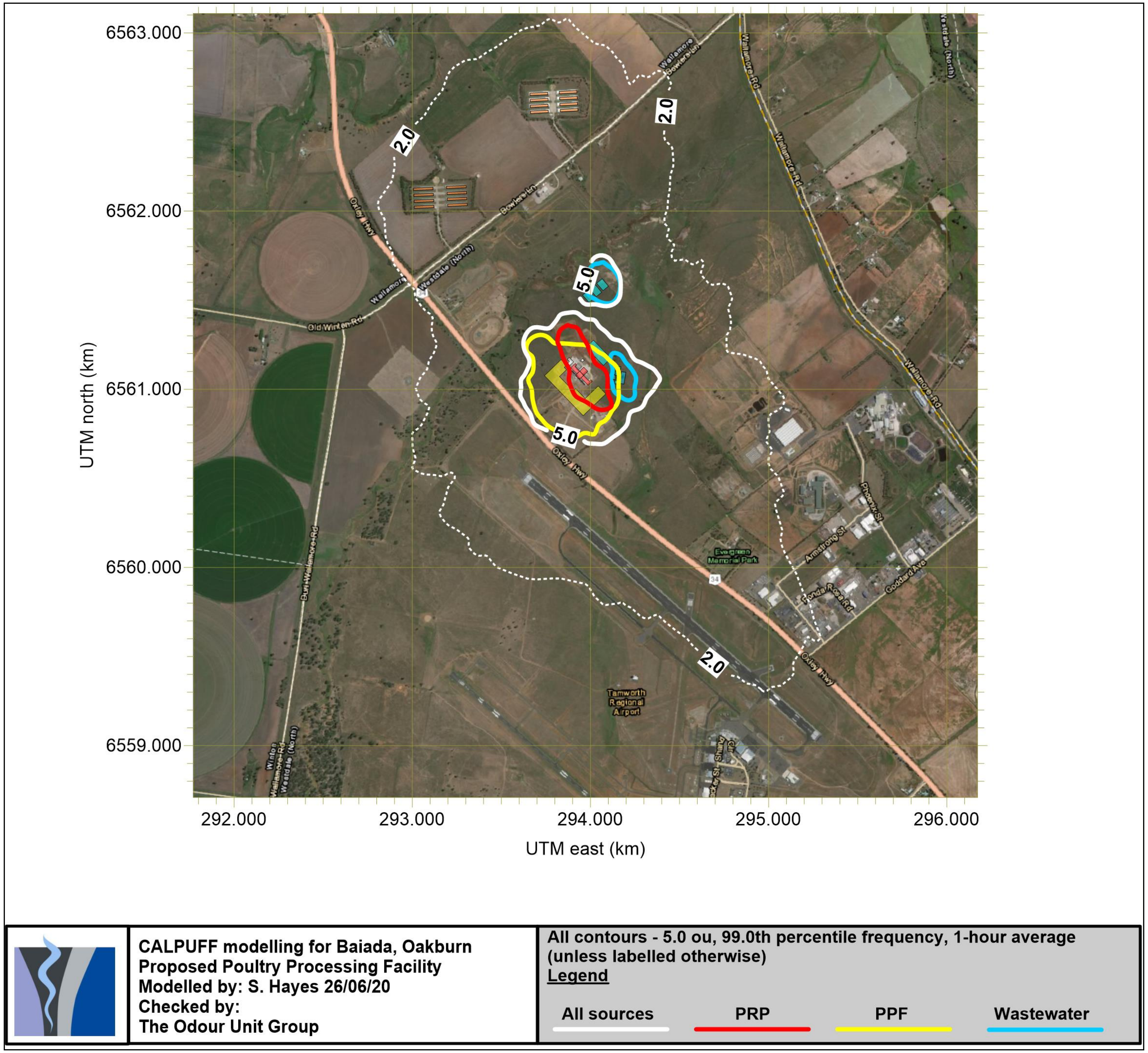
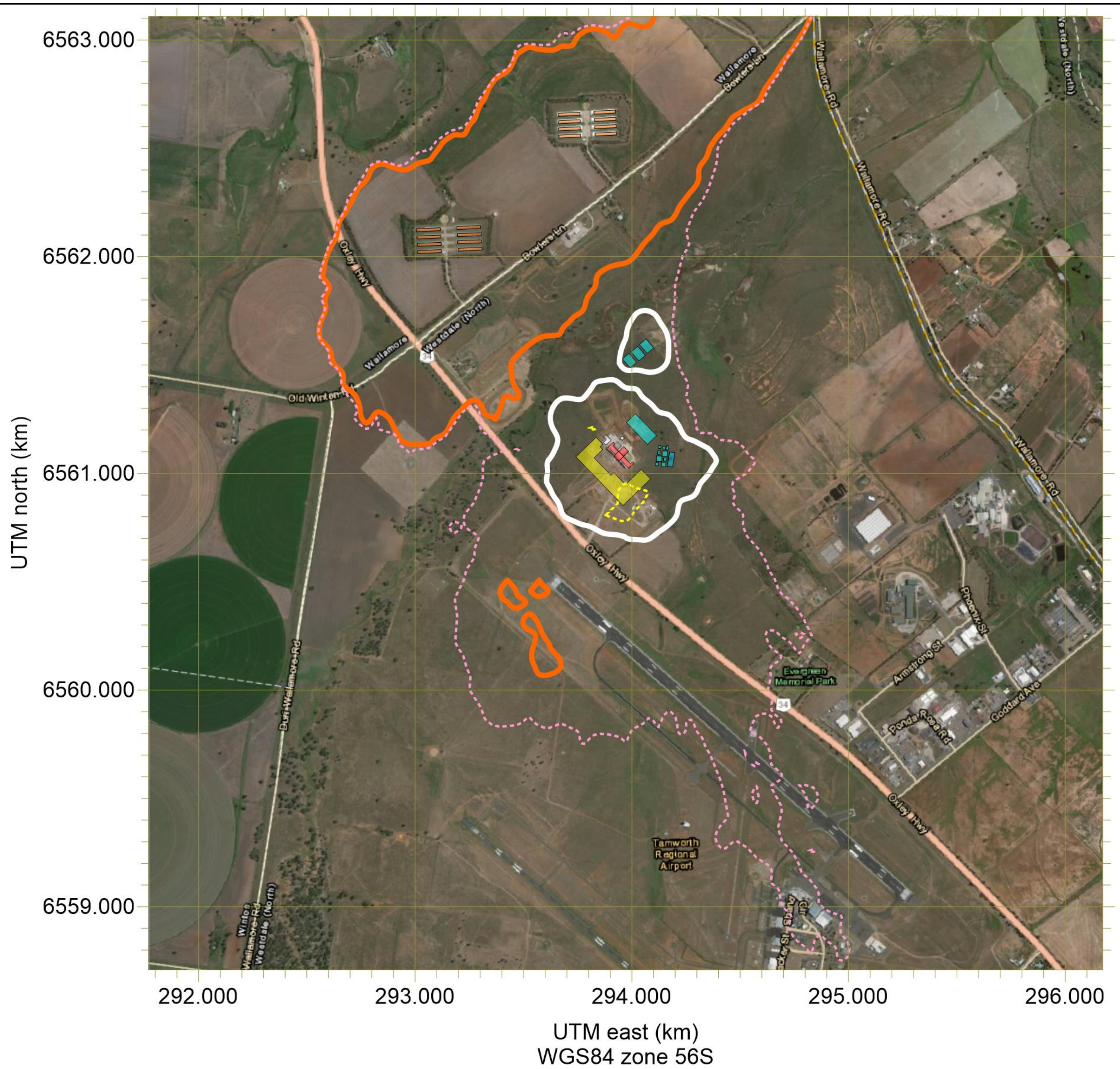


Figure 5.1 – Predicted ground level odour concentration – All sources



CALPUFF modelling for Baiada, Oakburn **Proposed Poultry Processing Facility** **Modelled by: S. Hayes 26/06/20** **Checked by:** **The Odour Unit Group**	**All contours - 5.0 ou, 99.0th percentile frequency, 1-hour average** **Legend** **All Sources** **Live Bird Reception** **Poultry Farms** **Cumulative**

Figure 5.2 – Predicted ground level odour concentration – Sensitivity Analysis

6 FINDINGS, COMMENTARY AND CONCLUSIONS

The following section documents the findings and conclusions from the odour modelling process undertaken in the OIA for the proposed PPF. It should be read in conjunction with the modelling results provided in **Section 5**. Moreover, this section also outlines and discuss the odour mitigation measures and management practices that will be implemented at the proposed PPF to minimise, management and/or prevent odour emission release from all key activities, both under normal and abnormal operating conditions, such that the modelled predictions and findings in the OIA are realised in practice upon commissioning of the proposed PPF activities.

6.1 ODOUR MODELLING FINDINGS

The odour dispersion modelling assessment was carried out using the CALPUFF Modelling System with use of odour emissions estimates based upon measurements collected by TOU at Oakburn PRP, Baiada Hanwood Processing Plant and at the Out Street, Tamworth abattoir. All Oakburn odour sources have been assessed as a combined impact and separately grouped by origin: PRP, PPF and WWTP (i.e. inclusive of the AWTP). The odour impact from the PRP biofilters was included for conservatism despite being a treated emission.

It should be noted that the meteorology developed for the modelling overpredicted calm and light wind conditions, particularly from the south-south-westerly direction. This would have a conservative effect on the results, that is overpredicting the extent and magnitude of odour concentration projections, especially north-north-westwards from the PPF site.

It is found that the addition of the proposed PPF modelled alone shows that the predicted odour impact does not largely exceed the NSW EPA odour IAC of 5 ou beyond the Oakburn site boundary as shown in **Figure 5.1**. The results show that the predicted odour impact for PRP and PPF WWTPs is below the NSW EPA odour IAC under the assumption that SBR night-time filling would be avoided and the PTB is mechanically ventilated by roof fans.

Overall, the results are below the odour IAC at the nearest sensitive receptor. The cumulative 5 ou contour encroaches beyond the site boundary marginally to the north and marginally to the south. Therefore, it has been found that the proposed PPF is unlikely to cause adverse odour impacts under normal conditions within the assumptions made for this assessment.

6.1.1 Childcare Findings

The results for the proposed childcare centre show that for both a 24 hour per day operation and a long-day operation, the odour IAC is predicted to be exceeded. The perceived sensitivity of the ancillary childcare centre to odour from the proposed PPF is debateable. Based upon the context and function of the proposal (i.e. employee family welfare), community expectations and recommended odour risk reduction measures for the ancillary childcare centre as part of an OMP, the residual odour annoyance risk at this location could be reduced significantly compared with a nearby stand-alone childcare facility without the recommended odour risk reduction measures implemented and having no commercial or functional relationship with Baiada. With due consideration to the information provided associated OMP, the residual odour impact risk rating for the ancillary childcare is considered to be low.

6.1.2 Sensitivity Analysis

The sensitivity analysis scenario, which assessed the cumulative odour effects from the proposed PPF with three poultry farms located to the northwest, demonstrates that there the model is sensitive to the presence of these sources. However, prediction of cumulative effects shown in **Figure 5.2** is almost certainly overstated as it considers all Oakburn sources including treated odours (e.g. biofilter, etc.) and odours of different characters (e.g. rendering, wastewater, etc.) that do not combine in the atmosphere and tend to be observed as individually identifiable odour characters in the field (as previously outlined in **Section 3.4**).

6.2 COMMENTARY ON ODOUR EMISSION RISKS AND MANAGEMENT

In operating the proposed PPF, there are several mitigation measures and management practices, both preventative and remedial, that will be incorporated into the Standard Operating Procedures (**SOPs**) upon commissioning and handover by the principal contractor to Baiada. These SOPs will be managed through Baiada's operational management system for the PPF and reference is to be made to these as required. The details contained in the SOPs will be included in an updated version of the existing OMP. With this in mind, the following section provides a detailed commentary on the odour emission risks posed by the process operations to be conducted at the proposed PPF and corresponding hierarchy of controls designed to minimise, management and/or prevent odour emission release, both under normal and abnormal operating conditions, such that the modelled predictions and findings in the OIA can be realised in practice.

6.2.1 Processing Lines 1 and 2

The odour management protocol adopted for the various processing area of the PPF is the use of a dilution and dispersion system that offers multiple levels of control that facilitate an integrated solution for emission control on Processing Lines 1 and 2, namely:

- Containment of odour within the PPF building spaces using a network of internal doors and extensive building ventilation air extraction system. The fan rate will be set to achieve the proposed extraction rate of 15 air changes per hour, although this may be varied to fit operational circumstances;

- A high air exchange rate within each of the processing area, which is a measure of the fresh air volume added to and removed from a building space over a specific time interval (dimensionally analysed on a per hour basis). This promotes good mixing properties within the building airspace, stabilises heat loads within the processing area, and provides the capability of achieving a comfortable environment for both operators and live birds. In turn, this air exchange phenomena leads to the minimises odour concentration levels within the building air space via a well-ventilated flux through the area;

- When air transports an odour from the source, dispersion and dilution of the odour is a feature of this phenomena. This results in a declining odour concentration with increasing distance downwind of the source. This reduction in odour concentration depends on the atmospheric stability. For this reason, an enhanced plume dispersion of the exhaust air from the processing areas via roof exhaust fans is selected for the PPF. As documented in the OIA, the design exit velocity selected for all roof exhaust fans at the PPF is 15 m/s. At this exit velocity, initial plume dispersion properties will be favourable and provide maximum plume dispersion capability; and

- Attainment of negative pressure conditions and minimisation of ground-level fugitive emission release via building leakage.

The suitability of the dilution and dispersion system on Processing Lines 1 and 2 is appropriate for the proposed PPF, given the rate of fresh material flow during normal operations, the site context and nature of operations that will be undertaken for the areas elected using this odour management protocol. This is a conventional technique in which livestock processing is conducted in Australia.

6.2.2 WWTP and AWTP

6.2.2.1 Wastewater Sources

The wastewater generated by the PPF operations originates from four key sources, as follows:

1. **Wastewater from livestock processing**: These flows are generated from the commencement of the kill until its completion. During the kill, the majority of wastewater is produced in the kill floor, offal, and chiller areas. These represent a continuous flow of wastewater. The wash down of production areas frequently occurs throughout the day to maintain adequate hygiene levels;

2. **Wastewater from washdown and kill completion**: These flows are generated when clean in place (**CIP**) activities are undertaken;

3. **Wastewater from PRP processing**: these flows are generated from by-product protein recovery, both at the LT and HT plan; and

4. **Wastewater from the OCS**: these flows are generated from the normal operation of the biofilter-based odour control system.

The odour emission risk characterisation for the above wastewater generation points are discussed in **Section 6.2.2.2**.

6.2.2.2 Wastewater Sources Odour Emission Risk Characterisation

The proposed PPF will be committed to active risk management strategy (**RMS**) to continually identify improved control and minimisation measures to ensure that the residual risks from operation of the WWTP and AWTP are as low as practicably achievable. The RMS has been developed by developing the environmental aspects and risk register for the purposed PPF. The environmental aspects and risk register for the PPF identified areas of the WWTP and AWTP that warrant management procedures and controls to reduce the uncontrolled risk to a low level. The interpretation of the risk ratings, likelihood, and the consequence are referred to in the OMP, as these will be further refined as part of the detailed design for the WWTP and AWTP.

In the context of the OIA, it is important to note that the proposed PPF will have a strong dependence on the effluent from the AWTP for its processing demand. Therefore, it will always be in the interest of the PPF to have the WWTP and AWTP operating in an optimised and steady-state capacity to minimise process disruption. This dependency will result in a heightened awareness of the WWTP and AWTP operations and, in turn, minimise the odour risks associated with the PPF wastewater treatment processes. The RMS will facilitate in achieving this performance target. The effluent characteristics from the WWTP and AWTP will be of a high-quality standard that is consistent with the guidelines provided in regularly water guidelines for food processing. As such, the OIA considers that the adequate management of wastewater will, in turn, lead to three mutually dependent outcomes:

1. Minimisation of odour emissions;

2. Discharge quality of trade waste to sewer within approved limits; and

3. Mechanical evaporation of brine with minimal risk of odour impacts (see **Section 6.2.2.2.1**).

6.2.2.2.1 AWTP Mechanical Evaporation

The reverse osmosis concentrate stream from the AWTP will be managed via an accelerated evaporation protocol with final disposal off-site as a concentrated brine. The accelerated evaporation protocol will be facilitated by a feedback loop from an in-built or on-site weather station. This protocol will be developed as part of the detailed design for the AWTP. A control system can adjust the operation to reduce or eliminate overspray by controlling droplet size and or stopping/reducing spray flow. In addition, the installation of overspray curtains or earth berm around the periphery of the pond is recommended by Hydroflux, especially with reference to the prevailing wind direction. In this instance, Hydroflux suggest that an overspray curtain should be considered, and combined with a weather-based control system.

The treated wastewater from the evaporation pond will not represent a significant source of odour emissions, given the effluent performance that will be achieved from the process. As such, no specific control to manage odour is required for this activity other than the current mechanical evaporation protocol that will be implemented by Hydroflux to manage fugitive aerosol plumes from the AWTP mechanical evaporation activities during normal operation.

The concentrated salt waste will be disposed of via a licenced disposal facility.

6.2.3 Contingency Plan

6.2.3.1 PPF Roof Ventilation Fans Contingency Plan

The performance of the roof ventilation fans for Processing Lines 1 and 2 will be monitored for operability. If there is a failure of any roof ventilation fans, a signal will be issued via the SCADA system notifying the appropriate Baiada representative. It is expected that spare parts will be readily available to ensure a quick turnaround time for remediating the failed roof fan. Moreover, it is also expected that preventative maintenance will result in a low probability of roof fan failure, as a key measure facilitating this process will be the recording of operating hours for each fan. This is achieved automatically via the SCADA system and will be readily accessible to the Baiada operator.

6.2.3.2 WWTP and AWTP

Given the dependence of the WWTP and AWTP for the uninterrupted and operational reliability of the PPF activities (as outlined in **Section 6.2.2.2**), a layer of contingency will be provided to address odour management under the following circumstances:

a. under repair;

b. undergoing maintenance;

c. being cleaned, desludged or serviced;

d. prevented from discharging to sewer/evaporation pond;

e. have restricted flows to sewer/evaporation pond; or

f. otherwise operating at less than ordinary capacity;

These circumstances will be addressed as part of the SOPs for the WWTP and AWTP as part of the detailed design and commissioning works by Hydroflux.

6.2.3.3 Power Failure

If a regional power failure occurs, then all processing will cease, and processing would recommence with the re-establishment of power connection. During this time, an odour monitoring campaign in the morning, afternoon and evening should be undertaken, corresponding with the recommencement of operation. However, power interruptions are not expected to be a common occurrence, and battery backup will be provided so essential programming is not lost.

6.2.3.4 Extreme and Unlikely Events

The risk of an extreme event with the layer of contingency for the PPF is very unlikely, and therefore, the probability of occurrence is practically negligible. As such, odour impact risks under such circumstances are extraordinary.

6.2.3.5 WWTP and AWTP Monitoring

The WWTP and AWTP will have an extensive SCADA system, which will generate a voluminous quantity of data and provide a network of feedback input for process optimisation and control. The WWTP and AWTP will be continuously supervised, with external contractors undertaking the necessary calibrations and checks as part of the service agreement for the WWTP and AWTP. All monitoring documentation, both hard and soft versions, will be managed by Baiada Environment Management System. All preventative maintenance documentation is kept with the Maintenance Division.

6.3 CONCLUDING REMARKS

Given the complexity and scale of the proposed PPF operations, a modelling based OIA is not an ideal tool to help form a contingency plan for unpredicted operational odour impacts or adequately predict the real-world impacts from measures designed to avoid, mitigate, manage and/or offset impacts (typical examples that support this position are the characteristics associated with treated quality emissions from a biofilter or aerobic wastewater treatment source, which in the OIA have been modelled and contributed to the cumulative odour impact prediction profile). These matters are best addressed by sufficient odour separation distances (i.e. odour buffers, when possible) and a site-specific OMP. A site-specific OMP is an important tool that facilitates in contextualising the modelling findings and give due consideration to the residual odour risk rating from the proposed engineered controls, monitoring and management protocols, and standard operating procedures that will support the proposed PPF operations. As such, on the basis that the proposed management practices and controls are implemented to that documented in the associated OMP, the residual odour impact risks for the proposed PPF operations will be significantly minimised to the degree that odour impacts in practice are unlikely.

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End of Document

Baiada Poultry Pty Ltd

Proposed Oakburn Poultry Processing Facility –

Odour Management Plan

Oakburn, NSW

Version 0

July 2020

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This document is the **Odour Management Plan** for the **Proposed Oakburn Poultry Processing Facility** located at **Oxley Highway, Westdale, NSW**. It may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. This document should not be used or copied without written authorisation from **Baiada Poultry Pty Ltd, The Odour Unit Pty Ltd** and **Hydroflux Industrial Pty Ltd**.

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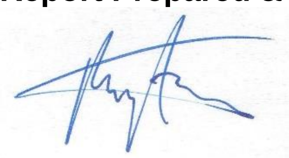
Report Prepared & Approved By:  Michael Assal B. Eng (Hon)/B.Sc, AMIChemE, MIEAust, CAQP Operations Manager, Senior Engineer & Consultant		
Report Title: Baiada Poultry Pty Ltd: Proposed Oakburn Poultry Processing Facility – Odour Management Plan – Version 0 - June 2020		

CONTENTS

FIGURES, FORM & TABLES

FIGURES

FORMS

TABLES

LIST OF ABBREVIATIONS & DEFINITIONS

AS	Australia Standards
AWTP	Advanced Water Treatment Plant
Baiada	Baiada Poultry Pty Ltd
CAL	covered anaerobic lagoon
CW	clear wells
DAF	dissolved air floatation
EPL	environment protection licence
FAOA	Field Ambient Odour Assessment
FOG	fats, oils and grease
HT	high temperature
Hydroflux	Hydroflux Industrial Pty Ltd
LRV	log reduction values
LT	low temperature
MBR	membrane bioreactor tank
NSW EPA	New South Wales Environment Protection Authority
OMP	Odour Management Plan
POEO Act	Protection of the Environment Operations Act 1997
PPF	Poultry Processing Facility
PRP	Protein Recovery Plant
RMS	risk management strategy
RO	reverse osmosis
SBR	sequencing batch reactor
SCADA	supervisory control and data acquisition
SOP	standard operating procedures

the July 2020 Report	*Baiada Poultry, Oakburn – Proposed Poultry Processing Facility Odour Impact Assessment* dated 3 July 2020
the OCS Manual	Baiada Poultry Pty Ltd – Biofilter System Operating Manual, Tamworth, NSW dated 2 April 2015
TOU	The Odour Unit Pty Ltd
WWTP	Wastewater Treatment Plant

UNITS OF MEASUREMENTS

m/s	metres per second
m^2	square metres
m^3/hr	cubic metres per hour, at standard conditions
ML	megalitres

1 INTRODUCTION

The following document is the Odour Management Plan (**OMP**) for the proposed integrated poultry processing facility (**PPF**) to be sited adjacent to the Oakburn Protein Recovery Plant (**PRP**) near Oxley Highway, Westdale, New South Wales (Lot 100 on DP1097471).

1.1 DOCUMENT CONTROL PROTOCOL

This is Version 0 of the OMP. The OMP should be regarded as a 'live' manual that is changed as required, to reflect the active practices and odour controls prevalent at the PPF. All updates/modifications to the OMP should be recorded in the *Document Revisions* table on the second page of this document, approved by Baiada Poultry Pty Ltd (**Baiada**) and TOU. Given that the OMP has been prepared in advance to the detailed design, construction and commissioning of the PPF operations, this OMP is subject to variations and updates following optimisation and attainment of steady-state conditions (see **Section 7**).

1.2 RELEVANT DOCUMENTATION

The OMP has been prepared by The Odour Unit Pty Ltd (**TOU**) to supplement the odour modelling assessment study conducted for the PPF. As such, the OMP should be read in conjunction with the corresponding report titled *Baiada Poultry, Oakburn – Proposed Poultry Processing Facility Odour Impact Assessment* dated 3 July 2020 (**the July 2020 Report**).

1.3 RELEVANT BACKGROUND AND SITE CONTEXT

The intent of the proposed PPF is to replace the existing abattoir operations located at Out Street, Tamworth, New South Wales. In conjunction with the July 2020 Report, the aim of the OMP is to identify and characterise all potential odour impacts of the proposed PPF and required level of measures to avoid, mitigate, manage and/or offset impacts.

1.3.1 Site Context and Surroundings

An aerial map of the PPF and its surroundings is shown in **Figure 1.1**. From an odour viewpoint, the surrounding features of interest to the proposed PPF include:

- Oakburn Park Raceway;
- Tamworth Regional Livestock Exchange;
- Tamworth Regional Airport;
- Sensitive places including eleven dwellings along Wallamore Road and Bowlers Lane;
- The dwelling on Bowlers Lane is understood to be owned by Tamworth Regional Council and will be removed as part of the proposed PPF; and
- The other land uses include beef processing, lamb processing, poultry farming, flour milling and a cemetery-crematorium.

The near-field topography surrounding the PPF could be described as a flat rural floodplain. Further afield there is a slightly elevated ridgeline that runs along Bowlers Lane from the north to the southwest. The Peel River valley is to the northeast.

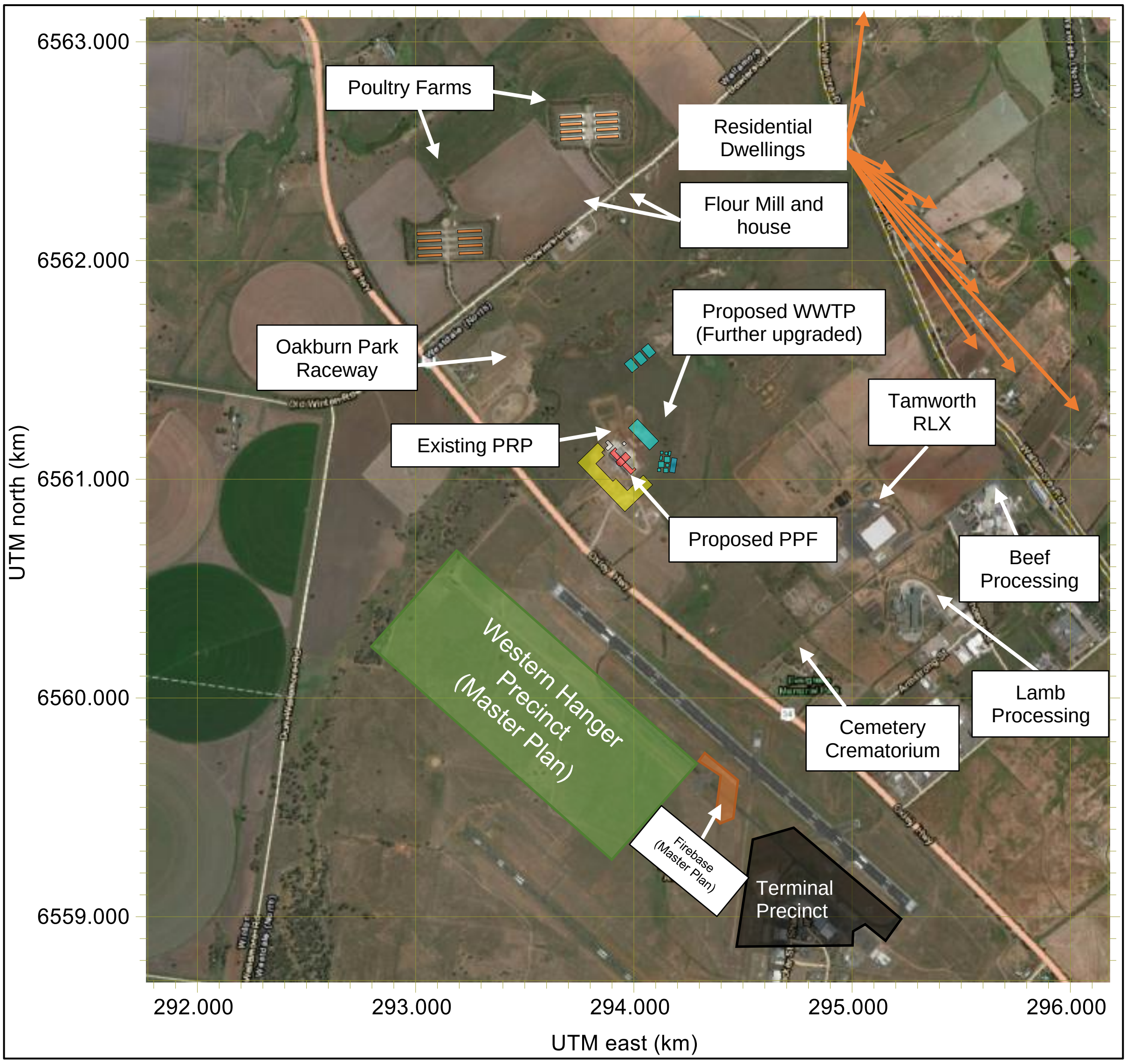


Figure 1.1 – Proposed PPF location, context and surrounds

1.4 PURPOSE OF THIS ODOUR MANAGEMENT PLAN

The OMP is a documented operational management system for the PPF detailing:

1. Proposed activities for approval by the New South Wales Environment Protection Authority (**NSW EPA**);

2. Preliminary standard operating procedures (**SOP**) employed in each key process area to anticipate the formation of odour, and minimise their release to the extent that adverse odour is very likely;

3. An outline of how the production and migration of odour is minimised, including design (where applicable) and operational practices;

4. The monitoring and control protocols required to assist in the management of odour;
5. Critical odour emissions risk and control points;
6. A description of the wastewater management system and its operation in the context of odour emissions and management, noting that this is a significant feature of the PPF;
7. An outline of the key staff and responsibilities with respect to odour management, including:
    a. Chief Operating Officer;
    b. Plant Manager; and
    c. Environment Manager.
8. An outline of the reporting requirements with respect to odour; and

Put simply, the sole purpose of the OMP is to eliminate, prevent or minimise the potential for odour generation at the PPF through a hierarchy of controls, in the form of, but not limited to, engineered, administration and/or management practices, as illustrated in **Figure 1.2**. The OMP seeks to find a practical balance between maintaining the quality and efficiency of process operations and the ability to control odour emission generation.

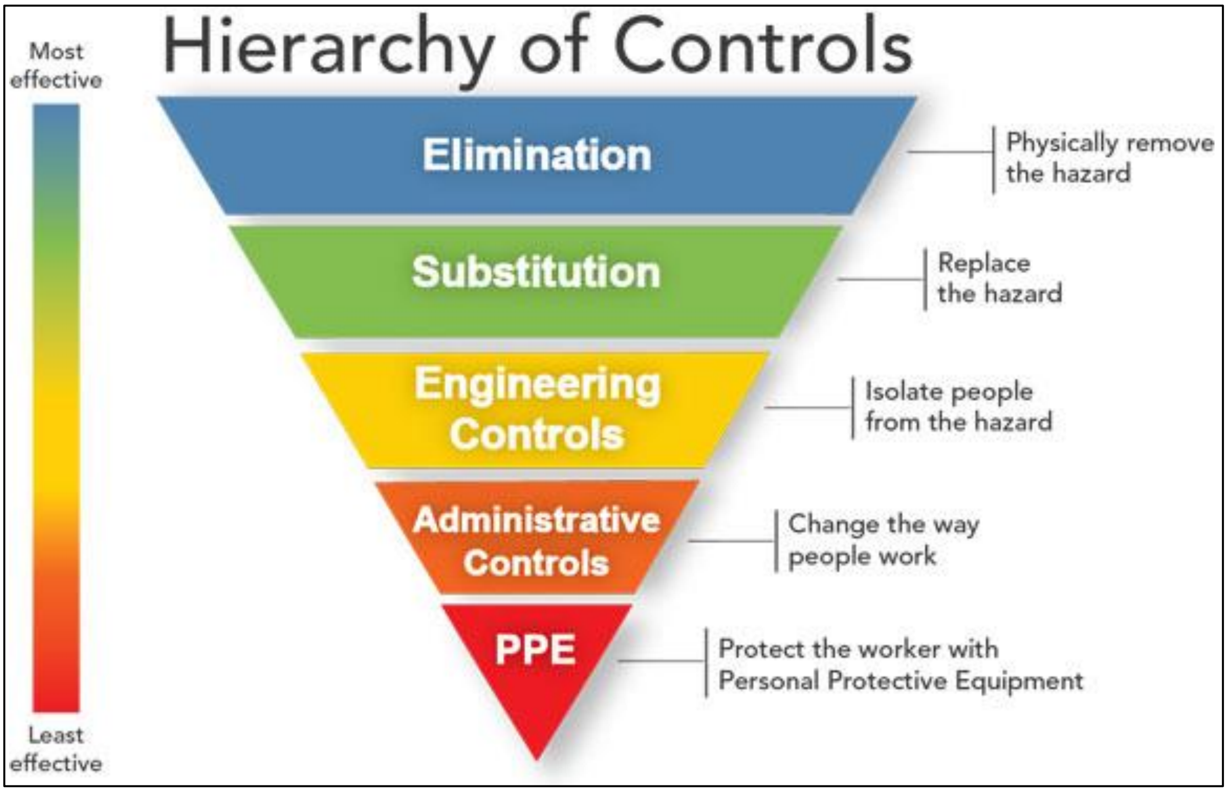


Figure 1.2 - Hierarchy of controls for the proposed PPF

1.4.1 Exclusions

The OMP is specific to the PPF operations and does **not** include or address the operations relating to the PRP to any significant detail, other than the interaction between the PPF and PRP and its relationship to odour management. The PRP operations are covered by existing documentation not relevant to the proposed PPF operations.

1.5 STATEMENT OF COMMITMENTS

The OMP is developed to fulfil the relevant legal and regulatory requirement, namely:

> *Protection of the Environment Operations Act 1997 No 156 – Section 129 Emission of odours from premises licensed for scheduled activities*
>
> *(1) The occupier of any premises at which scheduled activities are carried on under the authority conferred by a licence must not cause or permit the emission of any offensive odour from the premises to which the licence applies.*
>
> *(2) It is a defence in proceedings against a person for an offence against this section if the person establishes that—*
>
> > *(a) the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of the licence directed at minimising the odour, or*
> >
> > *(b) the only persons affected by the odour were persons engaged in the management or operation of the premises.*
>
> *(3) A person who contravenes this section is guilty of an offence.*

1.6 ENVIRONMENT PROTECTION LICENCE CONDITIONS

The operations being undertaken at the will be governed by a separate Environment Protection Licence yet to be finalised and issued by NSW EPA. A copy of the EPL will be made available in electronic form the following web address:

https://apps.epa.nsw.gov.au/prpoeoapp/

1.7 PROPOSED LICENCED ACTIVITIES

At the time of writing this OMP, Baiada was obtaining regulatory approval for the PPF that will enable the processing capability of up to three million live birds per week, an on-site wastewater treatment, recovery and recycling facility, and the corresponding increase yield in protein recovery utilising the existing PRP achieved via optimisation of operational hours.

The process operations for the PPF and associated areas are described in **Section 2**.

2 DESCRIPTION OF PROCESS OPERATIONS

2.1 SITE DESCRIPTION AND LAYOUT

A view of the PPF site layout is shown in **Figure 2.1,** with a ground floor plan shown in **Figure 2.2**. As shown in **Figure 2.1**, Baiada is proposing a PPF that will consist of the following items:

- An integrated PPF consisting of:
  - 39,810 square metres (**m^2**) of gross floor area providing for live bird storage, processing, chilling, cold store and distribution facilities;
  - 1118 m^2 workshop and store building;
  - 4,848 m^2 of ancillary administration, staff amenities and childcare space;
  - Wastewater Treatment Plant (**WWTP**) and Advanced Water Treatment Plant (**AWTP**); and
  - Installation of ancillary infrastructure, landscaping and services.
- A poultry processing capability of three million birds per week;
- The realisation of operational capability at the PRP to enable the production of a maximum of 1,680 tonnes of finished product per week (240 tonnes/day, 7 days a week). As will be noted in **Section 2.2.3**, this will not require a modification to the existing equipment infrastructure but an increase to the permitted operating hours to realise this increase in yield; and
- The operational capability for all aspects of the integrated site facility to 24 hours per day, 7 days a week with no restrictions.

2.2 PROCESS FLOW DESCRIPTION

The integrated site plan for the PPF is illustrated in **Figure 2.1**. The activities will be a feature of the PPF include:

- Receival of live birds into the reception hall via trucks;
- Processing Lines 1 and 2, which consist of:
  a. Livestock preparation including stunning, shackling and kill;
  b. Scalding and de-feathering;
  c. Evisceration and inspection;
  d. Removal and transport of offal, co-products and by-products to the PRP; and

e. Processing pumps, waste staging, crate wash and chillers

- A WWTP and AWTP.

Each of the key process flow operations is described in the following sections of this OMP, respectively. The odour management protocol for these areas is described in **Section 3.2**.

2.2.1 Live Bird Receival

The live bird receival area is an enclosed building area for temporary storage prior to stunning, shackling, and killing. The ventilation rate used is 900,000 cubic metres per hour (**m^3/hr**) based upon a design factor of 10 m^3/hr per bird and a maximum capacity of 90,000 birds per hour. The actual numbers are likely to be lower and fluctuate as trucks arrive and birds are processed over time. The live birds will be typically present between 0100 hrs and 2100 hrs. Under these production times, the processing of three million birds per week will require a production rate of approximately 21,500 birds per hour over 20 hours per day, seven days per week. On this basis, the design ventilation rate is based upon a peak capacity of 90,000 birds, which will maintain a level of contingency in operational capability at the PPF.

2.2.2 Processing Lines 1 & 2

As outlined in **Figure 2.2**, there are multiple areas that will be ventilated and managed via the dilution and dispersion system for the PPF. These areas include livestock preparation including stunning, shackling and kill; scalding and de-feathering; evisceration and inspection; and removal and transport of offal, co-products and by-products to the PRP; and processing pumps, waste staging, crate wash and chillers. Each of the areas is based on an air exchange rate of 15 air changes per hour, design to lead to containment, a good level of ventilation flux, and maximisation of plume dispersion from the roof ventilation fans servicing each area. The expected odour characters from the roof ventilation fans are expected to be of a neutral character that will tend to readily dispersion and adsorption in the natural environment prior to ground level detection at sensitive receptors, including the on-site childcare centre and nearby residential dwelling. This is supported by the risk assessment process conducted by the dispersion modelling in the July 2020 Report.

The chillers do not represent a significant source of odour at the PPF and are excluded from further analysis in the OMP. This effect is due to the cool environment in which material is stored, that facilitates in Baiada providing a high standard of product quality to the consumer.

2.2.3 PRP

The PRP consists of both low temperature (**LT**) and high temperature (**HT**) rendering systems, housed at either end of the PRP building. The HT plant is located at the western end of the PRP building, with the LT plant at the eastern end. Each rendering system consists of an odour collection and biofilter-based odour control system. The PRP will service the integrated PPF operations via an increase to the capability of the operational hours to 24 hours, 7 days per week. As such, no modifications or alterations to the PRP building infrastructure are required. Accordingly, the existing biofilter-based odour control system for the PRP will be adequate for the proposed PPF operations.

The documented operational management system for the biofilter-based odour control system is outlined in a TOU report titled *Baiada Poultry Pty Ltd – Biofilter System Operating Manual, Tamworth, NSW* dated 2 April 2015 (**the OCS Manual**).

2.2.4 WWTP and AWTP

A WWTP and AWTP concept process design for the PPF was completed by Hydroflux Industrial Pty Ltd (**Hydroflux**) that proposed to treat up to 8 million litres (**ML**) of wastewater from the PPF and allow recovery for up to 7.2 ML for reuse as potable water per day. All wastewater from the PRP will be treated separately by the operational WWTP, which is designed to accommodate up to 3 million birds per week with a contingency buffer.

The PRP wastewater would continue to be screened within the PRP where it is sent to be treated in a 25 ML Covered Anaerobic Lagoon (**CAL**) before being polished in a 5 ML Sequencing Batch Reactor (**SBR**). The liquid is discharged into two 5 ML Clear Wells (**CW**) before discharge to sewer. All wastewater from the PRP is currently operational and has been designed to accommodate additional volumes associated with the PPF. The treated wastewater from the PRP based operations will continue to be discharged to the sewer.

The wastewater from the proposed PPF will be treated with primary and secondary treatment processes by the WWTP involving dissolved air floatation (**DAF**) and a membrane bioreactor (**MBR**). The 8 ML/day design is expected to contain five membrane train. The effluent from the MBR is then further treated by the AWTP for reuse at the PPF by reverse osmosis, chlorination, ultraviolet light and remineralisation processes designed to exceed reuse water quality standards set out by various authorities. The layout of the WWTP and AWTP is illustrated in **Figure 2.3**, and process flow diagram is available in **Figure 2.4**.

From an odour management perspective, the primary and secondary treatment stages of the WWTP process are considered to have a moderate risk in generating and releasing odour emissions under normal operating circumstances. The tertiary treatment process including the AWTP process units will be negligible odour emission contributors and have not been given any further consideration, as the concentrations of primary suspended solids, organics and nutrients would be significantly reduced and stabilised to a level suitable for tertiary treatment processing.

As highlighted by Hydroflux, the proposed wastewater technology for the PPF is dissolved air flotation (**DAF**) to remove fats, oils and grease (**FOG**) and suspended solids (**TSS**), followed by a membrane bioreactor (**MBR**) designed to remove organics and nutrients such as nitrogen and phosphorus to target levels. The membrane bioreactor combines the features of a conventional bioreactor, combined with the water quality of an ultrafiltration membrane. Chemical phosphorus removal will be employed in both the primary and secondary treatment with the addition of an inorganic coagulant.

2.2.4.1 Effluent Characteristic and Quality

The effluent from the MBR will then be suitable for discharge, irrigation and or further treatment for re-use.

The effluent intended for reuse will then be treated by Reverse Osmosis (**RO**) to reduce the levels of dissolved solids. Following additional treatment, the RO permeate will be suitable for reuse. The additional treatment will consist of:

- Chlorination;
- Ultraviolet light; and
- Remineralisation.

Put simply, the WWTP and AWTP system will be designed by Hydroflux to meet and exceed the reuse water quality standards, including the log reduction values (**LVR**) of pathogens, as outlined in relevance documentation, namely:

- NSW Food Authority – Water Reuse Guideline – May 2008;
- NSW Government – Management of private recycle water schemes – May 2008;
- NSW Department of Primary Industries – Recycled Water Management Systems – May 2015; and
- Australian Government – NHMRC – NRMMC – Australian Drinking Water Guidelines 6 – 2011.

A RO concentrate stream will also be produced, this stream will have a high concentration of dissolved salts and is intended to be further treated via accelerated evaporation and with final disposal off-site as a concentrated brine. On this basis, the treated wastewater from evaporation will not represent a significant source of odour emissions, based on the effluent performance parameter provided by Hydroflux. Moreover, Hydroflux has indicated that the AWTP process is proven and has been operating successfully at two poultry processing plants in Australia for over ten years, further supporting its suitability for the proposed PPF operations.

Figure 2.1 – Aerial view of the integrated PPF operations

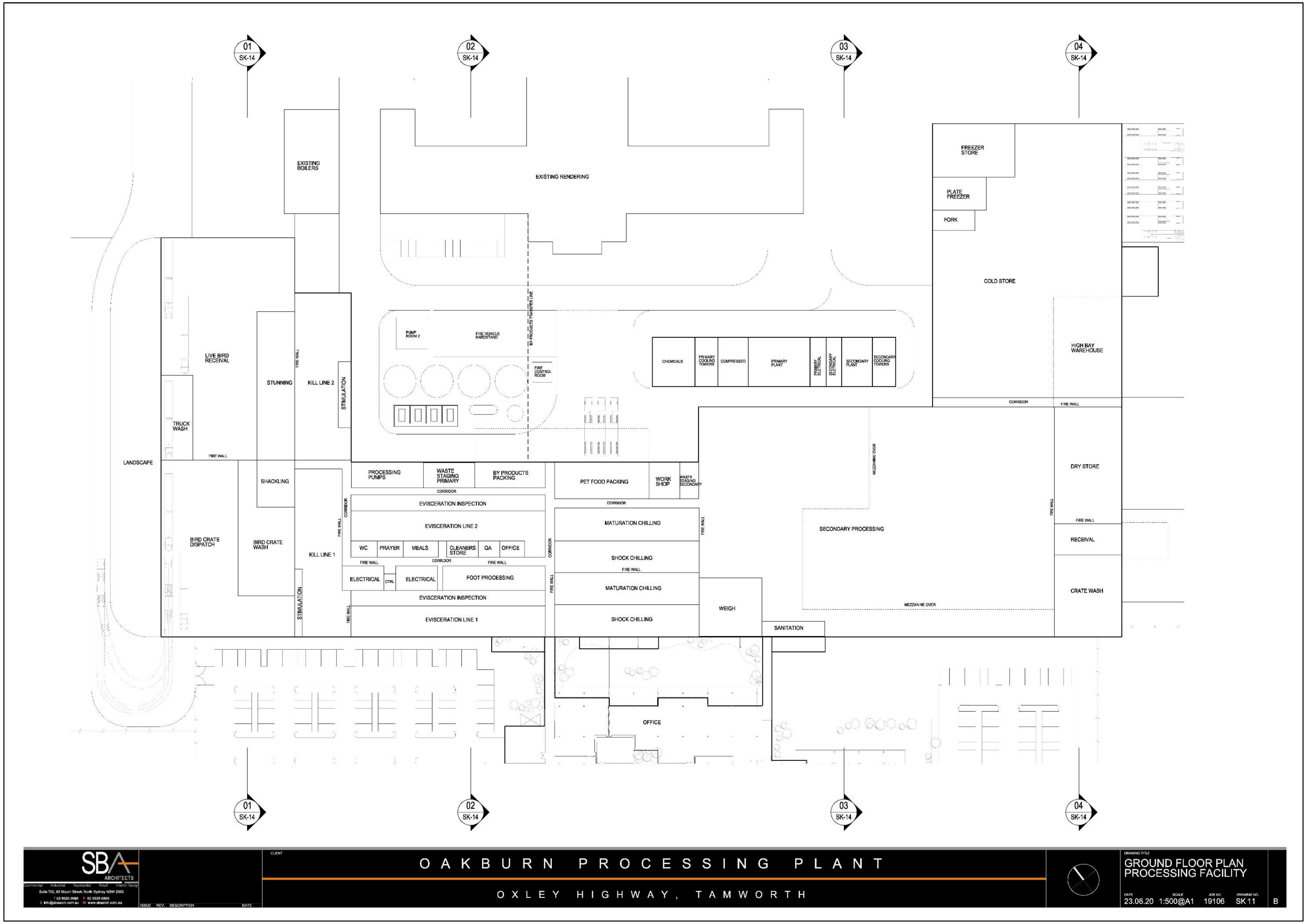


Figure 2.2 – Ground floor layout of the integrated PPF operations

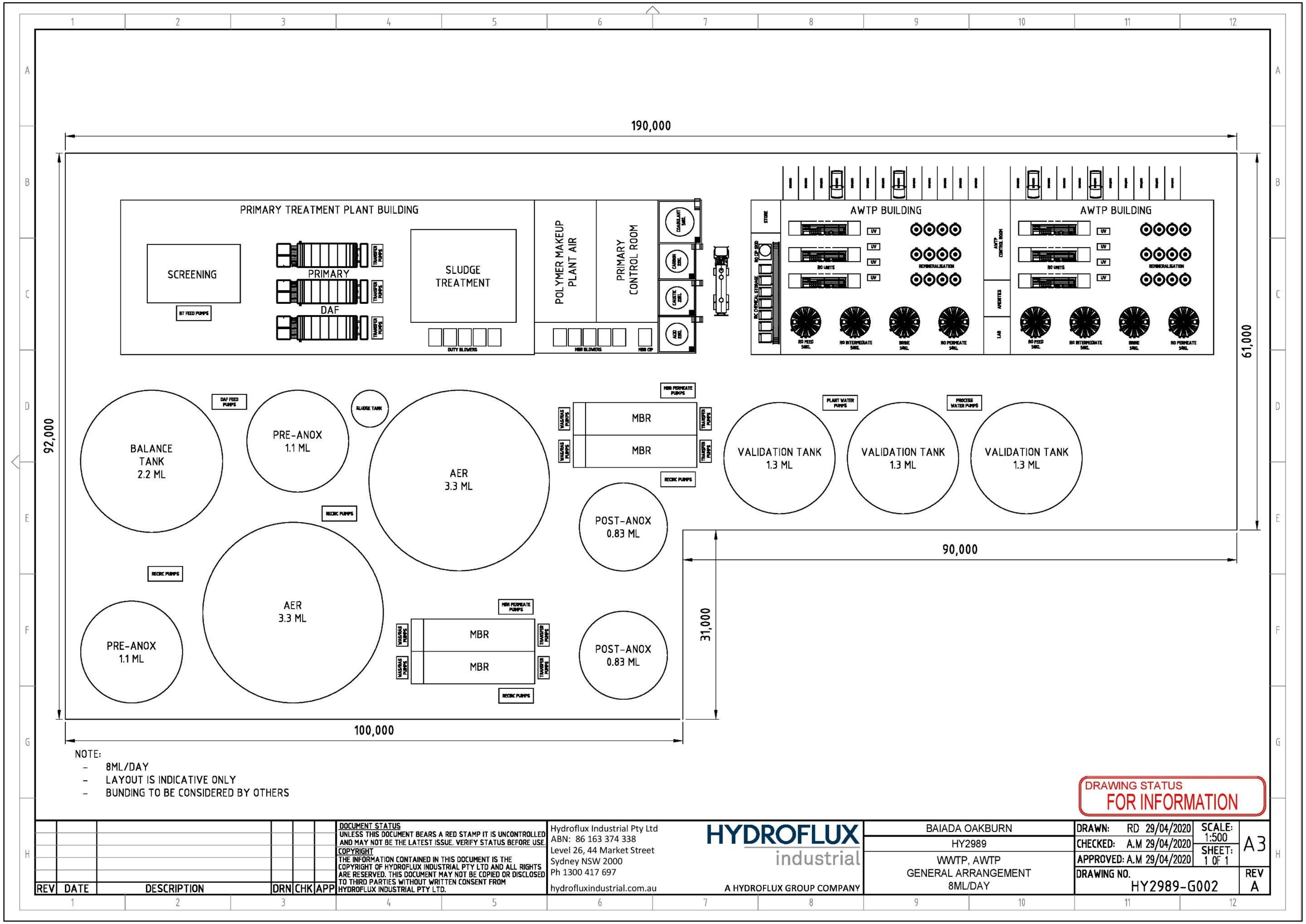
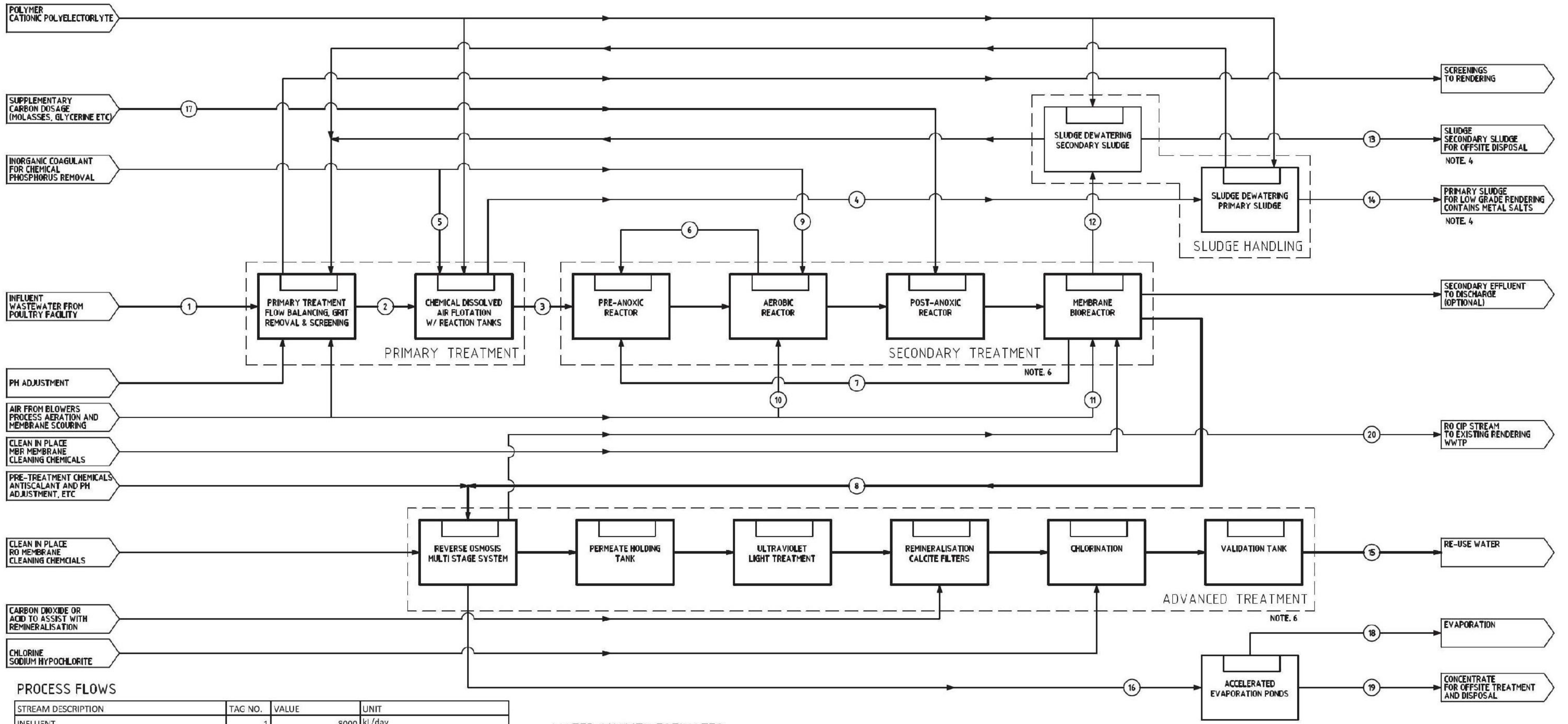


Figure 2.3 – Proposed PPF: General arrangement for the WWTP and AWTP



PROCESS FLOWS

STREAM DESCRIPTION	TAG NO.	VALUE	UNIT
INFLUENT	1	8000	kL/day
BALANCED FEED TO DAF	2	8000	kL/day
FEED TO SECONDARY TREATMENT	3	8000	kL/day
PRIMARY SLUDGE TO DEWATERING - NOTE 1	4	10502.4	kg TSS/day
COAGULANT TO DAF - NOTE. 2	5	4998.2	kg/day Ferric Chloride 42%
MIXED LIQUOR RETURN	6	32,000 - 64,000	kL/day
RETURN ACTIVATED SLUDGE	7	8000	kL/day
MEMBRANE BIOREACTOR EFFLUENT	8	7943.2	kL/day
COAGULANT TO SECONDARY TREATMENT - NOTE. 2	9	1249.6	kg/day Ferric Chloride 42%
AERATION FOR AEROBIC REACTOR	10	31960	Nm3/hr @ 620 mBar.g
AERATION FOR MEMBRANE SCOUR	11	13000	Nm3/hr @ 570 mBar.g
WASTE ACTIVATED SLUDGE - NOTE. 1	12	3077.6	kg TSS/day
DEWATERED SECONDARY SLUDGE	13	2923.7	kg TSS/day
DEWATED PRIMARY SLUDGE	14	9977.3	kg TSS/day
TREATED WATER FOR RECYCLING	15	7200	kL/day
RESERVE OSMOSIS CONCENTRATE	16	800	kL/day
SUPPLEMENTARY CARBON - NOTE 3.	17	AS REQUIRED FOR DENITRIFICATION PERFORMANCE.	
EVAPORATION OF CONCENTRATE	18	720	kL/day
CONCENTRATE POST EVAPORATION	19	80	kL/day
REVERSE OSMOSIS CIP STREAM TO EXISTING WWTP	20	40	kL/month

WATER QUALITY ESTIMATES

STREAM DESCRIPTION	TAG NO.	VOLUMETRIC FLOW	COD	BOD	TN	TKN	TP	PO4-P	TS	TSS	TDS
-	#	kL/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
INFLUENT	1	8000	3970	2380	210	210	40	36	2700	1300	1400
FEED TO SECONDARY TREATMENT	3	8000	1500	899	210	210	10	10	1600	200	1400
MEMBRANE BIOREACTOR EFFLUENT	8	8000	50	20	21	15	1	1	1405	5	1400
TREATED WATER FOR RECYCLING	15	7200	-	-	-	-	-	-	50 - 200	-	50 - 200
RESERVE OSMOSIS CONCENTRATE	16	800	250	200	210	150	312	272	13600	50	13550
CONCENTRATE POST EVAPORATION	19	80	2500	2000	2100	1500	3120	2720	136000	500	135500

NOTE. 5

NOTES:

1. PRELIMINARY CALCULATIONS SUGGEST 1,041 KG TSS IS PRECIPITATED DUE TO CHEMICAL P REMOVAL. FOR DESIGN PURPOSES IT HAS BEEN ASSUMED THAT 80% OF THIS SLUDGE IS PRODUCED DURING PRIMARY TREATMENT, WITH THE RESIDUAL PRODUCED IN THE SECONDARY TREATMENT PROCESS.
2. ESTIMATED FERRIC CHLORIDE DOSAGE IS 3,123.9 KG/DAY AS 42% SOLUTION. ASSUMPTION HAS BEEN MADE THAT THIS IS DOSED 4:1 INTO PRIMARY AND SECONDARY TREATMENT STAGES. MOLAR RATIO OF 2:1 [METAL]:[PHOSPHATE] USED FOR CALCULATIONS.
3. SUPPLEMENTARY CARBON DOSAGE MAY BE REQUIRED TO ACHIEVE TARGET TOTAL NITROGEN VALUES IN THE EFFLUENT.
4. WATER CONTENT OF DEWATERED SLUDGE HAS NOT BEEN CONSIDERED IN THE MASS BALANCE.
5. IMPACT OF CHEMICAL DOSING FOR PH CORRECTION, DISINFECTION AND CLEANING HAS NOT BEEN CONSIDERED IN THIS MASS BALANCE.
6. SECONDARY AND ADVANCED TREATMENT SPLIT INTO TWO PARALLEL TREATMENT TRAINS

Figure 2.4 - Process flow diagram of PPF WWTP and AWTP (**Source:** Hydroflux)

3 ODOUR RISK CHARACTERISATION & CONTROLS

3.1 PREAMBLE

In operating the PPF, there are several mitigation measures and management practices, both preventative and remedial, that will be incorporated into the SOPs upon commissioning and handover by the principal contractor to Baiada. These SOP will be managed through Baiada's operational management system for the PPF and referenced is to be made to these as required. As such, the following section is designed to educate the operators on the odour emission risks posed by process operations conducted at the PPF, with the view that the PPF personnel gain an adequate understanding and appreciation of the rationale behind the SOPs and its interaction with odour generation and management.

3.2 PROCESSING LINES 1 AND 2

The odour management protocol adopted for the various processing area of the PPF is the use of a dilution and dispersion system that offers multiple levels of control that facilitate an integrated solution for emission control, namely:

- Containment of odour within the PPF building spaces using a network of doors and extensive building ventilation air extraction system. The fan rate will be set to achieve the proposed extraction rate of 15 air changes per hour, although this may be varied to fit operational circumstances;

- A high air exchange rate within each of the processing area, which is a measure of the fresh air volume added to and removed from a building space over a specific time interval (dimensionally analysed on a per hour basis). This promotes good mixing properties within the building airspace, stabilises heat loads within the processing area, and provides the capability of achieving a comfortable environment for both operators and live birds. In turn, this air exchange phenomena leads to the minimises odour concentration levels within the building air space via a well-ventilated flux through the area;

- When air transports an odour from the source, dispersion and dilution of the odour is a feature of this phenomena. This results in a declining odour concentration with increasing distance downwind of the source. This reduction in odour concentration depends on the atmospheric stability. For this reason, an enhanced plume dispersion of the exhaust air from the processing areas via roof exhaust fans is selected for the PPF. As documented in the July 2020 Report, the design exit velocity selected for all roof exhaust fans at the PPF is 15 metres per second (**m/s**). At this exit velocity, initial plume dispersion properties will be favourable and provide maximum plume dispersion capability; and

- Attainment of negative pressure conditions and minimisation of ground-level fugitive emission release via building leakage.

The suitability of the dilution and dispersion system is appropriate for the PPF given the rate of fresh material flow during normal operations, the site context and nature of operations that will be undertaken for the areas elected using this odour management protocol. This is a conventional technique in which livestock processing is conducted in Australia.

3.3 WWTP AND AWTP

3.3.1 Wastewater Sources

The wastewater generated at the PPF originates from two key sources, as follows:

1. **Wastewater from livestock processing:** These flows are generated from the commencement of the kill until its completion. During the kill, the majority of wastewater is produced in the kill floor, offal, and chiller areas. These represent a continuous flow of wastewater. The wash down of production areas frequently occurs throughout the day to maintain adequate hygiene levels; and

2. **Wastewater from washdown and kill completion:** These flows are generated when clean in place (**CIP**) activities are undertaken;

3. **Wastewater from PRP processing**: these flows are generated from by-product protein recovery, both at the LT and HT plan; and

4. **Wastewater from the OCS:** these flows are generated from the normal operation of the biofilter-based odour control system.

3.3.2 Odour Emission Risk Characterisation

The PPF will have a risk management strategy (**RMS**) implemented to identify improved control and minimisation measures as to reduce residual risks to the operation of the WWTP and AWTP, so that impacts of discharge of sewer and odour emissions are minimised. Moreover, it is important to note that the PPF will have a strong dependence on the effluent from the AWTP for its processing demand. Therefore, it will always be in the interest of the PPF to have the WWTP and AWTP operating in optimised and steady-state capacity to minimise process disruption. This dependency will result in a heightened awareness of the WWTP and AWTP operations and, in turn, minimise the odour risks associated with the PPF wastewater treatment processes. As previously mentioned in **Section 2.2.4.1**, the effluent characteristics will meet a high-quality standard that is consistent with the guidelines provided in regularly water guidelines in food processing. As such, the OMP considers that the adequate management of wastewater will, in turn, lead to three mutually dependent outcomes:

1. Minimisation of odour emissions; and

2. Discharge quality of trade waste to sewer within approved limits; and

3. Mechanical evaporation of brine with minimal risk of odour impacts (see **Section 3.4.2**).

Moreover, the RMS has been developed by providing the environmental aspects and risk register for the PPF. The environmental aspects and risk register for the PPF identified areas of the WWTP and AWTP that warrant management procedures and controls to reduce the uncontrolled risk to a low level. The interpretation of the risk ratings, likelihood, and the consequence are shown in **Table 3.1**, **Table 3.2**, and **Table 3.3**, respectively.

Table 3.1 – Risk matrices						
Risk Assessment Rating Matrix		**Likelihood (how often?)**				
Environmental Consequence (how bad?)		**A**	**B**	**C**	**D**	**E**
		Very likely	Likely	Possible	Unlikely	Very unlikely
1. Severe		**H**	**H**	**H**	**M**	**M**
2. Significant		**H**	**H**	**M**	**M**	**M**
3. Moderate		**H**	**M**	**M**	**L**	**L**
4. Minor		**M**	**M**	**L**	**L**	**L**
5. Negligible		**L**	**L**	**L**	**L**	**L**
Risk Rating:	High Risk	**High**	Medium Risk	**Medium**	Low Risk	**Low**

Table 3.2 – Risk likelihood	
Likelihood: The probability that the identified consequence will occur, considering proximity and exposure to the environmental hazard	
A. Very likely	Over 90% probability, or 'Happens Often'
B. Likely	60% to 90% probability, or 'Could easily happen has occurred before'
C. Possible	20% to 60% probability, or 'Could happen has occurred before'
D. Unlikely	5% to 20% probability, or 'Hasn't happened yet but could'
E. Very unlikely	1% to 5% probability, or Conceivable, but only in extreme circumstances'

Table 3.3 – Risk consequence	
Consequence (impact): The most likely result of contact with the hazard	
Consequence (impact)	**Odour/Environmental impact**
1. Negligible	Negligible or no environmental harm or environmental nuisance.
2. Minor	Material environmental harm or an environmental nuisance, but prosecution unlikely, local publicity only, local nuisance impacts on the community.
3. Moderate	Serious environmental harm, possible prosecution, local state publicity.
4. Major	Serious environmental harm, prosecution probable, national publicity, reputation impacts, political and licence implications.
5. Extreme	Serious environmental harm, prosecution certain, severely affected reputation, international attention possible, probable licence restrictions.

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Table 3.4 – Odour risk management analysis of the key area of the PPF							
Element	**Aspect details**	**Description of Impacts**	**Inherent impact**	**Inherent Likelihood**	**Risk score**	**Management of Impacts**	**Residual risk**
Processing Lines 1 & 2							
Roof fan failure	Motor failure	Cause a reduction in the efficacy of the dilution and dispersion system at the affected process area.	Moderate	Unlikely	Medium	▪ Implementation of a preventative maintenance schedule.	Low
WWTP & AWTP							
Screening failure	Screen inoperative	High solids load to buffer tanks.	Negligible	Likely	Low	▪ Duty/standby arrangement. ▪ Buffer tanks have the capacity to handle solids. ▪ WWTP operator procedures & training. ▪ Parallel process trains.	Low
Failure/ inadequacy of pumps, pipes, dosing systems	WWTP and AWTP underperforms or inoperative	Non-compliant wastewater discharge to sewer/evaporation pond.	Moderate	Possible	Medium	▪ Duty/standby arrangement for key equipment with the automated switchover. ▪ Install additional capacity (pumps/dosing). ▪ WWTP operator procedures & training. ▪ Spare parts/pumps held on-site. ▪ Buffer tank buffer storage available for stoppages of half-day.	Low
Inadequacy/ failure of DAF	WWTP and AWTP underperforms or inoperative	Non-compliant effluent for production. Large solids may cause mechanical issues with downstream processes, and FOG can upset the biological process when introduced in high concentrations.	Moderate	Moderate	Medium	▪ Increase air saturator capacity in DAF. ▪ WWTP and AWTP operator procedures & training. ▪ Spare parts/pumps held on-site. ▪ The primary treatment is designed to protect downstream processes from solids and FOG. ▪ Three units to be operated, with a third the rated capacity to be designed in parallel for maintenance and operational reliability.	Low
Aeration failure in tank vessels	Aerators inoperative	Increased settled solids build up. Odour risks.	Moderate	Unlikely	Medium	▪ WWTP operator procedures & training. ▪ On-site maintenance staff available & spare parts held on-site.	Low
Influent piping blockage or failure	Piping inoperative	Causes contamination of ground or stormwater system.	Moderate	Unlikely	Medium	▪ Install contingency diversion. . ▪ WWTP and AWTP operator procedures & training.	Low
Power failure	WWTP and AWTP inoperative. Process plant may continue.	If prolonged, process plant shutdown required to reduce the risk of adverse odour emission release and impact.	Moderate	Moderate	Medium	▪ Refer to **Section 4.6**.	Low

Table 3.4 – Odour risk management analysis of the key area of the PPF

Element	Aspect details	Description of Impacts	Inherent impact	Inherent Likelihood	Risk score	Management of Impacts	Residual risk
Wastewater tank rupture or overflow	Escape/loss of wastes	Causes contamination of ground or stormwater system sludge on the building floor.	Moderate	Very Unlikely	Medium	▪ Tanks equipped with high/low-level sensors linked to the supervisory control and data acquisition (**SCADA**) system ▪ Buffer tanks bunded. Captured spillage returned to WWTP ▪ Tanks are concrete & unlikely to fail	Low
Membrane bioreactor and reverse osmosis systems.	Failure or fouling of membrane train	Reduce treatment and performance efficiency of the WWTP and AWTP	High	Unlikely	Low	▪ Cleaning will be undertaken to maintain efficient operation. ▪ The CIP waste streams generated by the reverse osmosis system is proposed to be sent to the existing rendering wastewater treatment system, and ultimately be discharged to trade waste. ▪ For the reverse osmosis system, a typical CIP schedule would include inorganic acid and organic acid wash, non-oxidising biocide wash, and an alkaline and surfactant wash. Each reverse osmosis train is required to be cleaned quarterly. ▪ The cleaning of the individual trains would be on a rotating schedule, where roughly two trains would be cleaned each month generating. As the existing plant is designed to treat up to 4 ML/week or 16 ML/month, the addition of 40 kilolitres/month of CIP waste will not make any significant impact to existing wastewater treatment systems performance. ▪ The CIP streams from the membrane bioreactor will be self-contained in the proposed WWTP and AWTP for the PPF. These streams will not need to be sent to the existing WWTP. A typical CIP schedule would be monthly cleaning with chlorine, caustic and organic acids. ▪ Provision for the system to be split into two parallel trains for operational redundancy.	Low

3.4 WEATHER STATION

In addition to the odour management protocol described in **Section 2.2**, a weather station will be installed and maintained at the PPF to record local meteorology conditions. At a minimum, the parameters recorded by the weather station include:

- Rainfall;
- Wind speed (2 m and 10 m);
- Wind direction (2 m and 10 m);
- Temperature;
- Relative humidity; and
- Solar radiation.

The adoption of an on-site weather station will assist in the identification of adverse weather conditions and provide a feedback loop to facilitate a proactive response plan of odour events. Moreover, the observational data will be logged and stored in a database for use in complaints investigations (see **Section 6.1** for details) and any supplementary air dispersion modelling studies that are required to be performed for the PPF in the future.

3.4.1 Siting of Meteorological Station

The siting of all existing meteorological station must be reviewed in the context of its consistency with the applicable Australia Standards (**AS**) including *AS2922-1987 – Ambient Air Guide for the Siting of Sampling Units* and *AS2923-1987 – Ambient Air – Guideline for measurement of horizontal wind for air quantity applications*. If an ideal site that is a flat open area substantially free of obstructions is not available, a potential siting solution that is consistent with the standard would be mounting a 10-metre mast at a central location on the PPF building roof with a horizontal clearance of at least ten times any roof ventilation fan unit height from the roofline.

3.4.2 AWTP Mechanical Evaporation

The RO concentrate stream from the AWTP will be managed via an accelerated evaporation protocol with final disposal off-site as a concentrated brine. The accelerated evaporation protocol will be facilitated by a feedback loop from an in-built or on-site weather station. This protocol will be developed as part of the detailed design for the AWTP. A control system can adjust the operation to reduce or eliminate overspray by controlling droplet size and or stopping/reducing spray flow. In addition, the installation of overspray curtains or earth berm around the periphery of the pond is recommended by Hydroflux, especially with reference to the prevailing wind direction. In this instance, Hydroflux suggest that an overspray curtain should be considered, and combined with a weather-based control system.

The treated wastewater from the evaporation pond will not represent a significant source of odour emissions, given the effluent performance that will be achieved from the process. As such, no specific control to manage odour is required for this activity other than the current mechanical evaporation protocol that will be implemented by Hydroflux to manage fugitive aerosol plumes from the AWTP mechanical evaporation activities during normal operation.

The concentrated salt waste will be disposed of via a licenced disposal facility.

3.5 ANCILLARY CHILDCARE CENTRE

It is proposed to operate a childcare centre on-site at the location indicated in **Figure 1.1.** Given the odour management protocol that will be adopted at the PPF as described in **Section 2.2** and **Section 3.4**, any ground-level odour impact risks are considered to be unlikely. However, given the sensitivity of a childcare environment, Baiada will be implementing the following precautionary measures as part of the PPF:

- Adaption of a hybrid high-efficiency particulate air and carbon filter system to protect the indoor airspace environment of the childcare activities during atypical or upset conditions. During normal operating conditions, odour impact risks are very unlikely under the odour management protocol adopted for the PPF operations; and

- Vegetative landscaping for the outdoor areas to provide a level of screening, attenuation and visual disconnection from the PPF operations.

3.6 STAFF TRAINING

All workers at the PPF will undergo active environmental awareness workshops and training, which will include, but not be limited to:

- The regulatory requirements associated with the environment protection licence (**EPL**);

- Potential environmental impacts which may be caused by the PPF during normal and atypical/upset conditions;

- Prevention of accidental emissions and actions to be taken under such circumstances;

- Procedures for complaint handling, investigation, resolution and reporting back to the complainant and NSW EPA (see **Section 6.1**); and

- All employees will be instructed to remain vigilant to and report any atypical odour or change in air quality around the PPF immediately to the site manager.

4 EMERGENCY/CONTINGENCY PLAN

Even at a well-managed food processing facility, operating under steady-state conditions, incidents can occur that result in the release of nuisance levels of odour. As such, to minimise the likely consequence of such events, it is essential to have a crisis strategy and continuity plan, that follows the workflow shown in **Figure 4.1**.

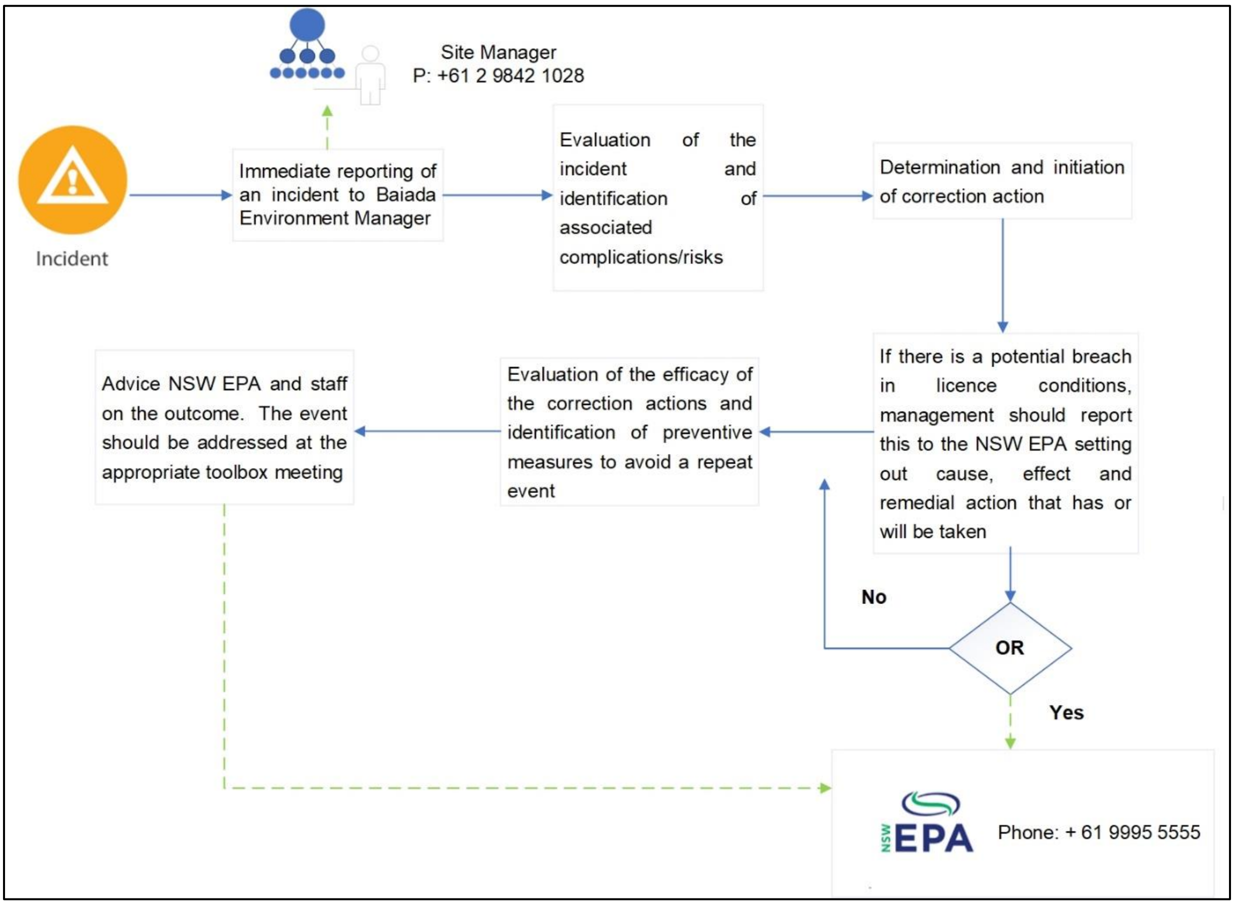

Figure 4.1 – Emergency/contingency plan workflow

4.1 UTILITY OF SOPS

The SOPs that will be developed in due course (see **Section 3.1**) will identify the components, define the layout of the system and describe the methodology of the PPF, WWTP and AWTP to adequately plan for contingency actions in the event of malfunction or other emergency scenarios at the PPF. It will apply to all potential odour generation and release points at the proposed PPF.

Given the importance and dependence of potable food-grade water for the PPF operations from the WWTP and AWTP, the emergency/contingency procedure will be developed to identify, eliminate or manage the risks associated with the movement, treatment and fate of effluent and trade waste. It will also include the emergency/contingency plan, which reflects a set of documented procedures to follow or reference in the instance of a plant or system failure at the PPF to manage the potential risk associated with odour impacts.

4.2 ROLES AND RESPONSIBILITIES

The following are the roles and responsibilities under an emergency event or a triggering of the contingency plan relating to the WWTP at the PPF to the potential risk associated with odour impacts:

a) The Plant Manager (or a delegated representative) has responsibility for the implementation of this relevant procedure;

b) The Maintenance Manager (or a delegated representative) has overall authority for the verification of the implementation and appropriateness of this procedure. They are responsible for the allocation of necessary resources to perform monitoring, preventative maintenance work and remediation of any faults associated with the system;

c) The Environment Manager is responsible for liaising with Senior Management and the General Manager to determine the appropriate course of action in the event of an incident which has or has the potential to impact either the environment or trade waste adversely;

d) The WWTP and AWTP operators have the responsibility to document and report any malfunctions in the WWTP which they observe immediately to both the Maintenance Manager and Environment Officer

e) All personnel at the PPF are responsible for reporting any faults or malfunctions immediately to the Maintenance Manager or Supervisor; and

f) External contractors will carry out preventative and maintenance work as directed by the Maintenance Manager or Environment Officer.

4.3 RECORDS

The following category of records will be developed and maintained as part of the operation of the PPF, WWTP and AWTP:

1. PPF, WWTP and AWTP checklists;
2. Pump checklist;
3. Operation checklist;
4. Preventative maintenance schedule; and
5. Maintenance log.

4.3.1 Corrective Actions

Any corrective actions performed by internal or external staff will be recorded using Baiada's Maintenance Management System.

4.4 WWTP AND AWTP CONTINGENCIES

Given the dependence of the WWTP and AWTP for the uninterrupted and operational reliability of the PPF activities (as outlined in **Section 3.3.2**), a layer of contingency will be provided to address odour management under the following circumstances:

a. under repair;

b. undergoing maintenance;

c. being cleaned, desludged or serviced;

d. prevented from discharging to sewer/evaporation pond;

e. have restricted flows to sewer/evaporation pond; or

f. otherwise operating at less than ordinary capacity;

These circumstances will be addressed as part of the SOPs for the WWTP and AWTP.

4.5 PPF ROOF VENTILATION FANS CONTINGENCY PLAN

The performance of the roof ventilation fans for Processing Lines 1 and 2 will be monitored for operability. If there is a failure of any roof ventilation fans, a signal will be issued via the SCADA system notifying the appropriate Baiada representative. It is expected that spare parts will be readily available to ensure a quick turnaround time for remediating the failed roof fan. Moreover, it is also expected that preventative maintenance will result in a low probability of roof fan failure, as a key measure facilitating this process will be the recording of operating hours for each fan. This is achieved automatically via the SCADA system and will be readily accessible to the Baiada operator.

4.6 POWER FAILURE

If a regional power failure occurs, then all processing will cease, and processing would recommence with the re-establishment of power connection. During this time, the undertaking of an FAOA survey (see **Section 6.2.1**) should be undertaken in the morning, afternoon and evening, corresponding with the recommencement of operation. However, power interruptions are not expected to be a common occurrence, and battery backup will be provided so essential programming is not lost.

4.7 EXTREME AND UNLIKELY EVENTS

The OMP does not cover extreme events as this is best dealt with on a case-by-case basis. The risk of an extreme event with the layer of contingency for the PPF is very unlikely, and therefore, the probability of occurrence is practically low. As such, odour impact risks under such circumstances are extraordinary.

4.8 WWTP AND AWTP MONITORING

The WWTP and AWTP will have an extensive SCADA system, which will generate a voluminous quantity of data and provide a network of feedback input for process optimisation and control. The WWTP and AWTP will be continuously supervised, with external contractors undertaking the necessary calibrations and checks as part of the service agreement for the WWTP and AWTP. All monitoring documentation, both hard and soft versions, will be managed by Baiada Environment Management System. All preventative maintenance documentation is kept with the Maintenance Division.

5 KEY STAFF AND RESPONSIBILITIES

This section summarises the key staff and responsibilities for ensuring that the OMP is valid, up to date and seek its overall implementation. The key staff responsible for the OMP at the PPF operations include:

- Chief Operating Officer;
- Plant Manager; and
- Environment Manager.

5.1 CHIEF OPERATING OFFICER

The Chief Operating Officer responsibilities are as follows:

- The environmental sustainability, livestock processing and business operations of the PPF; and
- Overall responsibility for the management of all the PPF operations.

5.2 PLANT MANAGER

The Plant Manager responsibilities are as follows:

- Overall responsibility for the management of operational activities for the PPF, including the oversight of the odour management and control systems;
- Oversees management of the PPF, ensuring that all activities and operations are conducted in compliance with management plans and operating systems, including supervision of those relating to environmental management (including odour). They are advised of any relevant odour complaints;
- Reports to Chief Operating Officer on operations and address of performances that require infrastructure support; and
- The implementation of the OMP on a day-to-day basis for the PPF operations.

5.3 ENVIRONMENT MANAGER

The Environment Manager responsibilities are as follows:

- Overall responsibility for administrative controls and environmental management systems for the PPF;
- Ensuring that the process parameters are being correctly undertaken and maintained; and
- Responsible for the maintenance of the monitoring records.

6 INCIDENT & COMPLAINTS MANAGEMENT

6.1 ODOUR COMPLAINTS/INCIDENT HANDLING

The PPF has two key reporting forms for the management of incident and complaints, as follows, respectively:

1. An environmental incident report; and
2. An environmental complaint form.

This is an existing feature of the PPF site location, which is provided by Baida's Environmental Management System.

6.2 ODOUR INCIDENT, MANAGEMENT AND MONITORING

6.2.1 Field Ambient Odour Assessment Surveys

In response to an odour complaint, the undertaking of Field Ambient Odour Assessment Surveys (**FAOA**) by suitable personnel from the PPF will allow for real-time monitoring of ambient odour levels, especially during atypical/upset process conditions and can be undertaken in the form of daily patrols both on-site and off-site (if necessary, at sensitive receptors). The FAOA surveys could also be a response protocol to an odour complaint received from the Plant Manager or Environment Manager of the PPF (provided the odour complaint has been logged the same day and within a reasonable timeframe since the odour episode).

The FAOA surveys are intended to be used as a complaints response and management tool, designed to record the PPF personnel determinations of the presence or absence of ambient odours at both on-site and off-site locations (in the instance that a positive detection beyond the PPF boundary is recorded), the perceived strength/intensity of any odour found to be present, the duration of the odour event, any definable odour character, and information of prevailing wind conditions. The results are to be recorded in an FAOA log sheet template (see **Form 6.1**). If there is an odour present, then the entry should be completed. If there is a prevailing wind from the direction of the PPF, and there is no positive detection observed, then the entry should still be made. These NIL entries can provide as much valuable data to the responsible PPF personnel as 'FAOA positive' form log sheet entries.

The key FAOA parameters that are to be recorded in the form log sheet are as follows:

- Date and time;
- Location;
- Intensity, according to the 7-point odour intensity scale (see **Table 6.1**); and
- Meteorological conditions including weather conditions, wind direction, and wind speed (via the installed meteorological station – see **Section 3.4**).

Form 6.1 should be printed or electronically stored, and template kept in a separate and accessible file at the PPF. All filled forms should also be kept in a separate file or attached to the corresponding logged complaint in the Baiada's Environmental Management System. To facilitate in the execution of the FAOA surveys at the PPF, **Section 6.2.1.1** & **Section 6.2.1.2** outline and describe the odour intensity scale and odour descriptors, respectively, available to the responsible PPF personnel for the assessment of odour during an FAOA survey.

6.2.1.1 Odour intensity scale

The odour strength for use in the FAOA is quantified, according to the German VDI 3940 odour intensity scale. The category scale for judging odour intensity in the field is a quantitative seven-point reference scale where the responsible PPF personnel award one of the attributes in **Table 6.1** to the assessor's odour impression. As a reference point, an odour is clearly recognised (category of intensity 3) when an odour descriptor can be clearly distinct.

Table 6.1 –Odour Intensity Chart

Odour Strength	Intensity Rank	Comment
Not detectable	0	No odour detected
Very Weak	1	Odour is recognised and where possible assigned to the odour source
Weak	2	Odour is weak but not yet distinct
Distinct	3	Odour is clearly detectable and distinct
Strong	4	Strong odour detectable
Very Strong	5	Very strong odour detectable
Extremely Strong	6	Extremely strong odour detectable

6.2.1.2 Odour character

Any potential odour sources have their origins from the process operations occurring at the PPF. Based on the PPF process operations, the key odour descriptors have been developed, as shown in **Table 6.2**. The odour descriptors are specific to the PPF and its operations. This enables the responsible Baiada personnel to readily identify the likely source of a positive odour entry during the daily FAOA survey.

Table 6.2 - Odour descriptors associated with the PPF

Character ID	Odour description
A	meaty, putrid
B	ammoniacal, pungent
C	faecal, dirty, septic
D	rotten egg, sewage
E	earthy, bark, musty

Field Ambient Odour Assessment Form Logsheet							
Date of Observation							
Time of Observation							
Measurement Location ID or location of odour							
Weather conditions (sunny, dry, rain, fog, snow etc)							
Temperature (hot, very warm, warm, mild, cold or degrees if known) *							
Wind strength (calm, light, steady, strong, gusting) *							
Wind direction (e.g. from NE) *							
What does it smell like? (Please circle response)	meaty, putrid ammoniacal, pungent faecal, dirty, septic rotten egg, sewage earthy, bark, musty stale water Other____						
How unpleasant is it?							
Was the character or strength of this smell offensive?							
Intensity – How strong was it? (Please circle) Refer to odour intensity scale for meaning (see below)	0	1	2	3	4	5	6
How long did the smell last?							
Was it constant or intermittent?							
Any other comments							

Form 6.1 - FAOA Logsheet

6.2.2 Odour Communication and Response Strategy

6.2.2.1 Odour diaries

Odour diaries can assist complainants in providing details of their perception of the suspected nuisance odours and any effects that the odour has on their behaviour. Details are recorded using a standard diary record sheet on a daily or weekly basis and particularly whenever an odour episode occurs. Simple local wind or weather condition records can also help identify or confirm the source of alleged nuisance odours. The odour descriptors and intensity chart should be provided to concerned neighbouring receptors, as shown in **Table 6.1** & **Table 6.2**.

The odour diaries are a valuable communication tool between the community, NSW EPA and the PPF operations, as it provides feedback on what the complainant is experiencing in real-time during an odour episode, especially in the event where they do not have the opportunity to lodge a complaint in real-time. This can be a contingency response plan in the event of any odour concerns associated with the PPF, which is expected to be not realised.

6.2.3 Meteorological Station

A meteorological station that is electronically enabled and logged will ensure best practice at the PPF to assist with odour related complaints (see **Section 3.4**).

7 OMP CONTINUOUS IMPROVEMENT PLAN

Version 0 of the OMP was developed as part of the regulatory approval process for the PPF. As such, the degree of information available, particularly of a detailed design nature regarding the engineered controls and monitoring system, were not available at the time of writing. Therefore, the current version of the OMP should be used as a supplementary document to the findings made in the July 2020 Report and as a framework that outlines the hierarchy of controls, in the form of, but not limited to, engineered, administration and/or management practices to prevent or minimise the potential of odour generation and release.

The OMP will undergo an update within three months of commissioning and optimisation of the PPF. Moreover, the OMP should be reviewed in conjunction with the regular checks by the Environment Manager throughout a typical environmental reporting year at the PPF.

End of Document

THE ODOUR UNIT

Baiada

PSA CONSULTING

Baiada Poultry Pty Ltd –

Proposed Poultry Processing Facility Odour Impact Assessment

Oakburn, NSW

Appendices

Version 2

August 2020

Main Report Reference: *Baiada Poultry Pty Ltd – Proposed Poultry Processing Facility Odour Impact Assessment - Oakburn, NSW - Final Report Version 2 August 2020* dated 18 August 2020 (Revision 2.3)

Note: This document contains information that is classified as **commercially sensitive** and should be treated as **commercial in confidence**.

Appendix A –

High Resolution Site Plan

PAVEMENT LEGEND

BIT.	HOT MIX BITUMEN
CONC.	CONCRETE FOR HEAVY VEHICLES
EX-CONC.	EXISTING CONCRETE

HEAVY DUTY CONCRETE (25,515sqm)

EXISTING CONCRETE (6,525sqm)

LIGHT DUTY PAVEMENT (36,000sqm)

SBA ARCHITECTS
Commercial Industrial Residential Retail Interior Design
Suite 702, 83 Mount Street, North Sydney NSW 2060
T 02 9929 9988 F 02 9929 8899
E info@sbaarch.com.au W www.sbaarch.com.au

ISSUE REV. DESCRIPTION DATE

CLIENT

OAKBURN PROCESSING PLANT

OXLEY HIGHWAY, TAMWORTH

DRAWING TITLE: SITE PLAN

DATE	SCALE	JOB NO.	DRAWING NO.	
16.06.20	1:2000@A1	19106	SK 10	E

Appendix B -

CALPUFF Source Configuration

Point Source Configuration

Source Name (12 chars.)	X Coord. (km)	Y Coord. (km)	Stack Height (m)	Base Elev. (m)	Stack Diam. (m)	Exit Veloc. (m/s)	Exit Temp. (K)	Building Downwash (0., 1., or 2.)	Platform Height (m)	Vertical Momentum Flux Factor (0. or 1.)
LB01	293.8332	6561.1371	13	388	2.06	15	293.15	1	0	1
LB02	293.8213	6561.1249	13	388	2.06	15	293.15	1	0	1
LB03	293.809	6561.1118	13	388	2.06	15	293.15	1	0	1
LB04	293.7831	6561.0935	13	388	2.06	15	293.15	1	0	1
LB05	293.7666	6561.0759	13	388	2.06	15	293.15	1	0	1
DF01	293.8466	6561.1074	13	388	0.93	15	293.15	1	0	1
DF02	293.8249	6561.0866	13	388	0.93	15	293.15	1	0	1
DF03	293.8058	6561.0685	13	388	0.93	15	293.15	1	0	1
DF04	293.7845	6561.0476	13	388	0.93	15	293.15	1	0	1
EV01	293.8236	6561.0378	13	388	1.15	15	293.15	1	0	1
EV02	293.8074	6561.0189	13	388	1.15	15	293.15	1	0	1
OF01	293.8455	6561.0141	13	388	0.63	15	293.15	1	0	1
OF02	293.8301	6560.9976	13	388	0.63	15	293.15	1	0	1
FT01	293.8414	6561.0096	13	388	0.53	15	293.15	1	0	1
FT02	293.8363	6561.0038	13	388	0.53	15	293.15	1	0	1
BP01	293.8615	6561.0279	13	388	0.62	15	293.15	1	0	1
PF01	293.8816	6561.0054	13	388	0.86	15	293.15	1	0	1
PP01	293.8324	6561.058	13	388	0.63	15	293.15	1	0	1
PW01	293.8403	6561.0487	13	388	0.52	15	293.15	1	0	1
SW01	293.8949	6560.9846	13	388	0.50	15	293.15	1	0	1
CR01	293.9677	6560.8752	13	388	0.76	15	293.15	1	0	1
CR02	293.9546	6560.8624	13	388	0.76	15	293.15	1	0	1
BF1C1	293.9443	6561.1196	2	385	8.24	0.052	313.15	1	0	1
BF1C2	293.9372	6561.1254	2	385	8.24	0.052	313.15	1	0	1
BF1C3	293.9322	6561.1313	2	385	8.24	0.052	313.15	1	0	1
BF2C1	293.9752	6561.0864	2	385	8.24	0.052	313.15	1	0	1
BF2C2	293.9802	6561.0805	2	385	8.24	0.052	313.15	1	0	1
BF2C3	293.9852	6561.0756	2	385	8.24	0.052	313.15	1	0	1
SCR	294.1772	6561.0418	6	384.3	1.09	15	273.15	1	0	1
DAF	294.1808	6561.0639	6	384.3	1.09	15	273.15	1	0	1
SLG	294.1844	6561.086	6	384.3	1.09	15	273.15	1	0	1
F1S1	294.7517	6563.4201	1	379	8.20	0.787	293.15	1	0	0
F1S2	294.7145	6563.3841	1	377.8	8.20	0.787	293.15	1	0	0
F1S3	294.6755	6563.3483	1	377.8	8.20	0.787	293.15	1	0	0
F1S4	294.6329	6563.3135	1	382.1	7.89	0.849	293.15	1	0	0
F1S5	294.5943	6563.2766	1	382.1	7.89	0.849	293.15	1	0	0
F1S6	294.5453	6563.2294	1	382.1	7.89	0.849	293.15	1	0	0
F1S7	294.5063	6563.1931	1	381.5	7.89	0.849	293.15	1	0	0
F1S8	294.4728	6563.159	1	384.1	8.20	0.787	293.15	1	0	0
F2S1	293.9604	6562.57	1	394.8	7.93	1.681	293.15	1	0	0
F2S2	293.9577	6562.6036	1	394.8	7.93	1.681	293.15	1	0	0
F2S3	293.9567	6562.6375	1	394.9	7.93	1.681	293.15	1	0	0
F2S4	293.9547	6562.6704	1	394.9	7.93	1.681	293.15	1	0	0
F2S5	293.6332	6562.5525	1	397.3	7.93	1.681	293.15	1	0	0
F2S6	293.6322	6562.5861	1	397.3	7.93	1.681	293.15	1	0	0
F2S7	293.6322	6562.6185	1	393	7.93	1.681	293.15	1	0	0
F2S8	293.6307	6562.6529	1	393	7.93	1.681	293.15	1	0	0
F3S1	293.3382	6562.0377	1	397.8	7.93	1.548	293.15	1	0	0
F3S2	293.3355	6562.0711	1	397.8	7.93	1.548	293.15	1	0	0
F3S3	293.3345	6562.1047	1	397.8	7.93	1.548	293.15	1	0	0
F3S4	293.3318	6562.1383	1	397.8	7.93	1.548	293.15	1	0	0
F3S5	292.9815	6562.0192	1	392.7	7.93	1.548	293.15	1	0	0
F3S6	292.9799	6562.0528	1	392.7	7.93	1.548	293.15	1	0	0
F3S7	292.9783	6562.087	1	392.7	7.93	1.548	293.15	1	0	0
F3S8	292.9762	6562.1209	1	392.7	7.93	1.548	293.15	1	0	0

Area Source Configuration

Source Name (12 chars.)	Lower Left X Coord. (km)	Lower Left Y Coord. (km)	Upper Left X Coord. (km)	Upper Left Y Coord. (km)	Upper Right X Coord. (km)	Upper Right Y Coord. (km)	Lower Right X Coord. (km)	Lower Right Y Coord. (km)	Effect. Height (m)	Base Elev. (m)	Init. Sigma Z (m)
CW1	294.0274	6561.5859	294.0624	6561.5439	294.0324	6561.519	293.9964	6561.5601	0	380.8	2
CAL1	294.0162	6561.2752	294.1141	6561.1743	294.0723	6561.133	293.9744	6561.2344	0	385	2
CW2	293.9868	6561.5536	294.0218	6561.5116	293.9918	6561.4867	293.9558	6561.5278	0	380.8	2
SBR1	294.0657	6561.6199	294.1007	6561.5779	294.0707	6561.553	294.0347	6561.5941	0	380.8	2
BAL1	294.1366	6561.0503	294.157	6561.0503	294.157	6561.0299	294.1366	6561.0299	6	384.3	2
PRAX1	294.1464	6561.0706	294.161	6561.0706	294.161	6561.056	294.1464	6561.056	6	384.3	2
PRAX2	294.1083	6561.0492	294.1229	6561.0492	294.1229	6561.0346	294.1083	6561.0346	6	384.3	2
AER1	294.1394	6561.1032	294.1654	6561.1032	294.1654	6561.0772	294.1394	6561.0772	6	384.3	2
AER2	294.1128	6561.08	294.1388	6561.08	294.1388	6561.054	294.1128	6561.054	6	384.3	2
MBR1	294.1603	6561.128	294.1706	6561.1263	294.1674	6561.1065	294.157	6561.1082	6	384.3	2
MBR2	294.1211	6561.1074	294.1314	6561.1057	294.1282	6561.086	294.1178	6561.0877	6	384.3	2
POAX1	294.1425	6561.1241	294.1552	6561.1241	294.1552	6561.1114	294.1425	6561.1114	6	384.3	2
POAX2	294.1216	6561.1274	294.1343	6561.1274	294.1343	6561.1147	294.1216	6561.1147	6	384.3	2

Volume Source Configuration

Source Name (12 chars.)	X Coord. (km)	Y Coord. (km)	Effect. Height (m)	Base Elev. (m)	Init. Sigma Y (m)	Init. Sigma Z (m)
HST	293.905	6561.1143	6.4	385	12.06	5.95
HPR	293.922	6561.0986	6.4	385	12.06	5.95
LPR	293.96	6561.0586	6.4	385	12.06	5.95
LST	293.976	6561.0415	6.4	385	12.06	5.95
LOAD	293.959	6561.1006	7.2	385	12.06	6.7

PRP Estimated Room Volumes

Room	Corresponding volume source	Floor area (m2)	Height (m)	Volume (m3)
Loading Bay	LOAD	1050	14.4	15120
Milling Area	50% to HPR 50% to LPR	1067	16	17072
High Temperature Rendering	HPR and HST	1217	12.8	15578
Low Temperature Rendering	LPR and LST	1384	12.8	17715

Loading Bay (LOAD) Estimated Fugitive Emission Rates

Source	Flow rate (m3/s)	Flow rate (m3/h)	Volume (m3)	Air changes (/h)	OER (ou.m3/s)	Derived discharge conc (ou)
HST	2.0	74017	24114	3.1	474	23
HPR	18.6					
LPR	16.9	77864	26251	3.0	640	30
LST	4.7					
LOAD	**12.7**	**45596**	**15120**	**3.0**	**334**	**26**

Appendix C -

BPIP-PRIME Configuration

BPIP-PRIME Summary

PRP and PPF

Bowlers Lane Poultry Farms

Baiada, Oakburn

BPIP (Dated: 04274)

DATE : 6/22/2020
TIME : 15:40:43
Baiada, Oakburn

============================
BPIP PROCESSING INFORMATION:
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The P flag has been set for preparing downwash related data for a model run utilizing the PRIME algorithm.

Inputs entered in METERS will be converted to meters using a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in UTM coordinates. BPIP will move the UTM origin to the first pair of UTM coordinates read. The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

The new local coordinates will be displayed in parentheses just below the UTM coordinates they represent.

Plant north is set to 0.00 degrees with respect to True North.

==============
INPUT SUMMARY:
==============

Number of buildings to be processed : 32

PPlant has 1 tier(s) with a base elevation of 388.00 METERS

BUILDING NAME	TIER NUMBER	BLDG-TIER NUMBER	TIER HEIGHT	NO. OF CORNERS	CORNER COORDINATES X	Y
PPlant	1	1	12.80	12		
					293865.50	6561135.20 meters
					(0.00	0.00) meters
					293852.60	6561122.70 meters
					(-12.90	-12.50) meters
					293865.30	6561109.60 meters
					(-0.20	-25.60) meters
					293825.80	6561071.50 meters
					(-39.70	-63.70) meters
					293904.00	6560990.50 meters
					(38.50	-144.70) meters
					293917.10	6561003.20 meters
					(51.60	-132.00) meters
					293970.20	6560948.10 meters
					(104.70	-187.10) meters
					294043.30	6561018.70 meters
					(177.80	-116.50) meters
					294086.10	6560974.40 meters
					(220.60	-160.80) meters
					293959.00	6560851.60 meters
					(93.50	-283.60) meters
					293742.00	6561076.20 meters
					(-123.50	-59.00) meters
					293835.00	6561166.80 meters
					(-30.50	31.60) meters

PRP_HOT has 1 tier(s) with a base elevation of 385.00 METERS

BUILDING NAME	TIER NUMBER	BLDG-TIER NUMBER	TIER HEIGHT	NO. OF CORNERS	CORNER COORDINATES X	Y

```
PRP_HOT     1        2     12.80     6
                                              293922.40  6561136.50 meters
                                          (        56.90        1.30) meters
                                              293913.70  6561127.90 meters
                                          (        48.20       -7.30) meters
                                              293939.50  6561102.20 meters
                                          (        74.00      -33.00) meters
                                              293923.50  6561086.20 meters
                                          (        58.00      -49.00) meters
                                              293889.50  6561120.30 meters
                                          (        24.00      -14.90) meters
                                              293914.50  6561144.40 meters
                                          (        49.00        9.20) meters


PRP_LBAY has 1 tier(s) with a base elevation of  385.00 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

PRP_LBAY    1        3     14.40     4
                                              293962.30  6561124.30 meters
                                          (        96.80      -10.90) meters
                                              293985.10  6561100.60 meters
                                          (       119.60      -34.60) meters
                                              293961.90  6561078.20 meters
                                          (        96.40      -57.00) meters
                                              293939.50  6561102.20 meters
                                          (        74.00      -33.00) meters


PRP_COLD has 1 tier(s) with a base elevation of  385.00 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

PRP_COLD    1        4     12.80     6
                                              293993.90  6561045.30 meters
                                          (       128.40      -89.90) meters
                                              294002.40  6561053.50 meters
                                          (       136.90      -81.70) meters
                                              294010.30  6561045.50 meters
                                          (       144.80      -89.70) meters
                                              293986.10  6561022.00 meters
                                          (       120.60     -113.20) meters
                                              293946.00  6561063.30 meters
                                          (        80.50      -71.90) meters
                                              293961.90  6561078.20 meters
                                          (        96.40      -57.00) meters


PRP_MILL has 1 tier(s) with a base elevation of  385.00 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

PRP_MILL    1        5     16.00     9
                                              293939.50  6561102.20 meters
                                          (        74.00      -33.00) meters
                                              293961.80  6561078.30 meters
                                          (        96.30      -56.90) meters
                                              293939.20  6561057.10 meters
                                          (        73.70      -78.10) meters
                                              293933.90  6561062.70 meters
                                          (        68.40      -72.50) meters
                                              293931.10  6561060.10 meters
                                          (        65.60      -75.10) meters
                                              293920.20  6561071.70 meters
                                          (        54.70      -63.50) meters
                                              293922.40  6561073.80 meters
                                          (        56.90      -61.40) meters
                                              293917.00  6561079.60 meters
                                          (        51.50      -55.60) meters
                                              293923.50  6561086.20 meters
                                          (        58.00      -49.00) meters


BOIL     has 1 tier(s) with a base elevation of  385.00 METERS
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BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

BOIL        1        6     12.80     6
                                             293881.80  6561155.70 meters
                                         (       16.30       20.50) meters
                                             293869.70  6561168.30 meters
                                         (        4.20       33.10) meters
                                             293880.90  6561179.20 meters
                                         (       15.40       44.00) meters
                                             293905.30  6561153.80 meters
                                         (       39.80       18.60) meters
                                             293880.90  6561130.40 meters
                                         (       15.40       -4.80) meters
                                             293868.60  6561143.00 meters
                                         (        3.10        7.80) meters


SHED     has 1 tier(s) with a base elevation of  385.00 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

SHED        1        7     12.80     4
                                             293955.70  6561173.30 meters
                                         (       90.20       38.10) meters
                                             293965.80  6561162.60 meters
                                         (      100.30       27.40) meters
                                             293955.40  6561152.80 meters
                                         (       89.90       17.60) meters
                                             293945.30  6561163.40 meters
                                         (       79.80       28.20) meters


F1S1     has 1 tier(s) with a base elevation of  380.40 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F1S1        1        8      4.80     4
                                             294614.40  6563420.40 meters
                                         (      748.90     2285.20) meters
                                             294721.30  6563425.90 meters
                                         (      855.80     2290.70) meters
                                             294722.00  6563412.00 meters
                                         (      856.50     2276.80) meters
                                             294615.20  6563406.40 meters
                                         (      749.70     2271.20) meters


F1S2     has 1 tier(s) with a base elevation of  382.10 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F1S2        1        9      4.80     4
                                             294577.40  6563384.40 meters
                                         (      711.90     2249.20) meters
                                             294684.30  6563389.90 meters
                                         (      818.80     2254.70) meters
                                             294685.00  6563375.90 meters
                                         (      819.50     2240.70) meters
                                             294578.10  6563370.40 meters
                                         (      712.60     2235.20) meters


F1S3     has 1 tier(s) with a base elevation of  382.10 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F1S3        1       10      4.80     4
                                             294538.30  6563348.40 meters
                                         (      672.80     2213.20) meters
                                             294645.20  6563353.90 meters
                                         (      779.70     2218.70) meters
                                             294645.90  6563340.00 meters
                                         (      780.40     2204.80) meters
                                             294539.00  6563334.40 meters
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                                    (      673.50     2199.20) meters


F1S4     has 1 tier(s) with a base elevation of  382.10 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F1S4        1       11      3.80     4
                                        294497.10  6563313.70 meters
                                    (      631.60     2178.50) meters
                                        294602.00  6563319.20 meters
                                    (      736.50     2184.00) meters
                                        294602.70  6563305.20 meters
                                    (      737.20     2170.00) meters
                                        294497.90  6563299.80 meters
                                    (      632.40     2164.60) meters


F1S5     has 1 tier(s) with a base elevation of  382.10 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F1S5        1       12      3.80     4
                                        294458.50  6563277.40 meters
                                    (      593.00     2142.20) meters
                                        294563.30  6563282.90 meters
                                    (      697.80     2147.70) meters
                                        294564.10  6563268.90 meters
                                    (      698.60     2133.70) meters
                                        294459.20  6563263.50 meters
                                    (      593.70     2128.30) meters


F1S6     has 1 tier(s) with a base elevation of  381.30 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F1S6        1       13      3.80     4
                                        294409.40  6563229.90 meters
                                    (      543.90     2094.70) meters
                                        294514.20  6563235.40 meters
                                    (      648.70     2100.20) meters
                                        294515.00  6563221.40 meters
                                    (      649.50     2086.20) meters
                                        294410.10  6563215.90 meters
                                    (      544.60     2080.70) meters


F1S7     has 1 tier(s) with a base elevation of  384.10 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F1S7        1       14      3.80     4
                                        294370.10  6563194.00 meters
                                    (      504.60     2058.80) meters
                                        294475.00  6563199.50 meters
                                    (      609.50     2064.30) meters
                                        294475.70  6563185.50 meters
                                    (      610.20     2050.30) meters
                                        294370.90  6563180.00 meters
                                    (      505.40     2044.80) meters


F1S8     has 1 tier(s) with a base elevation of  384.10 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F1S8        1       15      4.80     4
                                        294335.20  6563159.30 meters
                                    (      469.70     2024.10) meters
                                        294442.00  6563164.80 meters
                                    (      576.50     2029.60) meters
                                        294442.70  6563150.90 meters
                                    (      577.20     2015.70) meters
                                        294335.90  6563145.30 meters
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                                          (      470.40     2010.10) meters


F2S1     has 1 tier(s) with a base elevation of  394.80 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F2S1        1       16      4.50     4
                                              293830.10  6562570.40 meters
                                          (      -35.40     1435.20) meters
                                              293930.00  6562575.60 meters
                                          (       64.50     1440.40) meters
                                              293930.70  6562561.70 meters
                                          (       65.20     1426.50) meters
                                              293830.80  6562556.60 meters
                                          (      -34.70     1421.40) meters


F2S2     has 1 tier(s) with a base elevation of  394.80 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F2S2        1       17      4.50     4
                                              293827.70  6562604.20 meters
                                          (      -37.80     1469.00) meters
                                              293927.60  6562609.40 meters
                                          (       62.10     1474.20) meters
                                              293928.30  6562595.50 meters
                                          (       62.80     1460.30) meters
                                              293828.40  6562590.40 meters
                                          (      -37.10     1455.20) meters


F2S3     has 1 tier(s) with a base elevation of  394.90 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F2S3        1       18      4.50     4
                                              293826.70  6562637.70 meters
                                          (      -38.80     1502.50) meters
                                              293926.50  6562642.90 meters
                                          (       61.00     1507.70) meters
                                              293927.20  6562629.10 meters
                                          (       61.70     1493.90) meters
                                              293827.40  6562623.90 meters
                                          (      -38.10     1488.70) meters


F2S4     has 1 tier(s) with a base elevation of  394.90 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F2S4        1       19      4.50     4
                                              293824.50  6562671.20 meters
                                          (      -41.00     1536.00) meters
                                              293924.40  6562676.40 meters
                                          (       58.90     1541.20) meters
                                              293925.10  6562662.60 meters
                                          (       59.60     1527.40) meters
                                              293825.30  6562657.40 meters
                                          (      -40.20     1522.20) meters


F2S5     has 1 tier(s) with a base elevation of  397.70 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F2S5        1       20      4.50     4
                                              293663.00  6562560.90 meters
                                          (     -202.50     1425.70) meters
                                              293762.80  6562566.10 meters
                                          (     -102.70     1430.90) meters
                                              293763.60  6562552.20 meters
                                          (     -101.90     1417.00) meters
                                              293663.70  6562547.10 meters
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                                          (     -201.80     1411.90) meters


F2S6     has 1 tier(s) with a base elevation of  397.70 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F2S6        1       21      4.50     4
                                              293661.90  6562594.40 meters
                                          (     -203.60     1459.20) meters
                                              293761.80  6562599.60 meters
                                          (     -103.70     1464.40) meters
                                              293762.50  6562585.80 meters
                                          (     -103.00     1450.60) meters
                                              293662.60  6562580.60 meters
                                          (     -202.90     1445.40) meters


F2S7     has 1 tier(s) with a base elevation of  395.80 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F2S7        1       22      4.50     4
                                              293661.90  6562627.40 meters
                                          (     -203.60     1492.20) meters
                                              293761.80  6562632.60 meters
                                          (     -103.70     1497.40) meters
                                              293762.50  6562618.80 meters
                                          (     -103.00     1483.60) meters
                                              293662.60  6562613.60 meters
                                          (     -202.90     1478.40) meters


F2S8     has 1 tier(s) with a base elevation of  395.80 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F2S8        1       23      4.50     4
                                              293660.10  6562661.50 meters
                                          (     -205.40     1526.30) meters
                                              293759.90  6562666.70 meters
                                          (     -105.60     1531.50) meters
                                              293760.70  6562652.80 meters
                                          (     -104.80     1517.60) meters
                                              293660.80  6562647.60 meters
                                          (     -204.70     1512.40) meters


F3S1     has 1 tier(s) with a base elevation of  395.90 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F3S1        1       24      4.20     4
                                              293198.40  6562039.10 meters
                                          (     -667.10      903.90) meters
                                              293308.40  6562043.50 meters
                                          (     -557.10      908.30) meters
                                              293308.90  6562030.00 meters
                                          (     -556.60      894.80) meters
                                              293199.00  6562025.60 meters
                                          (     -666.50      890.40) meters


F3S2     has 1 tier(s) with a base elevation of  395.90 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F3S2        1       25      4.20     4
                                              293195.80  6562073.20 meters
                                          (     -669.70      938.00) meters
                                              293305.70  6562077.60 meters
                                          (     -559.80      942.40) meters
                                              293306.20  6562064.10 meters
                                          (     -559.30      928.90) meters
                                              293196.30  6562059.70 meters
```

```
                                             (      -669.20       924.50) meters


F3S3      has 1 tier(s) with a base elevation of  395.90 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F3S3        1       26      4.20     4
                                                 293194.70  6562106.10 meters
                                             (      -670.80       970.90) meters
                                                 293304.60  6562110.50 meters
                                             (      -560.90       975.30) meters
                                                 293305.10  6562097.00 meters
                                             (      -560.40       961.80) meters
                                                 293195.20  6562092.60 meters
                                             (      -670.30       957.40) meters


F3S4      has 1 tier(s) with a base elevation of  395.90 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F3S4        1       27      4.20     4
                                                 293192.00  6562139.40 meters
                                             (      -673.50      1004.20) meters
                                                 293301.90  6562143.80 meters
                                             (      -563.60      1008.60) meters
                                                 293302.50  6562130.30 meters
                                             (      -563.00       995.10) meters
                                                 293192.60  6562125.90 meters
                                             (      -672.90       990.70) meters


F3S5      has 1 tier(s) with a base elevation of  392.70 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F3S5        1       28      4.20     4
                                                 293010.70  6562028.10 meters
                                             (      -854.80       892.90) meters
                                                 293120.60  6562032.60 meters
                                             (      -744.90       897.40) meters
                                                 293121.20  6562019.10 meters
                                             (      -744.30       883.90) meters
                                                 293011.30  6562014.60 meters
                                             (      -854.20       879.40) meters


F3S6      has 1 tier(s) with a base elevation of  392.70 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F3S6        1       29      4.20     4
                                                 293010.10  6562061.40 meters
                                             (      -855.40       926.20) meters
                                                 293120.10  6562065.90 meters
                                             (      -745.40       930.70) meters
                                                 293120.60  6562052.40 meters
                                             (      -744.90       917.20) meters
                                                 293010.70  6562048.00 meters
                                             (      -854.80       912.80) meters


F3S7      has 1 tier(s) with a base elevation of  392.70 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F3S7        1       30      4.20     4
                                                 293008.30  6562095.30 meters
                                             (      -857.20       960.10) meters
                                                 293118.20  6562099.70 meters
                                             (      -747.30       964.50) meters
                                                 293118.70  6562086.30 meters
                                             (      -746.80       951.10) meters
                                                 293008.80  6562081.80 meters
```

```
                                        (     -856.70      946.60) meters


F3S8      has 1 tier(s) with a base elevation of  392.70 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

F3S8        1       31      4.20     4
                                            293006.00  6562129.00 meters
                                        (     -859.50      993.80) meters
                                            293115.90  6562133.40 meters
                                        (     -749.60      998.20) meters
                                            293116.40  6562119.90 meters
                                        (     -749.10      984.70) meters
                                            293006.50  6562115.50 meters
                                        (     -859.00      980.30) meters


PTP       has 1 tier(s) with a base elevation of  384.30 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

PTP         1       32      6.00     4
                                            294163.10  6561032.80 meters
                                        (      297.60     -102.40) meters
                                            294174.00  6561099.00 meters
                                        (      308.50      -36.20) meters
                                            294198.70  6561095.00 meters
                                        (      333.20      -40.20) meters
                                            294187.80  6561028.80 meters
                                        (      322.30     -106.40) meters

Number of stacks to be processed :  55

                   STACK            STACK   COORDINATES
 STACK NAME     BASE  HEIGHT          X           Y

 LB01         388.00   13.00 METERS
                                 293833.20  6561137.10 meters
                             (      -32.30        1.90) meters
 LB02         388.00   13.00 METERS
                                 293821.30  6561124.90 meters
                             (      -44.20      -10.30) meters
 LB03         388.00   13.00 METERS
                                 293809.00  6561111.80 meters
                             (      -56.50      -23.40) meters
 LB04         388.00   13.00 METERS
                                 293783.10  6561093.50 meters
                             (      -82.40      -41.70) meters
 LB05         388.00   13.00 METERS
                                 293766.60  6561075.90 meters
                             (      -98.90      -59.30) meters
 DF01         388.00   13.00 METERS
                                 293846.60  6561107.40 meters
                             (      -18.90      -27.80) meters
 DF02         388.00   13.00 METERS
                                 293824.90  6561086.60 meters
                             (      -40.60      -48.60) meters
 DF03         388.00   13.00 METERS
                                 293805.80  6561068.50 meters
                             (      -59.70      -66.70) meters
 DF04         388.00   13.00 METERS
                                 293784.50  6561047.60 meters
                             (      -81.00      -87.60) meters
 EV01         388.00   13.00 METERS
                                 293823.60  6561037.80 meters
                             (      -41.90      -97.40) meters
 EV02         388.00   13.00 METERS
                                 293807.40  6561018.90 meters
                             (      -58.10     -116.30) meters
 OF01         388.00   13.00 METERS
                                 293845.50  6561014.10 meters
                             (      -20.00     -121.10) meters
 OF02         388.00   13.00 METERS
                                 293830.10  6560997.60 meters
```

```
                         (      -35.40     -137.60) meters
FT01          388.00   13.00 METERS
                             293841.40  6561009.60 meters
                         (      -24.10     -125.60) meters
FT02          388.00   13.00 METERS
                             293836.30  6561003.80 meters
                         (      -29.20     -131.40) meters
PP01          388.00   13.00 METERS
                             293832.40  6561058.00 meters
                         (      -33.10      -77.20) meters
BP01          388.00   13.00 METERS
                             293861.50  6561027.90 meters
                         (       -4.00     -107.30) meters
PF01          388.00   13.00 METERS
                             293881.60  6561005.40 meters
                         (       16.10     -129.80) meters
PW01          388.00   13.00 METERS
                             293840.30  6561048.70 meters
                         (      -25.20      -86.50) meters
SW01          388.00   13.00 METERS
                             293894.90  6560984.60 meters
                         (       29.40     -150.60) meters
CR01          388.00   13.00 METERS
                             293967.70  6560875.20 meters
                         (      102.20     -260.00) meters
CR02          388.00   13.00 METERS
                             293954.60  6560862.40 meters
                         (       89.10     -272.80) meters
BF1C1         385.00    2.00 METERS
                             293944.30  6561119.60 meters
                         (       78.80      -15.60) meters
BF1C2         385.00    2.00 METERS
                             293937.20  6561125.40 meters
                         (       71.70       -9.80) meters
BF1C3         385.00    2.00 METERS
                             293932.20  6561131.30 meters
                         (       66.70       -3.90) meters
BF2C1         385.00    2.00 METERS
                             293975.20  6561086.40 meters
                         (      109.70      -48.80) meters
BF2C2         385.00    2.00 METERS
                             293980.20  6561080.50 meters
                         (      114.70      -54.70) meters
BF2C3         385.00    2.00 METERS
                             293985.20  6561075.60 meters
                         (      119.70      -59.60) meters
F1S1          379.00    1.00 METERS
                             294751.70  6563420.10 meters
                         (      886.20     2284.90) meters
F1S2          377.80    1.00 METERS
                             294714.50  6563384.10 meters
                         (      849.00     2248.90) meters
F1S3          377.80    1.00 METERS
                             294675.50  6563348.30 meters
                         (      810.00     2213.10) meters
F1S4          382.10    1.00 METERS
                             294632.90  6563313.50 meters
                         (      767.40     2178.30) meters
F1S5          382.10    1.00 METERS
                             294594.30  6563276.60 meters
                         (      728.80     2141.40) meters
F1S6          382.10    1.00 METERS
                             294545.30  6563229.40 meters
                         (      679.80     2094.20) meters
F1S7          381.50    1.00 METERS
                             294506.30  6563193.10 meters
                         (      640.80     2057.90) meters
F1S8          384.10    1.00 METERS
                             294472.80  6563159.00 meters
                         (      607.30     2023.80) meters
F2S1          394.80    1.00 METERS
                             293960.40  6562570.00 meters
                         (       94.90     1434.80) meters
F2S2          394.80    1.00 METERS
                             293957.70  6562603.60 meters
```

```
                                   (       92.20     1468.40) meters
F2S3            394.90    1.00 METERS
                                       293956.70  6562637.50 meters
                                   (       91.20     1502.30) meters
F2S4            394.90    1.00 METERS
                                       293954.70  6562670.40 meters
                                   (       89.20     1535.20) meters
F2S5            397.30    1.00 METERS
                                       293633.20  6562552.50 meters
                                   (     -232.30     1417.30) meters
F2S6            397.30    1.00 METERS
                                       293632.20  6562586.10 meters
                                   (     -233.30     1450.90) meters
F2S7            393.00    1.00 METERS
                                       293632.20  6562618.50 meters
                                   (     -233.30     1483.30) meters
F2S8            393.00    1.00 METERS
                                       293630.70  6562652.90 meters
                                   (     -234.80     1517.70) meters
F3S1            397.80    1.00 METERS
                                       293338.20  6562037.70 meters
                                   (     -527.30      902.50) meters
F3S2            397.80    1.00 METERS
                                       293335.50  6562071.10 meters
                                   (     -530.00      935.90) meters
F3S3            397.80    1.00 METERS
                                       293334.50  6562104.70 meters
                                   (     -531.00      969.50) meters
F3S4            397.80    1.00 METERS
                                       293331.80  6562138.30 meters
                                   (     -533.70     1003.10) meters
F3S5            392.70    1.00 METERS
                                       292981.50  6562019.20 meters
                                   (     -884.00      884.00) meters
F3S6            392.70    1.00 METERS
                                       292979.90  6562052.80 meters
                                   (     -885.60      917.60) meters
F3S7            392.70    1.00 METERS
                                       292978.30  6562087.00 meters
                                   (     -887.20      951.80) meters
F3S8            392.70    1.00 METERS
                                       292976.20  6562120.90 meters
                                   (     -889.30      985.70) meters
SCR             384.30    6.00 METERS
                                       294177.20  6561041.80 meters
                                   (      311.70      -93.40) meters
DAF             384.30    6.00 METERS
                                       294180.80  6561063.90 meters
                                   (      315.30      -71.30) meters
SLG             384.30    6.00 METERS
                                       294184.40  6561086.00 meters
                                   (      318.90      -49.20) meters
```

Appendix D -

Example CALPUFF List File

```
                                       CALPUFF       Version: 7.2.1          Level: 150618
************************************************************************************************************************************



 Clock time: 10:50:13
       Date: 06-24-2020


Internal Coordinate Transformations by  ---  COORDLIB   Version: 1.99   Level: 070921


Control File Type: CALPUFF.INP     7.0             Groups 0f,0g added; new emission scaling


 Run Title:
    Baiada Oakburn
    Proposed Poultry Processing Facility - All sources
    S. Hayes 21/06/20


   ****  CONFIRMATION OF CONTROL DATA  ****


--------------  INPUT GROUP 1  ---------------

metrun  =  0
ibyr    =  2017
ibmo    =  1
ibdy    =  1
ibhr    =  0
ibsec   =  0
ibdathr =  201700100
ieyr    =  2018
iemo    =  1
iedy    =  1
iehr    =  0
iesec   =  0
iedathr =  201800100
nsecdt  =  3600
irlg    =  8760
iavg    =  1
xbtz    =  -10.0000000
abtz    = UTC+1000
nspec   =  1
nse     =  1
itest   =  1
metfm   =  1
mprffm  =  1
mrestart=  0
nrespd  =  0
```

```
avet    =  60.0000000
pgtime  =  60.0000000
ioutu   =  2

--------------  INPUT GROUP 2  ---------------

mgauss =  1
mctadj =  3
mctsg  =  0
mslug  =  0
mtrans =  1
mchem  =  0
maqchem =  0
mlwc   =  0
mwet   =  0
mdry   =  0
mtilt  =  0
mdisp  =  2
mdisp2 =  3
mturbvw =  3
mtauly =  0.00000000E+00
mtauadv=  0
mcturb =  1
mrough =  0
mtip   =  1
mbdw   =  2
mshear =  0
mrise  =  1
mrise_fl=  2
mtip_fl=  0
msplit =  0
mpartl =  1
mpartlba=  1
mtinv  =  0
mpdf   =  1
msgtibl=  0
mbcon  =  0
msource=  0
mfog   =  0
mreg   =  0

--------------  INPUT GROUP 3  ---------------

SPECIES: ODOR          j: 1  isplst(-,j) =   1  1  0  GROUP: ODOR

--------------  INPUT GROUP 4  ---------------

pmap    = UTM
datum   = WGS-84
daten   = 02-21-2003
utmhem  = S
```

```
 iutmzn  =  56
 nx      =  150
 ny      =  150
 nz      =  11
 zface  =  0.00000000E+00 20.0000000 40.0000000 80.0000000 160.000000 320.000000 640.000000 1000.00000 1500.00000 2000.00000 2500.00000
3000.00000
 dgridkm =  0.200000003
 xorigkm =  279.072998
 yorigkm =  6546.00781
 iutmzn  =  56
 ibcomp  =  50
 jbcomp  =  50
 iecomp  =  100
 jecomp  =  100
 lsamp   =  T
 ibsamp  =  64
 jbsamp  =  64
 iesamp  =  86
 jesamp  =  86
 meshdn  =  4

 --------------  INPUT GROUP 5  ---------------

 icon    =  1
 idry    =  0
 iwet    =  0
 it2d    =  0
 irho    =  0
 ivis    =  0
 lcomprs =  T
 icprt   =  0
 idprt   =  0
 iwprt   =  0
 icfrq   =  0
 idfrq   =  0
 iwfrq   =  0
 (note:  i_frq values converted to timesteps)
 iprtu   =  5
 imesg   =  2
 imflx   =  0
 imbal   =  0
 inrise  =  0
 iqaplot =  1
 ipftrak =  0
 ldebug  =  F
 ipfdeb  =  1
 npfdeb  =  1
 nn1     =  1
 nn2     =  10

 GROUP: ODOR          j:   1  ioutop(-,j) =  0 1 0 0 0 0 0
```

```
--------------  INPUT GROUP 6  ---------------

        ------  Subgroup (6a)  ------

nhill  =  0
nctrec =  0
mhill  =  2
xhill2m=  1.00000000
zhill2m=  1.00000000
xctdmkm=  0.00000000E+00
yctdmkm=  0.00000000E+00

        ------  Subgroup (6b)  ------


        ------  Subgroup (6c)  ------


--------------  INPUT GROUP 7  ---------------

SPECIES: ODOR          j:   1  dryg(-,j) =    -999.00   -999.00   -999.00   -999.00   -999.00

--------------  INPUT GROUP 8  ---------------

SPECIES: ODOR          j:   1  dryp(-,j) =    -999.00   -999.00

--------------  INPUT GROUP 9  ---------------

rcutr   =  30.0000000
rgr     =  10.0000000
reactr  =  8.00000000
pconst  =  2.30000001E-08
bmin    =  1.00000001E-07
bmax    =  2.49999994E-06
qswmax  =  600.000000
dconst1 =  2.00000000
dconst2 =  0.666666687
dconst3 =  4.79999988E-04
dconst4 =  0.666666687
nint    =  9
iveg    =  1

--------------  INPUT GROUP 10  ---------------

SPECIES: ODOR          j:   1  wa(-,j) =  0.000E+00   0.000E+00

--------------  INPUT GROUP 11  ---------------

moz      =  0
bcko3m   =  80.0000000 80.0000000 80.0000000 80.0000000
```

```
         =  80.0000000 80.0000000 80.0000000 80.0000000
         =  80.0000000 80.0000000 80.0000000 80.0000000
mnh3     =  0
mavgnh3  =  1
bcknh3m  =  10.0000000 10.0000000 10.0000000 10.0000000
         =  10.0000000 10.0000000 10.0000000 10.0000000
         =  10.0000000 10.0000000 10.0000000 10.0000000
rnite1   =  0.200000003
rnite2   =  2.00000000
rnite3   =  2.00000000
mh2o2    =  1
bckh2o2m =  1.00000000 1.00000000 1.00000000 1.00000000
         =  1.00000000 1.00000000 1.00000000 1.00000000
         =  1.00000000 1.00000000 1.00000000 1.00000000
rh_isrp  =  50.0000000
so4_isrp =  4.00000005E-07
bckpmf   =  1.00000000 1.00000000 1.00000000 1.00000000
         =  1.00000000 1.00000000 1.00000000 1.00000000
         =  1.00000000 1.00000000 1.00000000 1.00000000
ofrac    =  0.150000006 0.150000006 0.200000003 0.200000003
         =  0.200000003 0.200000003 0.200000003 0.200000003
         =  0.200000003 0.200000003 0.200000003 0.150000006
vcnx     =  50.0000000 50.0000000 50.0000000 50.0000000
         =  50.0000000 50.0000000 50.0000000 50.0000000
         =  50.0000000 50.0000000 50.0000000 50.0000000

--------------  INPUT GROUP 12  ---------------

sytdep   =  550.000000
mhftsz   =  0
jsup     =  5
conk1    =  9.99999978E-03
conk2    =  0.100000001
iurb1    =  10
iurb2    =  19

anemht   =  10.0000000
isigmav  =  1
imixctdm =  0
ilanduin =  20
z0in     =  0.250000000
xlaiin   =  3.00000000
elevin   =  0.00000000E+00
xlatin   =  -999.000000
xlonin   =  -999.000000

xmxlen   =  1.00000000
mxnew    =  99
xsamlen  =  1.00000000
mxsam    =  99
ncount   =  2
```

```
sl2pf    =  10.0000000
wscalm   =  0.499994993
cdiv     =  0.00000000E+00 0.00000000E+00

tkcat    =  265.000000   top for class 1
tkcat    =  270.000000   top for class 2
tkcat    =  275.000000   top for class 3
tkcat    =  280.000000   top for class 4
tkcat    =  285.000000   top for class 5
tkcat    =  290.000000   top for class 6
tkcat    =  295.000000   top for class 7
tkcat    =  300.000000   top for class 8
tkcat    =  305.000000   top for class 9
tkcat    =  310.000000   top for class 10
tkcat    =  315.000000   top for class 11

wscat    =  1.53999996   top for class 1
wscat    =  3.08999991   top for class 2
wscat    =  5.13999987   top for class 3
wscat    =  8.22999954   top for class 4
wscat    =  10.8000002   top for class 5

Over LAND
svmin    =  0.200000003  for stability 1
svmin    =  0.200000003  for stability 2
svmin    =  0.200000003  for stability 3
svmin    =  0.200000003  for stability 4
svmin    =  0.200000003  for stability 5
svmin    =  0.200000003  for stability 6
swmin    =  0.200000003  for stability 1
swmin    =  0.119999997  for stability 2
swmin    =  7.99999982E-02  for stability 3
swmin    =  5.99999987E-02  for stability 4
swmin    =  2.99999993E-02  for stability 5
swmin    =  1.60000008E-02  for stability 6

Over WATER
svmin    =  0.200000003  for stability 1
svmin    =  0.200000003  for stability 2
svmin    =  0.200000003  for stability 3
svmin    =  0.200000003  for stability 4
svmin    =  0.200000003  for stability 5
svmin    =  0.200000003  for stability 6
swmin    =  0.200000003  for stability 1
swmin    =  0.119999997  for stability 2
swmin    =  7.99999982E-02  for stability 3
swmin    =  5.99999987E-02  for stability 4
swmin    =  2.99999993E-02  for stability 5
swmin    =  1.60000008E-02  for stability 6

symin    =  1.00000000
```

```
szmin    =  1.00000000
szcap_m  =  5000000.00
xminzi   =  50.0000000
xmaxzi   =  3000.00000

plx0     =  7.00000003E-02    for stability 1
plx0     =  7.00000003E-02    for stability 2
plx0     =  0.100000001    for stability 3
plx0     =  0.150000006    for stability 4
plx0     =  0.349999994    for stability 5
plx0     =  0.550000012    for stability 6

ptg0     =  1.99999996E-02    for stability 5
ptg0     =  3.50000001E-02    for stability 6

ppc      =  0.500000000    for stability 1
ppc      =  0.500000000    for stability 2
ppc      =  0.500000000    for stability 3
ppc      =  0.500000000    for stability 4
ppc      =  0.349999994    for stability 5
ppc      =  0.349999994    for stability 6
tbd      =  0.500000000
tibldist =  1.00000000 10.0000000 9.00000000
nlutibl  =  4
fclip    =  0.00000000E+00
nsplit   =  3
iresplit =  0 0 0 0
         =  0 0 0 0
         =  0 0 0 0
         =  0 0 0 0
         =  0 1 0 0
         =  0 0 0 0
zisplit  =  100.000000
roldmax  =  0.250000000
nsplith  =  5
sysplith =  1.00000000
shsplith =  2.00000000
cnsplith =  1.00000001E-07
epsslug  =  9.99999975E-05
epsarea  =  9.99999997E-07
dsrise   =  1.00000000
trajincl =  20.0000000
mdepbc   =  1
htminbc  =  500.000000
rsampbc  =  10.0000000

--------------  INPUT GROUP 13  ---------------

npt1     =  31
iptu     =  5   units =   OUV/s
      converted to g/s, odour_units*m3/s, or Bq/s
```

```
      by factor:  1.00000000
 nspt1    =  5
 npt2     =  4

 cnampt1  = LB01            LB02            LB03            LB04            LB05            DF01            DF02            DF03
DF04            EV01            EV02            OF01            OF02            FT01            FT02            BP01            PF01
PP01            PW01            SW01            CR01            CR02            BF1C1           BF1C2           BF1C3           BF2C1
BF2C2           BF2C3           SCR             DAF             SLG
 xpt1grd  =  73.8009644 73.7414551 73.6799622 73.5505676 73.4680176 73.8679504 73.7594604 73.6639404 73.5574341 73.7530518 73.6720276
73.8624573 73.7855530 73.8420105 73.8165283 73.9425659 74.0429688 73.7969971 73.8365173 74.1094971 74.4735718 74.4079590 74.3565369
74.3209839 74.2959595 74.5109558 74.5359802 74.5610046 75.5209351 75.5389404 75.5569458
 ypt1grd  =  75.6469727 75.5859375 75.5200195 75.4272461 75.3393555 75.4980469 75.3930664 75.3027344 75.1977539 75.1489258 75.0561523
75.0317383 74.9487305 75.0097656 74.9804688 75.1000977 74.9877930 75.2514648 75.2050781 74.8828125 74.3359375 74.2724609 75.5590820
75.5883789 75.6176758 75.3930664 75.3637695 75.3393555 75.1708984 75.2807617 75.3906250
 htstak   =  13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000
13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 13.0000000 2.00000000
2.00000000 2.00000000 2.00000000 2.00000000 2.00000000 6.00000000 6.00000000 6.00000000
 elstak   =  388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000
388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 388.000000 385.000000
385.000000 385.000000 385.000000 385.000000 385.000000 384.299988 384.299988 384.299988
 diam     =  2.05999994 2.05999994 2.05999994 2.05999994 2.05999994 0.930000007 0.930000007 0.930000007 0.930000007 1.14999998 1.14999998
0.629999995 0.629999995 0.529999971 0.529999971 0.620000005 0.860000014 0.629999995 0.519999981 0.500000000 0.759999990 0.759999990
8.23999977 8.23999977 8.23999977 8.23999977 8.23999977 8.23999977 1.09000003 1.09000003 1.09000003
 exitw    =  15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000
15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 15.0000000 5.20000011E-02
5.20000011E-02 5.20000011E-02 5.20000011E-02 5.20000011E-02 5.20000011E-02 15.0000000 15.0000000 15.0000000
 tstak    =  293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994
293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 293.149994 313.149994
313.149994 313.149994 313.149994 313.149994 313.149994 273.149994 273.149994 273.149994
 idownw   =  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 syipt1   =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
 szipt1   =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
 fmfpt1   =  1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000
1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000
1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000
 zplatpt1 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00

 pt. source: LB01              number:  1
 qstak    =  2.29999995
 bwidth   =  356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
```

334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -259.320007 -225.259995 -184.350006 -137.839996 -109.010002 -109.430000 -106.529999 -100.389999 -91.1999969 -79.2399979 -64.8700027 -48.5299988 -30.7199993 -21.5900002 -24.8199997 -27.2900009 -28.9400005 -29.7000008 -29.5599995 -28.5200005 -26.6200008 -44.3499985 -89.1500015 -137.669998 -182.000000 -220.809998 -252.899994 -277.309998 -293.290009 -300.369995 -298.309998 -299.570007 -310.149994 -311.309998 -303.010010 -285.500000
ybadj1 = -99.0400009 -114.209999 -125.919998 -133.800003 -138.990005 -142.660004 -142.009995 -137.039993 -127.900002 -114.879997 -98.3700027 -78.8600006 -46.7500000 -9.93000031 14.1199999 37.7400017 60.2099991 80.8499985 99.0400009 114.209999 125.919998 133.800003 138.990005 142.660004 142.009995 137.039993 127.900002 114.879997 98.3700027 78.8600006 46.7500000 9.93000031 -14.1199999 -37.7400017 -60.2099991 -80.8499985
ODOR Emission Factor Type: HOUR24
Index 1 to 24 Emission Factor = 0.00000000E+00 0.330000013 0.670000017 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 0.670000017 0.330000013 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00

pt. source: LB02 number: 2
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -245.240005 -209.720001 -167.830002 -120.849998 -92.0500031 -93.0299988 -91.1699982 -86.5500031 -79.3000031 -69.6399994 -57.8600006 -44.3300018 -29.4400005 -23.2900009 -29.4400005 -34.6899986 -38.8800011 -41.9000015 -43.6399994 -44.0600014 -43.1399994 -61.3499985 -106.110001 -154.070007 -197.360001 -234.639999 -264.799988 -286.910004 -300.299988 -304.570007 -299.589996 -297.869995 -305.529999 -303.910004 -293.059998 -273.299988
ybadj1 = -108.639999 -121.220001 -130.119995 -135.070007 -137.289993 -138.050003 -134.610001 -127.089996 -115.699997 -100.800003 -82.8300018 -62.3499985 -29.7500000 7.03000021 30.5200005 53.0900002 74.0500031 92.7500000 108.639999 121.220001 130.119995 135.070007 137.289993 138.050003 134.610001 127.089996 115.699997 100.800003 82.8300018 62.3499985 29.7500000 -7.03000021 -30.5200005 -53.0900002 -74.0500031 -92.7500000
ODOR Emission Factor Type: HOUR24
Index 1 to 24 Emission Factor = 0.00000000E+00 0.330000013 0.670000017 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 0.670000017 0.330000013 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00

pt. source: LB03 number: 3

```
 qstak    =  2.29999995
 bwidth   =  356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
 bht      =  12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002
 bln1     =  288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
 xbadj1   =  -230.199997 -193.210007 -150.339996 -102.910004 -74.2099991 -75.8199997 -75.1399994 -72.1600037 -67.0000000 -59.7999992 -
50.7799988 -40.2200012 -28.4400005 -25.4200001 -34.6300011 -42.7900009 -49.6500015 -55.0000000 -58.6800003 -60.5800018 -60.6300011 -
79.2900009 -123.949997 -171.279999 -213.399994 -249.029999 -277.100006 -296.750000 -307.380005 -308.679993 -300.589996 -295.739990 -
300.339996 -295.809998 -282.290009 -260.200012
 ybadj1   =  -118.470001 -128.300003 -134.229996 -136.070007 -135.160004 -132.850006 -126.510002 -116.320000 -102.599998 -85.7600021 -
66.3099976 -44.8499985 -11.8100004 24.8700008 47.7299995 69.1299973 88.4300003 105.050003 118.470001 128.300003 134.229996 136.070007
135.160004 132.850006 126.510002 116.320000 102.599998 85.7600021 66.3099976 44.8499985 11.8100004 -24.8700008 -47.7299995 -69.1299973 -
88.4300003 -105.050003
 ODOR        Emission Factor Type: HOUR24
 Index  1  to  24  Emission Factor =  0.00000000E+00 0.330000013 0.670000017 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000
1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 0.670000017 0.330000013
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00

 pt. source: LB04              number:  4
 qstak    =  2.29999995
 bwidth   =  356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
 bht      =  12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002
 bln1     =  288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
 xbadj1   =  -207.679993 -167.149994 -121.540001 -72.2399979 -42.5999985 -44.2400017 -44.5400009 -43.4799995 -41.0999985 -37.4700012 -
32.7000008 -26.9400005 -20.3600006 -22.7900009 -37.5299988 -51.1300011 -63.1699982 -73.3000031 -81.1999969 -86.6299973 -89.4300003 -
109.949997 -155.559998 -202.860001 -243.990005 -277.720001 -303.000000 -319.079987 -325.459991 -321.959991 -308.670013 -298.369995 -
297.440002 -287.470001 -268.769989 -241.899994
 ybadj1   =  -140.800003 -146.380005 -147.509995 -144.149994 -137.789993 -129.960007 -118.169998 -102.800003 -84.3000031 -63.2400017 -
40.2599983 -16.0599995 18.8600006 56.4799995 79.3099976 99.7300034 117.120003 130.949997 140.800003 146.380005 147.509995 144.149994
137.789993 129.960007 118.169998 102.800003 84.3000031 63.2400017 40.2599983 16.0599995 -18.8600006 -56.4799995 -79.3099976 -99.7300034 -
117.120003 -130.949997
 ODOR        Emission Factor Type: HOUR24
```

```
 Index  1  to  24  Emission Factor =  0.00000000E+00 0.330000013 0.670000017 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000
1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 0.670000017 0.330000013
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00

 pt. source: LB05             number:  5
 qstak    =  2.29999995
 bwidth   =  356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
 bht      =  12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002
 bln1     =  288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
 xbadj1   =  -187.479996 -144.970001 -98.0500031 -48.1500015 -18.6499996 -21.1499996 -23.0100002 -24.1700001 -24.6000004 -24.2800007 -
23.2199993 -21.4500008 -19.0400009 -25.6700001 -44.5200005 -62.0200005 -77.6399994 -90.9000015 -101.400002 -108.809998 -112.919998 -
134.039993 -179.509995 -225.949997 -265.519989 -297.019989 -319.500000 -332.269989 -334.950012 -327.450012 -309.989990 -295.500000 -
290.450012 -276.579987 -254.300003 -224.300003
 ybadj1   =  -154.000000 -155.860001 -153.000000 -145.479996 -134.910004 -122.959999 -107.279999 -88.3300018 -66.6999969 -43.0400009 -
18.0799999 7.44000006 42.9500008 80.4300003 102.400002 121.250000 136.419998 147.449997 154.000000 155.860001 153.000000 145.479996
134.910004 122.959999 107.279999 88.3300018 66.6999969 43.0400009 18.0799999 -7.44000006 -42.9500008 -80.4300003 -102.400002 -121.250000 -
136.419998 -147.449997
 ODOR         Emission Factor Type: HOUR24
 Index  1  to  24  Emission Factor =  0.00000000E+00 0.330000013 0.670000017 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000
1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000 0.670000017 0.330000013
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00

 pt. source: DF01             number:  6
 qstak    =  2.29999995
 bwidth   =  356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 45.0999985 44.4700012 42.4799995 40.6599998 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
 bht      =  12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 16.0000000 16.0000000 16.0000000 16.0000000 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002
 bln1     =  288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 44.7999992 44.3499985 42.5400009 39.4500008 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
 xbadj1   =  -232.399994 -201.929993 -165.330002 -123.699997 -100.180000 -106.190002 -108.959999 -108.430000 -104.599998 -97.5899963 -
87.6200027 -74.9899979 -60.0699997 -52.9599991 -57.2400017 -59.7900009 -60.5099983 -59.4000015 -56.4799995 -51.8499985 -45.6399994 -
58.4900017 -97.9800034 -140.910004 -179.570007 -212.770004 -115.199997 -118.500000 -118.209999 -114.320000 -268.959991 -268.200012 -
277.730011 -278.820007 -271.429993 -255.800003
 ybadj1   =  -80.6800003 -91.4599991 -99.4599991 -104.440002 -107.620003 -110.239998 -109.519997 -105.459999 -98.1999969 -87.9599991 -
75.0400009 -59.8400002 -32.6100006 -1.10000002 17.3600006 35.2999992 52.1699982 67.4499969 80.6800003 91.4599991 99.4599991 104.440002
```

107.620003 110.239998 109.519997 105.459999 27.7500000 11.2200003 -5.65000010 -21.6200008 32.6100006 1.10000002 -17.3600006 -35.2999992 -52.1699982 -67.4499969

pt. source: DF02 number: 7
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -208.139999 -174.960007 -136.470001 -93.8199997 -70.1900024 -76.9899979 -81.4599991 -83.4499969 -82.9000015 -79.8300018 -74.3399963 -66.5899963 -56.8199997 -54.9399986 -64.4100037 -71.9100037 -77.2300034 -80.1999969 -80.7399979 -78.8199997 -74.5100021 -88.3700027 -127.970001 -170.110001 -207.070007 -237.750000 -261.200012 -276.720001 -283.820007 -282.309998 -272.209991 -266.220001 -270.570007 -266.690002 -254.720001 -235.000000
ybadj1 = -98.4400024 -104.739998 -107.860001 -107.699997 -105.639999 -103.080002 -97.3899994 -88.7399979 -77.4000015 -63.7000008 -48.0699997 -30.9799995 -2.73000002 28.8899994 46.5600014 62.8100014 77.1500015 89.1500015 98.4400024 104.739998 107.860001 107.699997 105.639999 103.080002 97.3899994 88.7399979 77.4000015 63.7000008 48.0699997 30.9799995 2.73000002 -28.8899994 -46.5600014 -62.8100014 -77.1500015 -89.1500015

pt. source: DF03 number: 8
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -187.000000 -151.419998 -111.239998 -67.6800003 -43.9199982 -51.4000015 -57.3199997 -61.4900017 -63.7999992 -64.1699982 -62.5900002 -59.0999985 -53.8199997 -56.5299988 -70.5299988 -82.3799973 -91.7399979 -98.3000031 -101.879997 -102.360001 -99.7300034 -114.510002 -154.240005 -195.699997 -231.210007 -259.700012 -280.299988 -292.380005 -295.579987 -289.799988 -275.209991 -264.630005 -264.440002 -256.220001 -240.210007 -216.899994
ybadj1 = -114.110001 -116.500000 -115.349998 -110.690002 -104.050003 -96.9599991 -86.9199982 -74.2399979 -59.2999992 -42.5600014 -24.5300007 -5.76000023 23.4200001 55.1599998 72.1500015 86.9499969 99.0999985 108.250000 114.110001 116.500000 115.349998 110.690002 104.050003 96.9599991 86.9199982 74.2399979 59.2999992 42.5600014 24.5300007 5.76000023 -23.4200001 -55.1599998 -72.1500015 -86.9499969 -99.0999985 -108.250000

pt. source: DF04 number: 9
qstak = 2.29999995

bwidth   = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
bht   = 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
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12.8000002
bln1   = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
xbadj1   = -162.720001 -124.500000 -82.4899979 -37.9799995 -14.1700001 -22.5100002 -30.1599998 -36.8899994 -42.5000000 -46.8199997 -
49.7200012 -51.1100006 -50.9399986 -58.8499985 -77.9800034 -94.7399979 -108.620003 -119.199997 -126.160004 -129.279999 -128.479996 -
144.210007 -183.990005 -224.589996 -258.380005 -284.309998 -301.600006 -309.730011 -308.450012 -297.790009 -278.089996 -262.309998 -
256.989990 -243.860001 -223.320007 -196.000000
ybadj1   = -131.449997 -129.360001 -123.339996 -113.580002 -101.730003 -89.5100021 -74.5599976 -57.3499985 -38.4000015 -18.2800007
2.39000010 22.9899998 53.1199989 84.9100037 101.040001 114.110001 123.709999 129.550003 131.449997 129.360001 123.339996 113.580002
101.730003 89.5100021 74.5599976 57.3499985 38.4000015 18.2800007 -2.39000010 -22.9899998 -53.1199989 -84.9100037 -101.040001 -114.110001 -
123.709999 -129.550003

pt. source: EV01   number: 10
qstak   = 2.29999995
bwidth   = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
bht   = 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
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12.8000002
bln1   = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
xbadj1   = -159.860001 -128.660004 -93.5500031 -55.5999985 -37.8300018 -51.4700012 -63.5499992 -73.6900024 -81.5999985 -87.0299988 -
89.8099976 -89.8700027 -87.1900024 -91.4899979 -106.019997 -117.320000 -125.059998 -129.000000 -129.020004 -125.120003 -117.419998 -
126.589996 -160.330002 -195.630005 -224.990005 -247.500000 -262.500000 -269.519989 -268.350006 -259.029999 -241.839996 -229.669998 -
228.949997 -221.279999 -206.880005 -186.199997
ybadj1   = -91.2500000 -89.2699966 -84.5800018 -77.3199997 -69.0899963 -61.4700012 -51.9799995 -40.9099998 -28.6000004 -15.4200001 -
1.76999998 11.9300003 35.4900017 61.2500000 72.0800018 80.7200012 86.9100037 90.4499969 91.2500000 89.2699966 84.5800018 77.3199997
69.0899963 61.4700012 51.9799995 40.9099998 28.6000004 15.4200001 1.76999998 -11.9300003 -35.4900017 -61.2500000 -72.0800018 -80.7200012 -
86.9100037 -90.4499969

pt. source: EV02   number: 11
qstak   = 2.29999995
bwidth   = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006

bht = 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
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12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
xbadj1 = -138.429993 -105.360001 -69.0899963 -30.7099991 -13.2700005 -27.9899998 -41.8600006 -54.4599991 -65.4000015 -74.3600006 -
81.0500031 -85.2900009 -86.9300003 -95.5599976 -114.290001 -129.539993 -140.860001 -147.899994 -150.449997 -148.419998 -141.889999 -
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ybadj1 = -103.919998 -98.0299988 -89.1600037 -77.5800018 -65.0199966 -53.2000008 -39.7599983 -25.1100006 -9.69999981 6.01000023
21.5300007 36.4000015 60.3800011 85.8099976 95.5599976 102.410004 106.139999 106.650002 103.919998 98.0299988 89.1600037 77.5800018
65.0199966 53.2000008 39.7599983 25.1100006 9.69999981 -6.01000023 -21.5300007 -36.4000015 -60.3800011 -85.8099976 -95.5599976 -102.410004 -
106.139999 -106.650002

pt. source: OF01 number: 12
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
bht = 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
xbadj1 = -140.320007 -113.879997 -83.9800034 -51.5299988 -39.3699989 -58.5800018 -76.0199966 -91.1399994 -103.500000 -112.709999 -
118.500000 -120.680000 -119.199997 -123.720001 -137.490005 -147.080002 -152.199997 -152.699997 -148.559998 -139.899994 -126.989998 -
130.669998 -158.789993 -188.520004 -212.509995 -230.050003 -240.600006 -243.839996 -239.669998 -228.220001 -209.830002 -197.440002 -
197.479996 -191.520004 -179.740005 -162.500000
ybadj1 = -65.5599976 -60.5900002 -53.7700005 -45.3100014 -36.8600006 -29.9899998 -22.2199993 -13.7700005 -4.90000010 4.11999989
13.0100002 21.5100002 39.5699997 59.7099991 64.9700012 68.2500000 69.4499969 68.5500031 65.5599976 60.5900002 53.7700005 45.3100014
36.8600006 29.9899998 22.2199993 13.7700005 4.90000010 -4.11999989 -13.0100002 -21.5100002 -39.5699997 -59.7099991 -64.9700012 -68.2500000 -
69.4499969 -68.5500031

pt. source: OF02 number: 13
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
bht = 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002

bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -121.400002 -93.1100006 -61.9900017 -28.9899998 -16.9699993 -37.0000000 -55.9000015 -73.1100006 -88.0999985 -100.410004 -109.669998 -115.599998 -118.010002 -126.470001 -144.080002 -157.320007 -165.779999 -169.199997 -167.479996 -160.669998 -148.979996 -153.210007 -181.190002 -210.100006 -232.630005 -248.080002 -256.000000 -256.140015 -248.500000 -233.300003 -211.020004 -194.699997 -190.889999 -181.279999 -166.169998 -146.000000
ybadj1 = -77.8600006 -69.4100037 -58.8499985 -46.5000000 -34.1199989 -23.3999996 -11.9799995 -0.189999998 11.6000004 23.0400009 33.7799988 43.5000000 62.1100006 82.1100006 86.5500031 88.3600006 87.4800034 83.9499969 77.8600006 69.4100037 58.8499985 46.5000000 34.1199989 23.3999996 11.9799995 0.189999998 -11.6000004 -23.0400009 -33.7799988 -43.5000000 -62.1100006 -82.1100006 -86.5500031 -88.3600006 -87.4800034 -83.9499969

pt. source: FT01 number: 14
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -135.179993 -108.250000 -78.0299988 -45.4399986 -33.3400002 -52.7799988 -70.6299973 -86.3199997 -99.4000015 -109.449997 -116.180000 -119.379997 -118.949997 -124.540001 -139.339996 -149.910004 -155.919998 -157.199997 -153.699997 -145.529999 -132.940002 -136.750000 -164.830002 -194.320007 -217.899994 -234.869995 -244.699997 -247.089996 -241.979996 -229.520004 -210.080002 -196.630005 -195.630005 -188.690002 -176.020004 -158.000000
ybadj1 = -68.8199997 -62.9000015 -55.0699997 -45.5600014 -36.0499992 -28.1499996 -19.3899994 -10.0500002 -0.400000006 9.26000023 18.6399994 27.4500008 45.6500015 65.7399979 70.7699966 73.6399994 74.2699966 72.6500015 68.8199997 62.9000015 55.0699997 45.5600014 36.0499992 28.1499996 19.3899994 10.0500002 0.400000006 -9.26000023 -18.6399994 -27.4500008 -45.6500015 -65.7399979 -70.7699966 -73.6399994 -74.2699966 -72.6500015

pt. source: FT02 number: 15
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012

xbadj1   = -128.580002 -101.059998 -70.4599991 -37.7200012 -25.7000008 -45.4700012 -63.8499985 -80.3000031 -94.3000031 -105.440002 -113.379997 -117.870003 -118.779999 -125.699997 -141.809998 -153.610001 -160.750000 -163.000000 -160.300003 -152.729996 -140.509995 -144.470001 -172.460007 -201.630005 -224.679993 -240.899994 -249.800003 -251.110001 -244.789993 -231.029999 -210.259995 -195.460007 -193.160004 -184.990005 -171.190002 -152.199997
ybadj1   = -72.8399963 -65.7099991 -56.5800018 -45.7400017 -34.8800011 -25.6700001 -15.6899996 -5.21999979 5.40000010 15.8599997 25.8299999 35.0299988 53.3699989 73.3799973 78.0800018 80.4100037 80.3000031 77.7500000 72.8399963 65.7099991 56.5800018 45.7400017 34.8800011 25.6700001 15.6899996 5.21999979 -5.40000010 -15.8599997 -25.8299999 -35.0299988 -53.3699989 -73.3799973 -78.0800018 -80.4100037 -80.3000031 -77.7500000

pt. source: BP01   number: 16
qstak   = 2.29999995
bwidth   = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 34.3600006 38.9099998 42.2799988 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht   = 12.8000002 16.0000000 16.0000000 16.0000000 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
bln1   = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 36.1100006 39.3300018 41.6500015 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1   = -156.690002 -132.320007 -103.930000 -72.3799973 -60.5000000 -79.3399963 -95.7699966 -109.300003 -119.500000 -126.070000 -128.809998 -127.639999 -122.589996 -123.440002 -133.539993 -139.589996 -141.389999 -138.899994 -132.190002 -121.459999 -107.040001 -109.809998 -109.230003 -112.059998 -111.489998 -211.899994 -224.600006 -230.479996 -229.350006 -221.259995 -206.440002 -197.729996 -201.429993 -199.009995 -190.550003 -176.300003
ybadj1   = -52.2000008 -50.2700005 -46.8100014 -41.9300003 -37.1399994 -33.9399986 -29.7099991 -24.5799999 -18.7000008 -12.2500000 -5.42999983 1.55999994 18.7099991 38.5800018 44.2099991 48.4900017 51.2999992 52.5499992 52.2000008 50.2700005 46.8100014 41.9300003 10.3999996 -5.88999987 -22.0000000 24.5799999 18.7000008 12.2500000 5.42999983 -1.55999994 -18.7099991 -38.5800018 -44.2099991 -48.4900017 -51.2999992 -52.5499992

pt. source: PF01   number: 17
qstak   = 2.29999995
bwidth   = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 42.5400009 39.4500008 35.1500015 34.3600006 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht   = 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 16.0000000 16.0000000 16.0000000 16.0000000 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
bln1   = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 42.4799995 40.6599998 37.6500015 36.1100006 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1   = -138.020004 -118.050003 -94.4899979 -68.0699997 -61.4300003 -85.5000000 -106.970001 -125.180000 -139.600006 -149.770004 -155.399994 -156.300003 -152.449997 -153.589996 -163.080002 -167.600006 -167.039993 -161.399994 -150.860001 -110.769997 -112.779999 -111.370003 -108.300003 -161.600006 -181.559998 -196.009995 -204.500000 -206.779999 -202.770004 -192.600006 -176.580002 -167.570007 -171.889999 -171.000000 -164.899994 -153.800003

ybadj1 = -28.5000000 -23.6900005 -18.1499996 -12.0699997 -6.98999977 -4.40999985 -1.70000005 1.07000005 3.79999995 6.42000008 8.84000015 10.9899998 23.0300007 37.6500015 38.0499992 37.2999992 35.4099998 32.4500008 28.5000000 29.1599998 13.2799997 -3.00000000 -19.7600002 4.40999985 1.70000005 -1.07000005 -3.79999995 -6.42000008 -8.84000015 -10.9899998 -23.0300007 -37.6500015 -38.0499992 -37.2999992 -35.4099998 -32.4500008

pt. source: PP01 number: 18
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -181.279999 -150.649994 -115.449997 -76.7300034 -57.5499992 -69.1900024 -78.7200012 -85.8700027 -90.4000015 -92.1900024 -91.1699982 -87.3899994 -80.9499969 -81.6699982 -92.9199982 -101.349998 -106.699997 -108.800003 -107.599998 -103.129997 -95.5199966 -105.459999 -140.610001 -177.910004 -209.809998 -235.330002 -253.699997 -264.359985 -266.989990 -261.510010 -248.080002 -239.490005 -242.050003 -237.250000 -225.250000 -206.399994
ybadj1 = -86.0899963 -87.9100037 -87.0599976 -83.5699997 -78.9100037 -74.5599976 -67.9499969 -59.2799988 -48.7999992 -36.8400002 -23.7600002 -9.96000004 14.3599997 41.5299988 54.3600006 65.5400009 74.7300034 81.6500015 86.0899963 87.9100037 87.0599976 83.5699997 78.9100037 74.5599976 67.9499969 59.2799988 48.7999992 36.8400002 23.7600002 9.96000004 -14.3599997 -41.5299988 -54.3600006 -65.5400009 -74.7300034 -81.6500015

pt. source: PW01 number: 19
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -173.490005 -144.619995 -111.339996 -74.6900024 -57.6300011 -71.3799973 -82.9700012 -92.0299988 -98.3000031 -101.580002 -101.779999 -98.8799973 -92.9800034 -93.8799973 -104.930000 -112.790001 -117.230003 -118.099998 -115.389999 -109.160004 -99.6299973 -107.500000 -140.529999 -175.720001 -205.559998 -229.160004 -245.800003 -254.970001 -256.390015 -250.020004 -236.050003 -227.289993 -230.039993 -225.809998 -214.720001 -197.100006
ybadj1 = -76.6900024 -77.3099976 -75.5699997 -71.5400009 -66.6999969 -62.5600014 -56.5099983 -48.7500000 -39.5000000 -29.0499992 -17.7299995 -5.86000013 16.4099998 41.4500008 52.1699982 61.2999992 68.5699997 73.7500000 76.6900024 77.3099976 75.5699997 71.5400009 66.6999969 62.5600014 56.5099983 48.7500000 39.5000000 29.0499992 17.7299995 5.86000013 -16.4099998 -41.4500008 -52.1699982 -61.2999992 -68.5699997 -73.7500000

pt. source: SW01 number: 20
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
bht = 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
xbadj1 = -119.849998 -103.059998 -83.1299973 -60.6800003 -58.2500000 -86.6200027 -112.349998 -134.669998 -152.899994 -166.479996 -
175.009995 -178.220001 -176.009995 -178.080002 -187.740005 -191.699997 -189.830002 -182.199997 -169.029999 -150.720001 -127.839996 -
121.510002 -139.910004 -160.479996 -176.179993 -186.520004 -191.199997 -190.070007 -183.160004 -170.679993 -153.020004 -143.089996 -
147.229996 -146.899994 -142.110001 -133.000000
ybadj1 = -11.7900000 -4.07000017 3.76999998 11.4899998 17.4899998 20.2500000 22.3999996 23.8600006 24.6000004 24.5900002 23.8299999
22.3500004 30.4200001 40.8300018 36.9300003 31.9200001 25.9300003 19.1499996 11.7900000 4.07000017 -3.76999998 -11.4899998 -17.4899998 -
20.2500000 -22.3999996 -23.8600006 -24.6000004 -24.5900002 -23.8299999 -22.3500004 -30.4200001 -40.8300018 -36.9300003 -31.9200001 -
25.9300003 -19.1499996

pt. source: CR01 number: 21
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004
334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012
344.100006
bht = 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002
12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013
348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004
247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002
315.200012
xbadj1 = -24.7500000 -25.1499996 -24.7900009 -23.6700001 -43.7000008 -94.9599991 -143.339996 -187.369995 -225.699997 -257.170013 -
280.829987 -295.959991 -302.100006 -308.679993 -318.880005 -319.399994 -310.209991 -291.600006 -264.130005 -228.630005 -186.179993 -
158.520004 -154.460007 -152.139999 -145.190002 -133.830002 -118.400002 -99.3799973 -77.3300018 -52.9399986 -26.9400005 -12.4899998 -
16.0900002 -19.2000008 -21.7299995 -23.6000004
ybadj1 = 78.9000015 101.750000 121.510002 137.580002 148.100006 151.399994 150.100006 144.240005 134.000000 119.690002 101.739998
80.6999969 67.4300003 55.3800011 28.5900002 0.920000017 -26.7700005 -53.6500015 -78.9000015 -101.750000 -121.510002 -137.580002 -148.100006 -
151.399994 -150.100006 -144.240005 -134.000000 -119.690002 -101.739998 -80.6999969 -67.4300003 -55.3800011 -28.5900002 -0.920000017
26.7700005 53.6500015

pt. source: CR02 number: 22
qstak = 2.29999995
bwidth = 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999
210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004

334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006
bht = 12.8000002
bln1 = 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012 288.880005 253.779999 210.970001 182.190002 198.160004 247.100006 288.529999 321.200012 344.100006 356.549988 358.170013 348.899994 329.029999 321.160004 334.970001 338.600006 331.940002 315.200012
xbadj1 = -9.86999989 -8.64000034 -7.15000010 -5.44999981 -25.4300003 -77.2200012 -126.650002 -172.240005 -212.600006 -246.500000 -272.899994 -291.019989 -300.290009 -310.059998 -323.420013 -326.950012 -320.540009 -304.399994 -279.010010 -245.139999 -203.820007 -176.750000 -172.729996 -169.880005 -161.880005 -148.949997 -131.500000 -110.050003 -85.2600021 -57.8800011 -28.7399998 -11.1000004 -11.5500002 -11.6499996 -11.3999996 -10.8000002
ybadj1 = 68.2200012 93.8199997 116.570000 135.770004 149.479996 155.929993 157.649994 154.570007 146.800003 134.570007 118.250000 98.3300018 85.6500015 73.6500015 46.3300018 17.6100006 -11.6499996 -40.5499992 -68.2200012 -93.8199997 -116.570000 -135.770004 -149.479996 -155.929993 -157.649994 -154.570007 -146.800003 -134.570007 -118.250000 -98.3300018 -85.6500015 -73.6500015 -46.3300018 -17.6100006 11.6499996 40.5499992

pt. source: BF1C1 number: 23
qstak = 2.29999995
bwidth = 44.3499985 42.5400009 39.4500008 35.1500015 321.160004 39.7200012 43.1800003 45.3300018 46.0999985 45.4700012 43.4599991 40.1199989 35.5699997 33.9000015 39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009 39.4500008 35.1500015 321.160004 39.7200012 43.1800003 45.3300018 46.0999985 45.4700012 43.4599991 40.1199989 35.5699997 33.9000015 39.3300018 41.6500015 43.8899994 44.7999992
bht = 16.0000000 16.0000000 16.0000000 16.0000000 12.8000002 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 12.8000002 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 16.0000000 16.0000000 16.0000000 16.0000000
bln1 = 44.4700012 42.4799995 40.6599998 37.6500015 198.160004 38.6899986 42.2999992 44.6300011 45.5999985 45.1899986 43.4000015 40.2900009 35.9599991 35.0600014 38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995 40.6599998 37.6500015 198.160004 38.6899986 42.2999992 44.6300011 45.5999985 45.1899986 43.4000015 40.2900009 35.9599991 35.0600014 38.9099998 42.2799988 44.3600006 45.0999985
xbadj1 = -62.4399986 -60.4799995 -58.1300011 -54.0600014 -182.869995 -12.8599997 -10.4600000 -7.75000000 -4.80000019 -1.71000004 1.44000006 4.53999996 7.51000023 7.96999979 12.6700001 14.7100000 16.2999992 17.3999996 17.9699993 17.9899998 17.4699993 16.4099998 -15.2900000 -25.8299999 -31.8400002 -36.8800011 -40.7999992 -43.4799995 -44.8400002 -44.8300018 -43.4700012 -43.0299988 -51.5800018 -56.9900017 -60.6599998 -62.5000000
ybadj1 = -2.23000002 -9.30000019 -16.0799999 -22.3799992 -54.1699982 -24.7900009 -23.3299999 -21.1599998 -18.3500004 -14.9799995 -11.1599998 -6.98999977 -2.61999989 2.08999991 -25.1599998 -18.5100002 -11.8800001 -4.90000010 2.23000002 9.30000019 16.0799999 22.3799992 54.1699982 24.7900009 23.3299999 21.1599998 18.3500004 14.9799995 11.1599998 6.98999977 2.61999989 -2.08999991 25.1599998 18.5100002 11.8800001 4.90000010

pt. source: BF1C2 number: 24
qstak = 2.29999995
bwidth = 44.3499985 42.5400009 39.4500008 329.029999 321.160004 334.970001 338.600006 45.3300018 46.0999985 45.4700012 43.4599991 40.1199989 35.5699997 33.9000015 39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009 39.4500008 329.029999 321.160004 334.970001 338.600006 45.3300018 46.0999985 45.4700012 43.4599991 40.1199989 35.5699997 33.9000015 39.3300018 41.6500015 43.8899994 44.7999992
bht = 16.0000000 16.0000000 16.0000000 12.8000002 12.8000002 12.8000002 12.8000002 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 12.8000002 12.8000002

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12.8000002 12.8000002 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 16.0000000 16.0000000 16.0000000
16.0000000
 bln1     =  44.4700012 42.4799995 40.6599998 200.750000 198.160004 247.100006 288.529999 44.6300011 45.5999985 45.1899986 43.4000015
40.2900009 35.9599991 35.0600014 38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995 40.6599998 200.750000 198.160004
247.100006 288.529999 44.6300011 45.5999985 45.1899986 43.4000015 40.2900009 35.9599991 35.0600014 38.9099998 42.2799988 44.3600006
45.0999985
 xbadj1   =  -66.9199982 -63.5000000 -59.5999985 -195.729996 -181.160004 -193.649994 -200.259995 -1.75999999 2.29999995 6.28999996 10.1000004
13.5900002 16.6700001 16.9799995 21.2399998 22.5900002 23.2500000 23.2000008 22.4500008 21.0100002 18.9400005 -5.01999998 -17.0000000 -
53.4500008 -88.2799988 -42.8699989 -47.9000015 -51.4799995 -53.4900017 -53.8800011 -52.6300011 -52.0299988 -60.1500015 -64.8700027 -
67.6100006 -68.3000031
 ybadj1   =  -10.2299995 -17.9500008 -25.1299992 -46.6100006 -63.1699982 -80.5299988 -95.4400024 -28.1100006 -24.1499996 -19.4599991 -
14.1800003 -8.46000004 -2.49000001 3.79999995 -21.9099998 -13.8199997 -5.90000010 2.20000005 10.2299995 17.9500008 25.1299992 46.6100006
63.1699982 80.5299988 95.4400024 28.1100006 24.1499996 19.4599991 14.1800003 8.46000004 2.49000001 -3.79999995 21.9099998 13.8199997
5.90000010 -2.20000005

 pt. source: BF1C3             number:  25
 qstak    =  2.29999995
 bwidth   =  44.3499985 42.5400009 348.899994 329.029999 321.160004 334.970001 338.600006 336.179993 46.0999985 45.4700012 43.4599991
40.1199989 35.5699997 33.9000015 39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009 348.899994 329.029999 321.160004
334.970001 338.600006 336.179993 46.0999985 45.4700012 43.4599991 40.1199989 35.5699997 33.9000015 39.3300018 41.6500015 43.8899994
44.7999992
 bht      =  16.0000000 16.0000000 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 12.8000002 14.3999996 14.3999996 14.3999996
14.3999996 14.3999996 14.3999996 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 12.8000002 12.8000002 12.8000002
12.8000002 12.8000002 12.8000002 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 16.0000000 16.0000000 16.0000000
16.0000000
 bln1     =  44.4700012 42.4799995 244.660004 200.750000 198.160004 247.100006 288.529999 321.200012 45.5999985 45.1899986 43.4000015
40.2900009 35.9599991 35.0600014 38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995 244.660004 200.750000 198.160004
247.100006 288.529999 321.200012 45.5999985 45.1899986 43.4000015 40.2900009 35.9599991 35.0600014 38.9099998 42.2799988 44.3600006
45.0999985
 xbadj1   =  -71.8600006 -67.3300018 -228.830002 -197.039993 -181.119995 -192.270004 -197.570007 -196.880005 7.30000019 12.2399998 16.8099995
20.8700008 24.2999992 24.7099991 28.8500004 29.8400002 29.9300003 29.1000004 27.3899994 24.8500004 -15.8299999 -3.72000003 -17.0400009 -
54.8300018 -90.9599991 -124.320000 -52.9000015 -57.4300003 -60.2099991 -61.1599998 -60.2599983 -59.7700005 -67.7600021 -72.1200027 -
74.2900009 -74.1999969
 ybadj1   =  -16.1800003 -24.6700001 -37.2799988 -54.2299995 -70.9100037 -88.1399994 -102.699997 -112.010002 -30.0499992 -24.3999996 -
18.0100002 -11.0699997 -3.79999995 3.83999991 -20.5300007 -11.1400003 -2.00000000 7.19999981 16.1800003 24.6700001 37.2799988 54.2299995
70.9100037 88.1399994 102.699997 112.010002 30.0499992 24.3999996 18.0100002 11.0699997 3.79999995 -3.83999991 20.5300007 11.1400003
2.00000000 -7.19999981

 pt. source: BF2C1             number:  26
 qstak    =  2.29999995
 bwidth   =  45.1899986 43.4000015 39.4500008 35.1500015 34.3600006 38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995
40.6599998 35.5699997 33.9000015 38.6899986 42.2999992 44.6300011 45.5999985 45.1899986 43.4000015 39.4500008 35.1500015 34.3600006
38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995 40.6599998 35.5699997 33.9000015 38.6899986 42.2999992 44.6300011
45.5999985
 bht      =  14.3999996 14.3999996 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000
16.0000000 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 16.0000000 16.0000000 16.0000000
16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996
14.3999996
 bln1     =  45.4700012 43.4599991 40.6599998 37.6500015 36.1100006 39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009
39.4500008 35.9599991 35.0600014 39.7200012 43.1800003 45.3300018 46.0999985 45.4700012 43.4599991 40.6599998 37.6500015 36.1100006
```

39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009 39.4500008 35.9599991 35.0600014 39.7200012 43.1800003 45.3300018
46.0999985
xbadj1 = -10.3800001 -12.2500000 -44.8300018 -48.4900017 -51.5800018 -54.9799995 -57.0200005 -58.5000000 -58.2000008 -56.1300011 -
52.3600006 -47.0000000 -37.5000000 -37.3300018 -39.2700005 -40.0299988 -39.5600014 -37.9000015 -35.0800018 -31.2000008 4.17000008 10.8400002
15.4700003 15.6499996 15.3599997 14.6000004 13.3999996 11.7900000 9.81999969 7.55000019 1.53999996 2.26999998 -0.449999988 -3.16000009 -
5.76999998 -8.19999981
ybadj1 = 15.3100004 17.2500000 27.2800007 22.6399994 17.8700008 12.0799999 5.92000008 -0.419999987 -6.75000000 -12.8699999 -18.6000004 -
24.5000000 2.96000004 -0.239999995 -3.67000008 -6.98999977 -10.1000004 -12.8999996 -15.3100004 -17.2500000 -27.2800007 -22.6399994 -
17.8700008 -12.0799999 -5.92000008 0.419999987 6.75000000 12.8699999 18.6000004 24.5000000 -2.96000004 0.239999995 3.67000008 6.98999977
10.1000004 12.8999996

pt. source: BF2C2 number: 27
qstak = 2.29999995
bwidth = 45.1899986 43.4000015 40.2900009 60.7000008 58.6100006 38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995
40.6599998 35.5699997 33.9000015 38.6899986 42.2999992 44.6300011 45.5999985 45.1899986 43.4000015 40.2900009 60.7000008 58.6100006
38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995 40.6599998 35.5699997 33.9000015 38.6899986 42.2999992 44.6300011
45.5999985
bht = 14.3999996 14.3999996 14.3999996 12.8000002 12.8000002 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000
16.0000000 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 12.8000002 12.8000002
16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996
14.3999996
bln1 = 45.4700012 43.4599991 40.1199989 34.6100006 37.8199997 39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009
39.4500008 35.9599991 35.0600014 39.7200012 43.1800003 45.3300018 46.0999985 45.4700012 43.4599991 40.1199989 34.6100006 37.8199997
39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009 39.4500008 35.9599991 35.0600014 39.7200012 43.1800003 45.3300018
46.0999985
xbadj1 = -5.44000006 -8.42000008 -11.1400003 -41.0200005 -37.2500000 -56.3600006 -59.7000008 -62.4000015 -63.2000008 -62.0800018 -
59.0800018 -54.2799988 -45.1300011 -45.0600014 -46.8800011 -47.2799988 -46.2400017 -43.7999992 -40.0299988 -35.0400009 -28.9799995 6.40999985
-0.560000002 17.0300007 18.0400009 18.5000000 18.3999996 17.7399998 16.5400009 14.8299999 9.17000008 10.0000000 7.15999985 4.09999990
0.910000026 -2.29999995
ybadj1 = 21.2600002 23.9699993 25.9500008 -15.2100000 -19.2999992 19.6900005 13.1700001 6.26000023 -0.850000024 -7.92999983 -14.7700005 -
21.8899994 4.26000023 -0.280000001 -5.05000019 -9.67000008 -14.0000000 -17.8999996 -21.2600002 -23.9699993 -25.9500008 15.2100000 19.2999992
-19.6900005 -13.1700001 -6.26000023 0.850000024 7.92999983 14.7700005 21.8899994 -4.26000023 0.280000001 5.05000019 9.67000008 14.0000000
17.8999996

pt. source: BF2C3 number: 28
qstak = 2.29999995
bwidth = 45.1899986 66.5100021 64.5899963 60.7000008 58.6100006 38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995
40.6599998 35.5699997 33.9000015 38.6899986 42.2999992 44.6300011 45.5999985 45.1899986 66.5100021 64.5899963 60.7000008 58.6100006
38.9099998 42.2799988 44.3600006 45.0999985 44.4700012 42.4799995 40.6599998 35.5699997 33.9000015 38.6899986 42.2999992 44.6300011
45.5999985
bht = 14.3999996 12.8000002 12.8000002 12.8000002 12.8000002 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000
16.0000000 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996 12.8000002 12.8000002 12.8000002 12.8000002
16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 16.0000000 14.3999996 14.3999996 14.3999996 14.3999996 14.3999996
14.3999996
bln1 = 45.4700012 44.5299988 36.5699997 34.6100006 37.8199997 39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009
39.4500008 35.9599991 35.0600014 39.7200012 43.1800003 45.3300018 46.0999985 45.4700012 44.5299988 36.5699997 34.6100006 37.8199997
39.3300018 41.6500015 43.8899994 44.7999992 44.3499985 42.5400009 39.4500008 35.9599991 35.0600014 39.7200012 43.1800003 45.3300018
46.0999985
xbadj1 = -1.49000001 -50.0600014 -45.9700012 -40.4799995 -37.9399986 -58.2400017 -62.7200012 -66.4700012 -68.1999969 -67.8600006 -
65.4599991 -61.0600014 -52.1100006 -52.0299988 -53.6300011 -53.5999985 -51.9399986 -48.7000008 -43.9799995 5.53000021 9.39999962 5.86999989

0.119999997 18.9099998 21.0699997 22.5799999 23.3999996 23.5100002 22.9099998 21.6100006 16.1499996 16.9699993 13.8999996 10.4099998
6.61000013 2.59999990
ybadj1 = 27.0300007 -0.629999995 -4.48999977 -8.22999954 -12.3299999 26.4300003 19.4899998 11.9499998 4.05000019 -3.97000003 -11.8800001
-20.1399994 4.80000019 -0.959999979 -6.92999983 -12.6899996 -18.0699997 -22.8999996 -27.0300007 0.629999995 4.48999977 8.22999954 12.3299999
-26.4300003 -19.4899998 -11.9499998 -4.05000019 3.97000003 11.8800001 20.1399994 -4.80000019 0.959999979 6.92999983 12.6899996 18.0699997
22.8999996

pt. source: SCR number: 29
qstak = 2.29999995
bwidth = 25.7800007 36.9799995 47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027
71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995 47.0499992 55.7000008 62.6500015
67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027 71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006
35.5999985
bht = 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000
bln1 = 67.4400024 70.6200027 71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995
47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027 71.6699982 70.5299988 67.2500000
61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995 47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988
70.1999969
xbadj1 = -11.3100004 -13.2799997 -14.8400002 -15.9600000 -16.5900002 -16.7099991 -16.3299999 -15.4499998 -14.1000004 -13.0799999 -
22.5699997 -31.3700008 -39.2200012 -45.8699989 -51.1399994 -54.8400002 -56.8899994 -57.2000008 -56.1300011 -57.3499985 -56.8199997 -
54.5699997 -50.6699982 -45.2200012 -38.4000015 -30.4099998 -21.5000000 -12.6999998 -14.4099998 -15.6800003 -16.4799995 -16.7700005 -
16.5599995 -15.8400002 -14.6400003 -13.0000000
ybadj1 = 0.189999998 4.07999992 7.84999990 11.3699999 14.5500002 17.2900009 19.5000000 21.1200008 22.1000004 22.4099998 22.0300007
20.9899998 19.3099995 17.0400009 14.2500000 11.0400000 7.48000002 3.70000005 -0.189999998 -4.07999992 -7.84999990 -11.3699999 -14.5500002 -
17.2900009 -19.5000000 -21.1200008 -22.1000004 -22.4099998 -22.0300007 -20.9899998 -19.3099995 -17.0400009 -14.2500000 -11.0400000 -
7.48000002 -3.70000005

pt. source: DAF number: 30
qstak = 2.29999995
bwidth = 25.7800007 36.9799995 47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027
71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995 47.0499992 55.7000008 62.6500015
67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027 71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006
35.5999985
bht = 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000
bln1 = 67.4400024 70.6200027 71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995
47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027 71.6699982 70.5299988 67.2500000
61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995 47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988
70.1999969
xbadj1 = -33.7000008 -35.2799988 -35.7799988 -35.2000008 -33.5499992 -30.8799992 -27.2700005 -22.8299999 -17.7000008 -12.7900000 -
18.3899994 -23.4400005 -27.7700005 -31.2600002 -33.7999992 -35.3100014 -35.7500000 -35.0999985 -33.7400017 -35.3499985 -35.8800011 -
35.3300018 -33.7000008 -31.0499992 -27.4599991 -23.0300007 -17.8999996 -12.9899998 -18.5799999 -23.6100006 -27.9200001 -31.3899994 -
33.9000015 -35.3800011 -35.7799988 -35.0999985
ybadj1 = -0.100000001 -9.00000036E-02 -9.00000036E-02 -7.99999982E-02 -5.99999987E-02 -5.00000007E-02 -2.99999993E-02 -1.99999996E-02
0.00000000E+00 1.99999996E-02 2.99999993E-02 5.00000007E-02 5.99999987E-02 7.99999982E-02 9.00000036E-02 9.00000036E-02 0.100000001
0.100000001 0.100000001 9.00000036E-02 9.00000036E-02 7.99999982E-02 5.99999987E-02 5.00000007E-02 2.99999993E-02 1.99999996E-02

```
0.00000000E+00 -1.99999996E-02 -2.99999993E-02 -5.00000007E-02 -5.99999987E-02 -7.99999982E-02 -9.00000036E-02 -9.00000036E-02 -0.100000001 -
0.100000001

 pt. source: SLG               number:  31
 qstak    =  2.29999995
 bwidth   =  25.7800007 36.9799995 47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027
71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995 47.0499992 55.7000008 62.6500015
67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027 71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006
35.5999985
 bht      =  6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000
 bln1     =  67.4400024 70.6200027 71.6699982 70.5299988 67.2500000 61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995
47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988 70.1999969 67.4400024 70.6200027 71.6699982 70.5299988 67.2500000
61.9300003 54.7299995 45.8600006 35.5999985 25.7800007 36.9799995 47.0499992 55.7000008 62.6500015 67.6900024 70.6900024 71.5299988
70.1999969
 xbadj1   =  -56.0900002 -57.2799988 -56.7200012 -54.4399986 -50.5099983 -45.0499992 -38.2099991 -30.2099991 -21.2999992 -12.5000000 -
14.2200003 -15.5100002 -16.3199997 -16.6399994 -16.4599991 -15.7700005 -14.6099997 -13.0000000 -11.3500004 -13.3500004 -14.9399996 -
16.0900002 -16.7399998 -16.8799992 -16.5200005 -15.6499996 -14.3000002 -13.2799997 -22.7600002 -31.5400009 -39.3699989 -46.0000000 -
51.2400017 -54.9099998 -56.9199982 -57.2000008
 ybadj1   =  -0.389999986 -4.26999998 -8.02000046 -11.5200005 -14.6800003 -17.3899994 -19.5699997 -21.1599998 -22.1000004 -22.3700008 -
21.9599991 -20.8899994 -19.1800003 -16.8899994 -14.0799999 -10.8500004 -7.28000021 -3.50000000 0.389999986 4.26999998 8.02000046 11.5200005
14.6800003 17.3899994 19.5699997 21.1599998 22.1000004 22.3700008 21.9599991 20.8899994 19.1800003 16.8899994 14.0799999 10.8500004
7.28000021 3.50000000

 --------------  INPUT GROUP 14  ---------------

 nar1     =  13
 iaru     =  5   units =   OUV/s/m^2
    converted to g/s/m^2, odour_units*m/s,
    or Bq/s/m^2  by factor:  1.00000000
 nsar1    =  13
 nar2     =  0

 cnamar1  = CW1             CAL1            CW2             SBR1            BAL1            PRAX1           PRAX2           AER1
AER2            MBR1            MBR2            POAX1           POAX2
 htar1    =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000 6.00000000
6.00000000 6.00000000 6.00000000
 elar1    =  380.799988 385.000000 380.799988 380.799988 384.299988 384.299988 384.299988 384.299988 384.299988 384.299988 384.299988
384.299988 384.299988
 sz0ar1   =  2.00000000 2.00000000 2.00000000 2.00000000 2.00000000 2.00000000 2.00000000 2.00000000 2.00000000 2.00000000 2.00000000
2.00000000 2.00000000

 area source: CW1              number:  1
 qar1     =  2167.51562
 area1    =  2167.51562
 [x,y]ar1grd  =  74.7720337 77.8906250
 [x,y]ar1grd  =  74.9470520 77.6806641
 [x,y]ar1grd  =  74.7970581 77.5561523
 [x,y]ar1grd  =  74.6170044 77.7612305
```

```
 ODOR        Emission Factor Type: WSP6_PGCLASS6
 Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
 Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

 area source: CAL1             number:  2
 qar1     =  8275.37500
 area1    =  8275.37500
 [x,y]ar1grd  =  74.7160339 76.3378906
 [x,y]ar1grd  =  75.2055359 75.8325195
 [x,y]ar1grd  =  74.9964905 75.6250000
 [x,y]ar1grd  =  74.5069885 76.1328125
 ODOR        Emission Factor Type: WSP6_PGCLASS6
 Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
 Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

 area source: CW2              number:  3
 qar1     =  2166.49512
 area1    =  2166.49512
 [x,y]ar1grd  =  74.5689392 77.7294922
 [x,y]ar1grd  =  74.7439575 77.5195312
 [x,y]ar1grd  =  74.5939636 77.3950195
 [x,y]ar1grd  =  74.4140625 77.6000977
 ODOR        Emission Factor Type: WSP6_PGCLASS6
 Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
 Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
 Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

 area source: SBR1             number:  4
 qar1     =  2167.51562
 area1    =  2167.51562
 [x,y]ar1grd  =  74.9635315 78.0615234
 [x,y]ar1grd  =  75.1385498 77.8515625
 [x,y]ar1grd  =  74.9885559 77.7270508
 [x,y]ar1grd  =  74.8085022 77.9321289
 ODOR        Emission Factor Type: HOUR24
 Index  1  to  24  Emission Factor =  1.47000002E-02 8.79000034E-03 8.79000034E-03 8.79000034E-03 8.79000034E-03 8.79000034E-03 8.79000034E-
03 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 0.108999997 0.108999997 0.108999997
4.01000008E-02 4.01000008E-02 4.01000008E-02 1.47000002E-02 1.47000002E-02

 area source: BAL1             number:  5
```

```
qar1     =  418.692749
area1    =  418.692749
[x,y]ar1grd  =  75.3179932 75.2124023
[x,y]ar1grd  =  75.4200745 75.2124023
[x,y]ar1grd  =  75.4200745 75.1098633
[x,y]ar1grd  =  75.3179932 75.1098633
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

area source: PRAX1             number:  6
qar1     =  214.129684
area1    =  214.129684
[x,y]ar1grd  =  75.3669739 75.3149414
[x,y]ar1grd  =  75.4400635 75.3149414
[x,y]ar1grd  =  75.4400635 75.2416992
[x,y]ar1grd  =  75.3669739 75.2416992
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

area source: PRAX2             number:  7
qar1     =  213.682663
area1    =  213.682663
[x,y]ar1grd  =  75.1765442 75.2075195
[x,y]ar1grd  =  75.2494812 75.2075195
[x,y]ar1grd  =  75.2494812 75.1342773
[x,y]ar1grd  =  75.1765442 75.1342773
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

area source: AER1              number:  8
qar1     =  672.877014
area1    =  672.877014
[x,y]ar1grd  =  75.3320312 75.4760742
[x,y]ar1grd  =  75.4620361 75.4760742
[x,y]ar1grd  =  75.4620361 75.3466797
[x,y]ar1grd  =  75.3320312 75.3466797
```

```
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

area source: AER2             number:  9
qar1     =  672.877014
area1    =  672.877014
[x,y]ar1grd  =  75.1989746 75.3613281
[x,y]ar1grd  =  75.3289795 75.3613281
[x,y]ar1grd  =  75.3289795 75.2319336
[x,y]ar1grd  =  75.1989746 75.2319336
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

area source: MBR1             number:  10
qar1     =  209.838181
area1    =  209.838181
[x,y]ar1grd  =  75.4365540 75.6005859
[x,y]ar1grd  =  75.4879761 75.5932617
[x,y]ar1grd  =  75.4719543 75.4931641
[x,y]ar1grd  =  75.4200745 75.5029297
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

area source: MBR2             number:  11
qar1     =  208.705658
area1    =  208.705658
[x,y]ar1grd  =  75.2404785 75.4980469
[x,y]ar1grd  =  75.2920532 75.4882812
[x,y]ar1grd  =  75.2760315 75.3906250
[x,y]ar1grd  =  75.2239990 75.4003906
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
```

```
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

area source: POAX1            number:  12
qar1     =  161.558395
area1    =  161.558395
[x,y]ar1grd  =  75.3474426 75.5810547
[x,y]ar1grd  =  75.4110718 75.5810547
[x,y]ar1grd  =  75.4110718 75.5175781
[x,y]ar1grd  =  75.3474426 75.5175781
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

area source: POAX2            number:  13
qar1     =  161.170914
area1    =  161.170914
[x,y]ar1grd  =  75.2430725 75.5981445
[x,y]ar1grd  =  75.3065491 75.5981445
[x,y]ar1grd  =  75.3065491 75.5346680
[x,y]ar1grd  =  75.2430725 75.5346680
ODOR        Emission Factor Type: WSP6_PGCLASS6
Index  1  to  6  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  7  to  12  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  13  to  18  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  19  to  24  Emission Factor =  2.29999995 2.29999995 2.29999995 2.29999995 2.29999995 2.29999995
Index  25  to  30  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998
Index  31  to  36  Emission Factor =  1.89999998 1.89999998 1.89999998 1.89999998 1.89999998 1.89999998

--------------  INPUT GROUP 15  ---------------

nln2     =  0
nlines   =  0
ilnu     =  5   units =   OUV/s
      converted to g/s, odour_units*m3/s, or Bq/s
      by factor:  1.00000000
nsln1    =  0
xl       =  0.00000000E+00
hbl      =  0.00000000E+00
wbl      =  0.00000000E+00
wml      =  0.00000000E+00
dxl      =  0.00000000E+00
fprimel  =  0.00000000E+00
mxnseg     =  7
nlrise   =  6


--------------  INPUT GROUP 16  ---------------
```

```
 nvl1     =  9
 ivlu     =  5   units =   OUV/s
      converted to g/s, odour_units*m3/s, or Bq/s
      by factor:  1.00000000
 nsvl1    =  0
 nvl2     =  0

 cnamvl1  = HST             HPR             CPR             CST             LOAD            MILL            SCR             DAF
SLG
 xvl1grd  =  74.1600037 74.2449951 74.4349670 74.5150757 74.4300842 74.3449402 75.5209351 75.5389404 75.5569458
 yvl1grd  =  75.5322266 75.4541016 75.2539062 75.1684570 75.4638672 75.3540039 75.1708984 75.2807617 75.3906250
 htvl1    =  6.40000010 6.40000010 6.40000010 6.40000010 7.19999981 8.00000000 3.00000000 3.00000000 3.00000000
 elvl1    =  385.000000 385.000000 385.000000 385.000000 385.000000 385.000000 384.299988 384.299988 384.299988
 sy0vl1   =  12.0600004 12.0600004 12.0600004 12.0600004 12.0600004 12.0600004 10.3699999 10.3699999 10.3699999
 sz0vl1   =  5.94999981 5.94999981 5.94999981 5.94999981 6.69999981 7.44000006 2.78999996 2.78999996 2.78999996

 volume source: HST              number:  1
 qvl1     =  2.29999995

 volume source: HPR              number:  2
 qvl1     =  2.29999995

 volume source: CPR              number:  3
 qvl1     =  2.29999995

 volume source: CST              number:  4
 qvl1     =  2.29999995

 volume source: LOAD             number:  5
 qvl1     =  2.29999995

 volume source: MILL             number:  6
 qvl1     =  2.29999995

 volume source: SCR              number:  7
 qvl1     =  2.29999995

 volume source: DAF              number:  8
 qvl1     =  2.29999995

 volume source: SLG              number:  9
 qvl1     =  2.29999995

 --------------  INPUT GROUP 17  ---------------

 nfl2     =  0

 --------------  INPUT GROUP 18  ---------------

 nrd1     =  0
```

```
nrd2     =  0
nsfrds   =  0


--------------  INPUT GROUP 20  ---------------

nrec     =  0
nrgrp    =  0


-----------------------------------------------------------------------------------------------------------------------------------
         INPUT FILES

Default Name     Unit No.     File Name and Path
------------     --------     ------------------
 CALPUFF.INP         1        calpuff.inp
(CALMET Domain: 1 )  MASTER
  CALMET.DAT       100        ..\..\calmet\janfebcalmet.dat
    (----)         100        ..\..\calmet\maraprcalmet.dat
    (----)         100        ..\..\calmet\mayjuncalmet.dat
    (----)         100        ..\..\calmet\julaugcalmet.dat
    (----)         100        ..\..\calmet\sepoctcalmet.dat
    (----)         100        ..\..\calmet\novdeccalmet.dat
 PTEMARB.DAT       110        bl3b_ptemarb.dat


-----------------------------------------------------------------------------------------------------------------------------------
         OUTPUT FILES

Default Name     Unit No.     File Name and Path
------------     --------     ------------------
 CALPUFF.LST         2        calpuff.lst
    CONC.DAT         8        calpuff.con


SETNEST: Setup results for nested CALMET grids
----------------------------------------------

Properties of each CALMET domain grid

  Domain      =  1
  Origin(m)   =  279073.000 6546008.00
nx,ny,cell(m) =  150 150 200.000000
  Nest Factor =  1
Offset nx0,ny0=  0.00000000E+00 0.00000000E+00
Corner coordinates in outermost grid units:
  LL Corner   =  0.00000000E+00 0.00000000E+00
  UR Corner   =  150.000000 150.000000
Horizontal splitting parameters for domain:
  SYSPLITH(m) =  200.000000
SHSPLITH(m/s) =  0.111111112
```

```
--------------------------------------------------------------------------------------------------------------------------------

Header record data from the PTEMARB point source file    1

DATASET: PTEMARB.DAT
IBSRC2:          1
IESRC2:          4
NSE2:         1
AXTZ2:   UTC+1000
IBDATHR2:201700100
IBSEC2:     0
IEDATHR2:201800100
IESEC2:     0
MAP2:    UTM
DATUM:   WGS-84

UTMZN:     56
UTMHEM:  S
   SPECIES      MOL. WT.

ODOR             0.000

Time-invariant PTEMARB data
Source =  1 CID2 = F3S5
Source =  1 TIEM2 =  292.981506 6562.01904 1.00000000 7.92999983 392.700012 1.00000000 0.00000000E+00 0.00000000E+00
--- BHT2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00
--- BWD2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00
--- BLN2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00
--- XBADJ2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00
--- YBADJ2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
```

```
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00
 Source =  2 CID2 = F3S6
 Source =  2 TIEM2 =  292.979889 6562.05273 1.00000000 7.92999983 392.700012 1.00000000 0.00000000E+00 0.00000000E+00
 --- BHT2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00
 --- BWD2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00
 --- BLN2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 --- XBADJ2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 Source =  3 CID2 = F3S7
 Source =  3 TIEM2 =  292.978302 6562.08691 1.00000000 7.92999983 392.700012 1.00000000 0.00000000E+00 0.00000000E+00
 --- BHT2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 --- BWD2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 --- XBADJ2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 --- YBADJ2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 Source =  4 CID2 = F3S8
 Source =  4 TIEM2 =  292.976196 6562.12109 1.00000000 7.92999983 392.700012 1.00000000 0.00000000E+00 0.00000000E+00
 --- BHT2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 --- BWD2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 --- BLN2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 --- XBADJ2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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 --- YBADJ2 =  0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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0.00000000E+00
 IXREM2 =  1

 -----------------------------------------------------------------------------------------------------------------------------------

 Completion of CALPUFF test mode run -- run terminating normally

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  End of run -- Clock time: 10:50:14
                      Date: 06-24-2020

        Elapsed Clock Time:        1.0 (seconds)

                  CPU Time:        0.3 (seconds)
```