

18 October 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) – SUPPLEMENTARY RESPONSE TO SUBMISSIONS

We are writing with respect to SSD 9394 for the Integrated Poultry Processing Plant at 1154 Gunnedah Road, Westdale. As you are aware, since the initial response to submissions was submitted on 3 July 2020, the Applicant has received additional submissions from various agencies and departments via DPIE. These matters have been raised and addressed in separate responses.

As requested, this correspondence has been prepared to provide a consolidate all the supplementary responses to submission and an updated set of development plans within a single document.

1. REVISIONS TO THE DEVELOPMENT PLANS

Please note that, in response to the submissions and in the interest of finalising the assessment in a timely manner, the Applicant has decided to remove proposed Child Care Facility from the project.

As such, a revised set of development plans is included as **Attachment 1** and Revised Landscape Plans are included as **Attachment 2**. It is important to note that there are no other changes to the development plans, apart from the removal of the child care building. The revised GFA calculations are summarised in **Table 1**.

Table 1: Gross Floor Area Summary

COMPONENT	GFA (m2)
Existing Rendering Plant, Boilers and Maintenance Shed	5,482
Proposed Poultry Processing Plant	30,273
Proposed Administration, Amenities, Child Care	4,834
Proposed Ancillary Structures and WWTP	4,343
TOTAL	44,932m2

It is important to note that there is no change to:

- The core objectives of the proposal;
- The production volumes (3 million birds / week and 1,680 tonnes of finished rendering products / week);
- The hours of operation (24 hours, 7 days);
- The number of staff (1176 positions);
- The number of forecast light and heavy vehicle movements and car parking spaces; and
- The proposed access road to the site from Armstrong Street via Workshop Lane.

2. SUPPLEMENTARY RESPONSES TO SUBMISSIONS

As outlined above, since the initial response to submissions was submitted on 3 July 2020, the Applicant has received additional submissions from various agencies and departments via DPIE. The applicant has responded to each of these additional submissions individually. The following table provides a summary of the additional submissions, and the dates they were received and responded to. A copy of each supplementary response is provided as an Attachment to this letter.

Table 1: Response to Submissions

SUBMISSION DATE	DETAILS	RESPONSE DATE	ATTACHMENT
23 July 2020	Transport for NSW	31 July 2020	Attachment 3
5 August 2020	Hunter New England Local Health District	25 August 2020	Attachment 4
3 August 2020	Environmental Protection Agency	31 August 2020	Attachment 5
18 August 2020	Natural Resources Access Regulator	2 September 2020	Attachment 6
3 August 2020	Tamworth Regional Council	9 September 2020	Attachment 7
27 July 2020	DPIE (Hazards)	21 September 2020	Attachment 8
7 October 2020	DPIE (Hazards) / NSW Fire & Rescue	15 October 2020	Attachment 9

3. SUMMARY

The applicant has prepared a detailed response to all items raised in the initial and supplementary submissions. Amendments to the supporting reports and development plans have been made in response to the matters raised where required and appropriate. As demonstrated, the amendments made in response to the submissions and shown on the attached plans have improved the operations and environmental performance of the proposed processing plant.

The revised material included in this supplementary response to submission has been prepared in accordance with the requirements of the relevant State and Local statutory planning requirements and consider all relevant impacts of the proposed development. Where impacts have been identified, appropriate management and mitigation measures have been prescribed. Provided that the management and mitigation measures described in this EIS are adhered to, the proposed development is not predicted to result in unacceptable impacts on the receiving environment or local community. Accordingly, the development is recommended for Approval, subject to relevant and reasonable conditions.

If you wish to discuss, please do not hesitate to contact me on telephone number (07) 3220 0288 or email david@psaconsult.com.au

Regards,



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

VERSION	DATE	DETAILS	AUTHOR	AUTHORISATION
V1	18 October 2020	FINAL	NICOLE BOULTON	 DAVID IRELAND



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)



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ISSUE	REV.	DESCRIPTION	DATE

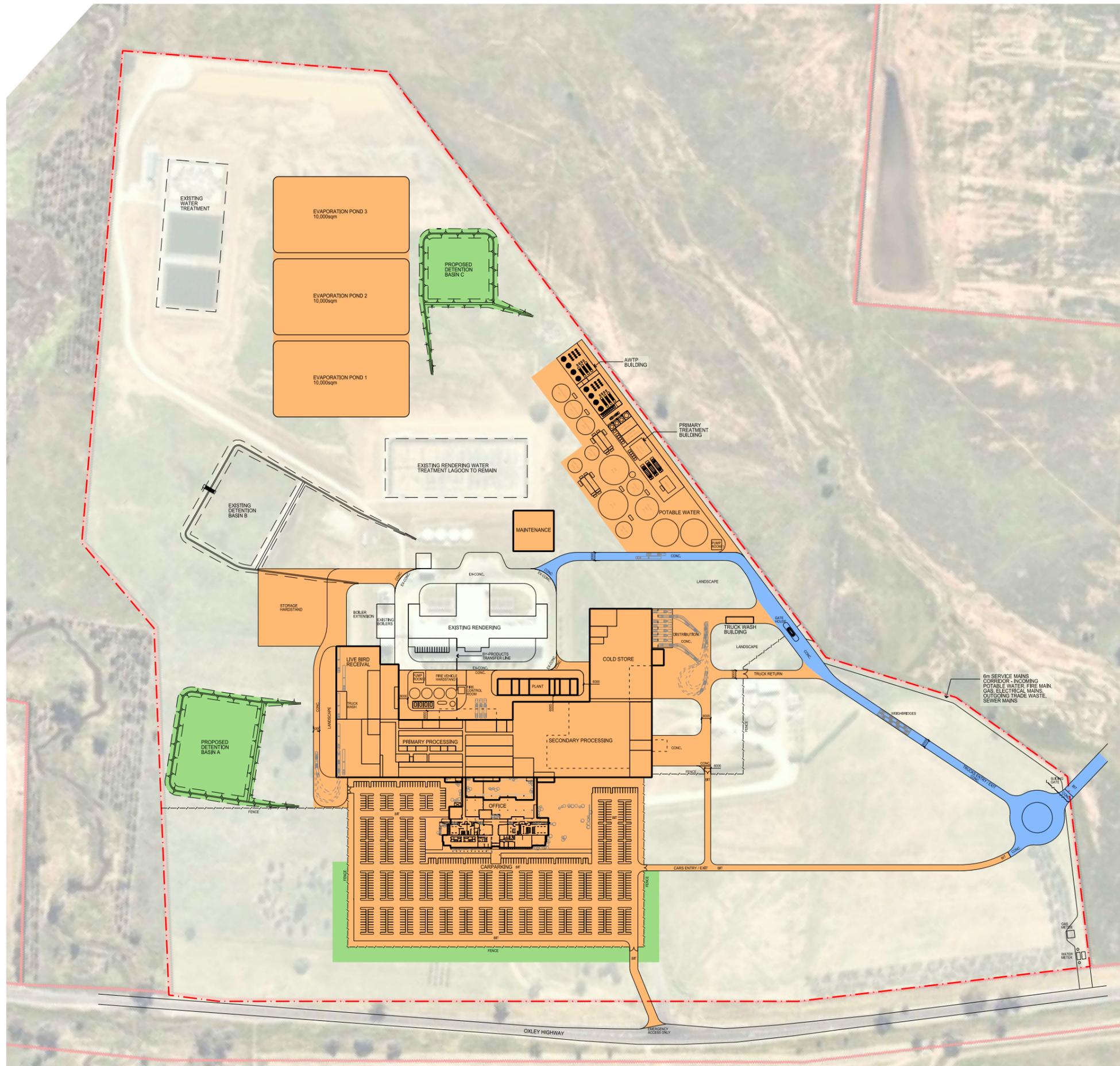
CLIENT

OAKBURN PROCESSING PLANT

OXLEY HIGHWAY, TAMWORTH



DRAWING TITLE			
SITE PLAN			
DATE	SCALE	JOB NO.	DRAWING NO.
16.10.20	1:2000@A1	19106	SK 10
			H



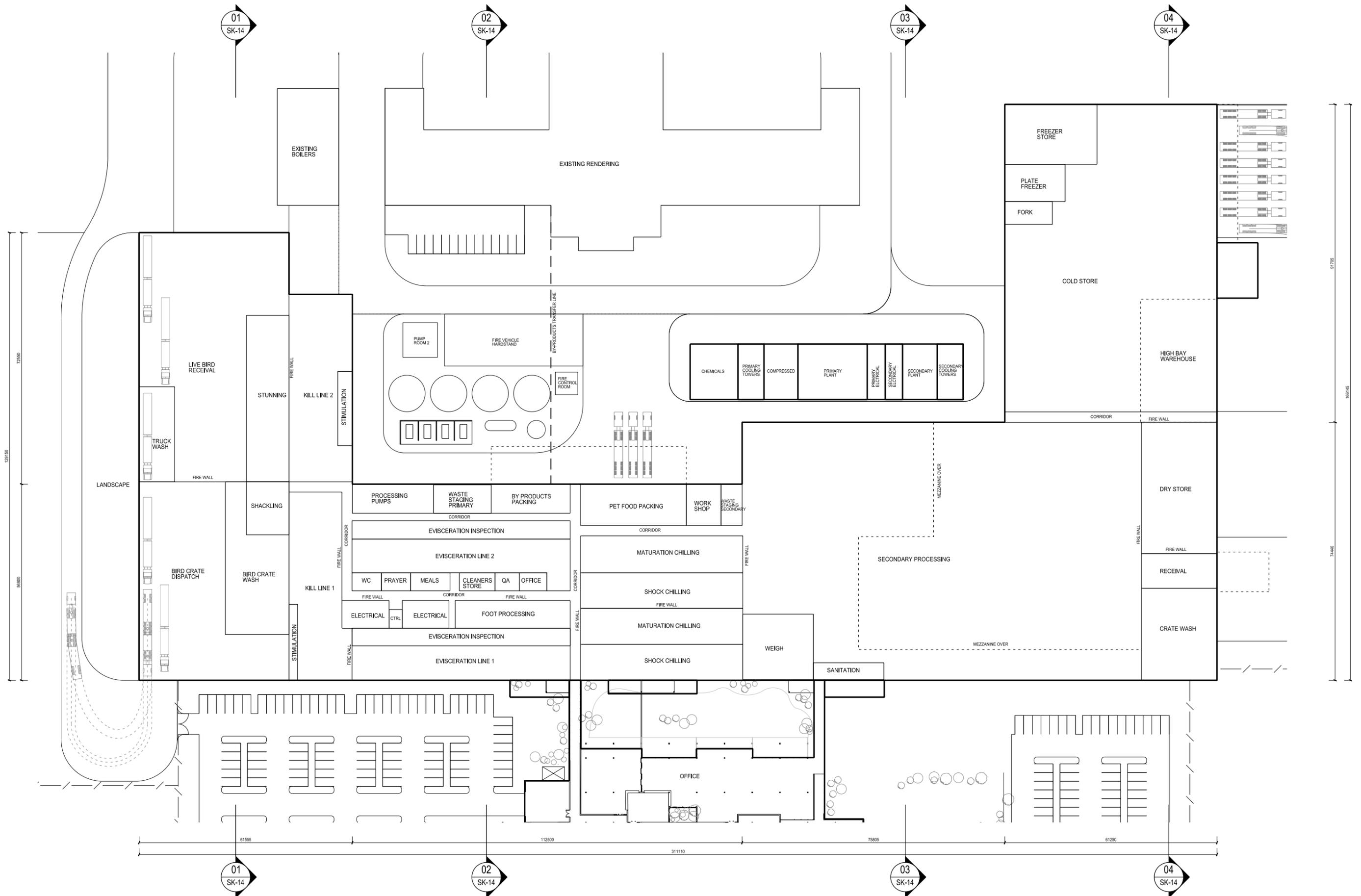
PAVEMENT LEGEND

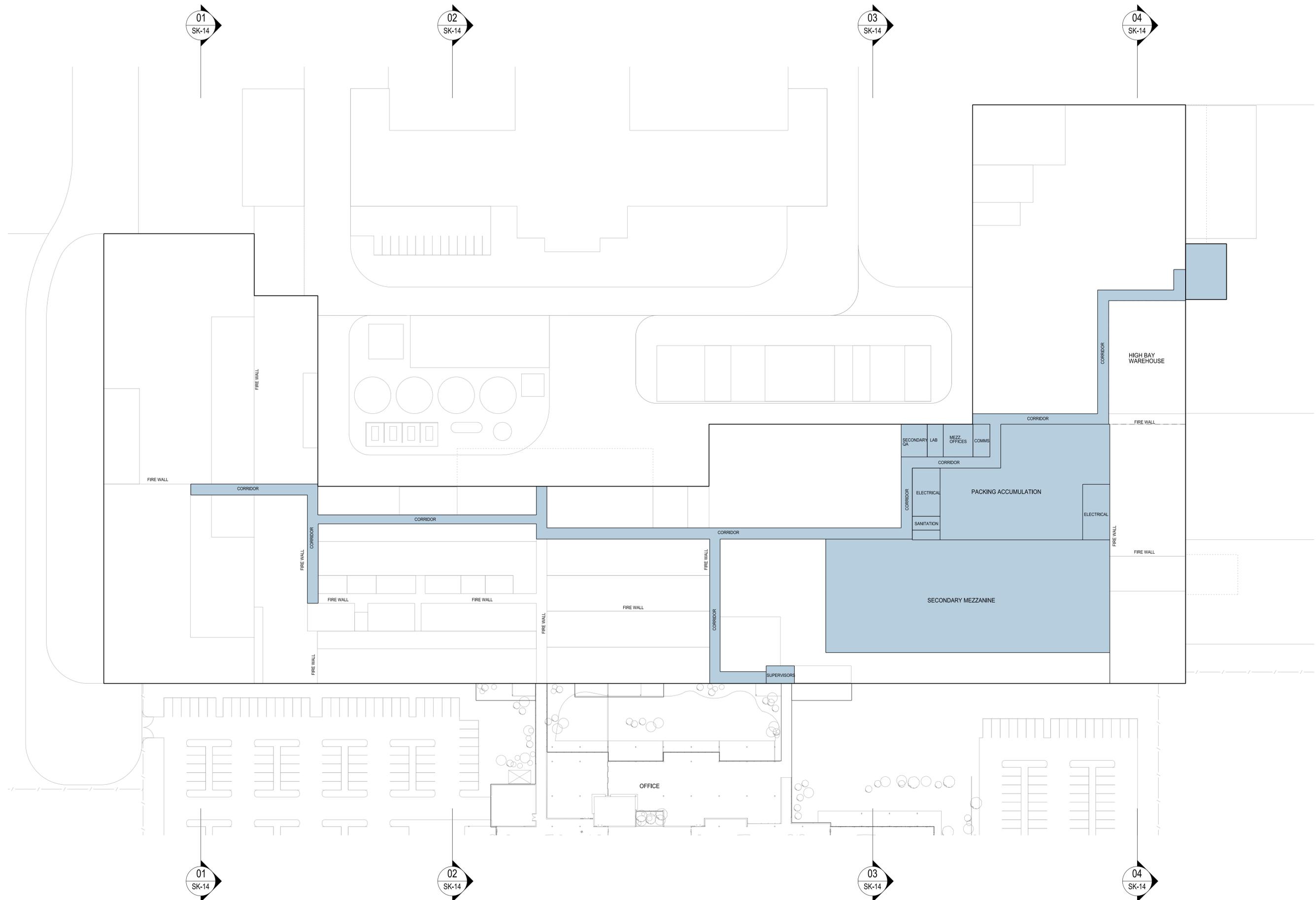
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- CONC. CONCRETE FOR HEAVY VEHICLES
- EX-CONC. EXISTING CONCRETE

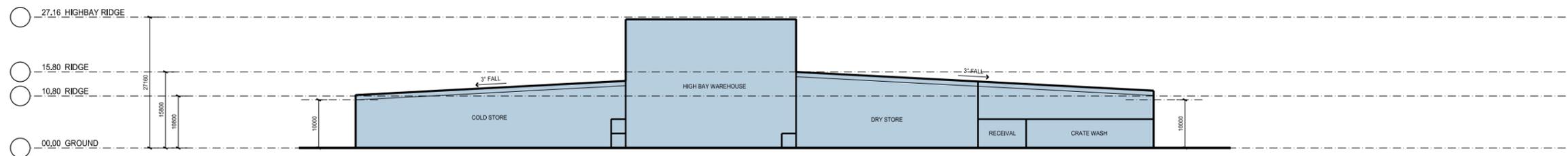
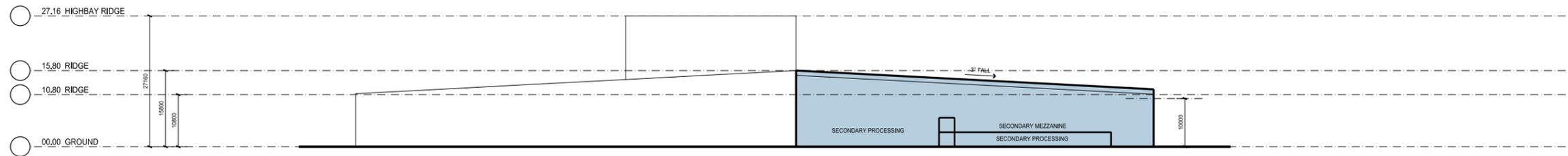
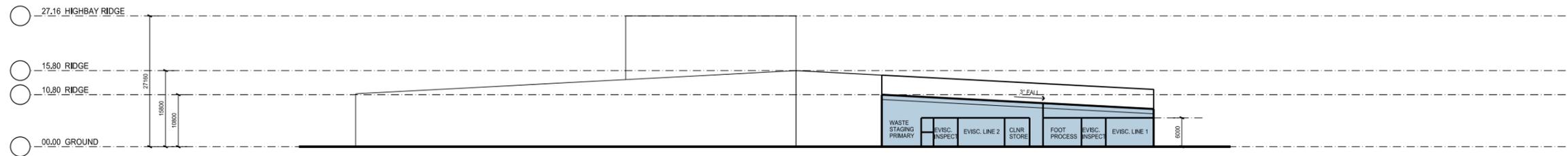
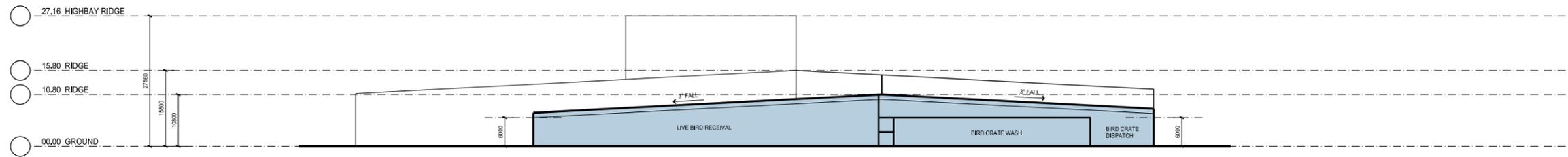
STAGE 1 - SITE COMPOUND, WORKSHOP, LANE EXTENSION, INTERNAL ACCESS ROADS TO EXISTING RENDERING BUILDING

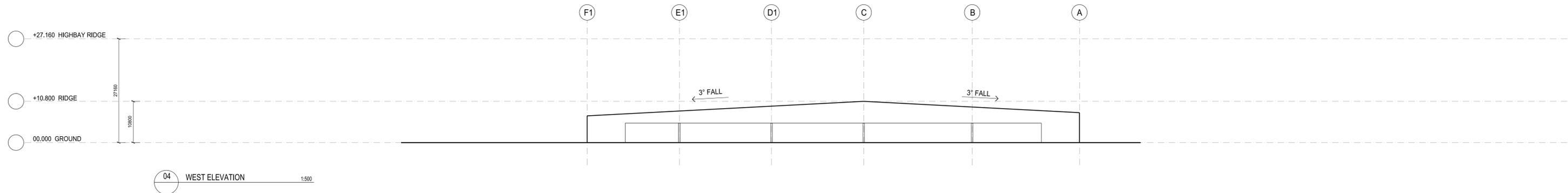
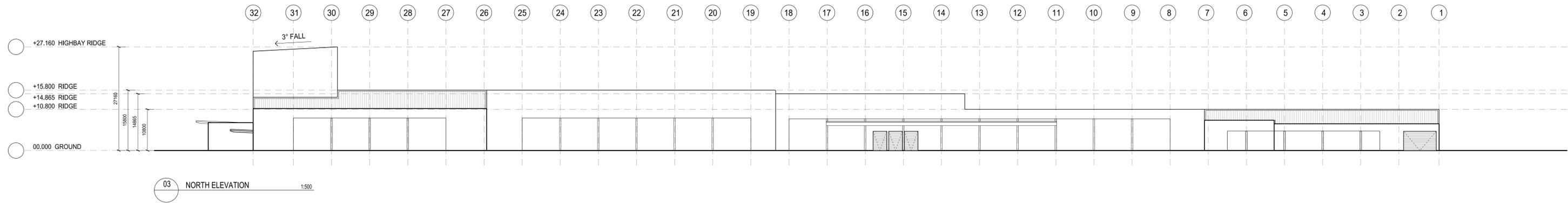
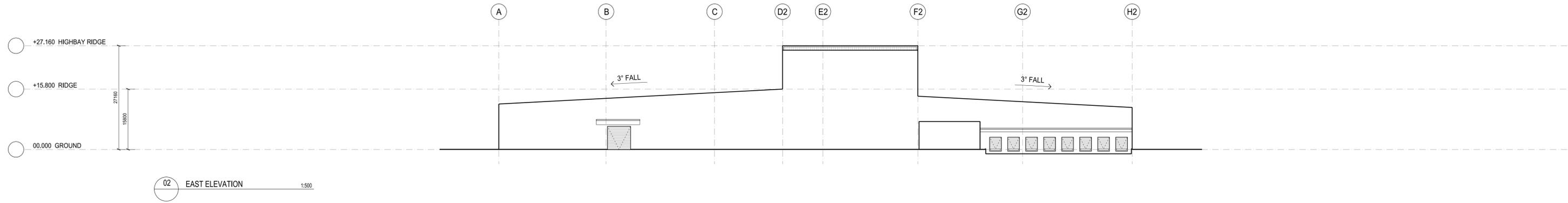
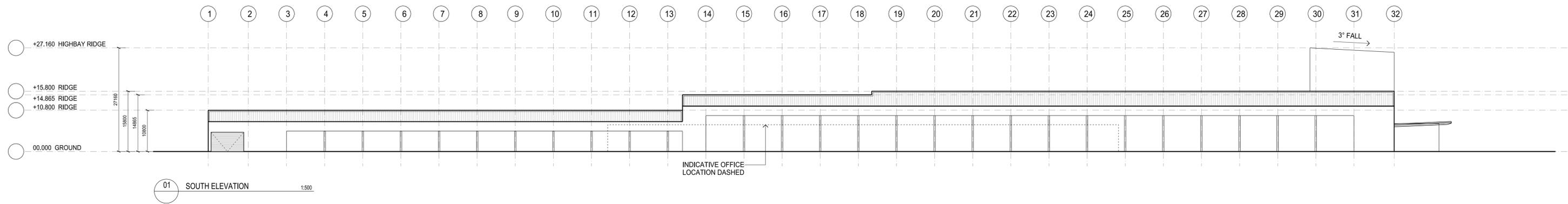
STAGE 2 - BULK EARTHWORKS, SITE PREPARATION, DETENTION BASINS, PERIMETER LANDSCAPE, SCREENING MOUNDS AND PLANTING

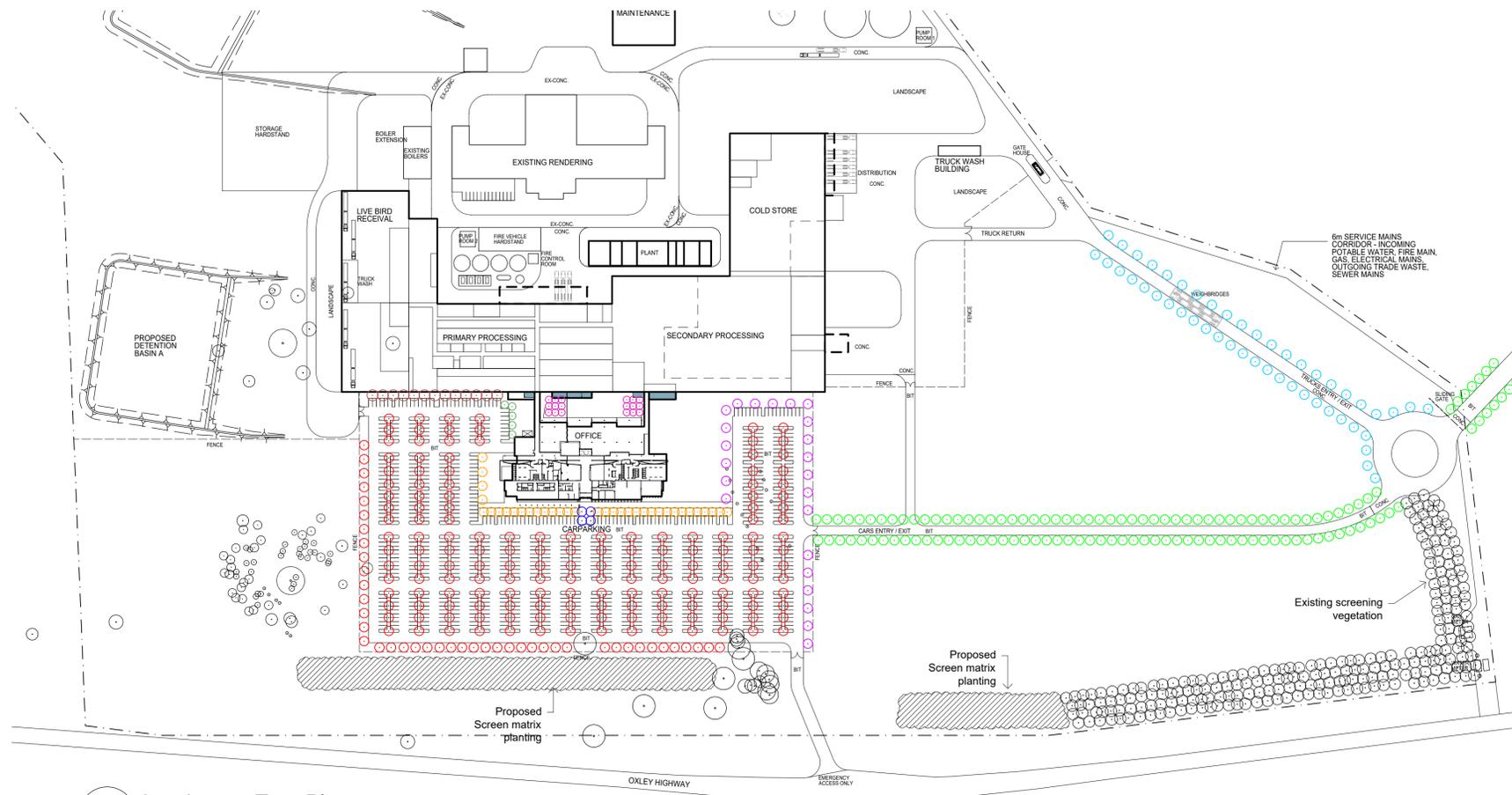
STAGE 3 - PROCESSING BUILDING, CARPARK & ROADS, OFFICE BUILDING, MAINTENANCE, WASTE WATER TREATMENT, PLANT BUILDINGS, PONDS











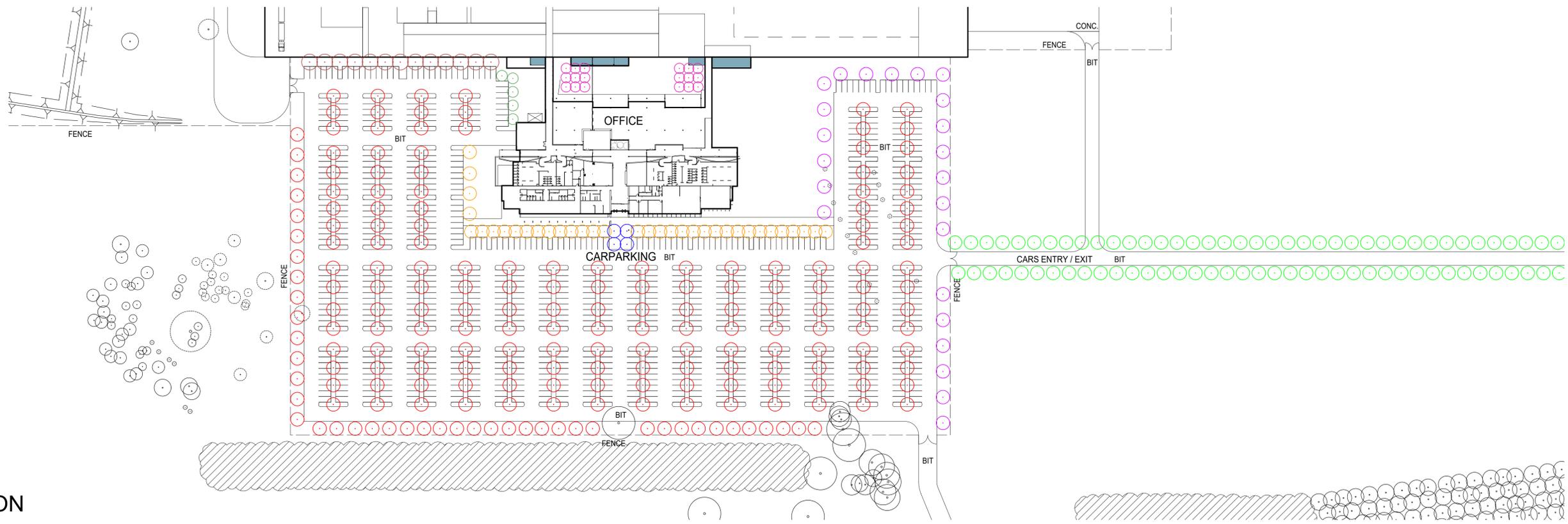
TREES	Common Name	Mature Size
<i>Fraxinus excelsior</i> 'Aurea'	Golden Ash	7 x 7
<i>Ginkgo biloba</i>	Maidenhair Tree	12 x 5
<i>Gleditsia tricanthos</i> 'Shademaster'	Green Honey Locust	11 x 8
<i>Lagerstromia indica</i> 'Natchez'	Crepe Myrtle	6 x 4
<i>Nyssa sylvatica</i>	Tupelo	11 x 6
<i>Pistacia chinensis</i>	Chinese Pistacia	8 x 6
<i>Populus nigra</i> 'Italica'	Lombardy Poplar	15 x 3
<i>Pyrus</i> 'Aristocrat'	Ornamental Pear	11 x 7
<i>Pyrus</i> 'Capital'	Ornamental Pear	12 x 3
<i>Quercus palustris</i>	Swamp Spanish Oak	15 x 8

PROPOSED SCREEN MATRIX PLANTING		
TREES	Common Name	Mature Size
<i>Angophora floribunda</i>	Rough Barked Apple	30 x 10
<i>Eucalyptus albens</i>	White Box	25 x 10
<i>Eucalyptus blakelyi</i>	Blakely's red gum	20 x 8
<i>Eucalyptus melliodora</i>	Yellow Box	10 x 15

SHRUBS		
Common Name	Mature Size	
<i>Acacia implexa</i>	Hickory Wattle	2 x 1
<i>Acacia decora</i>	Western Silver Wattle	2 x 1
<i>Hibbertia riparia</i>	Erect Guinea-flower	0.6 x 1
<i>Myoporum montanum</i>	Western Boobialla	4 x 3
<i>Notelaea Microcarpa</i>	Gorge Mock Olive	10 x 4

GRASSES & GROUNDCOVERS		
Common Name	Mature Size	
<i>Ajuga australis</i>	Austral bugle	0.3 x 0.5
<i>Carex inversa</i>	Knob sedge	0.75 x 0.75
<i>Cyperus gracilis</i>	Slender Flat Sedge	0.3 x 0.3
<i>Dianella longifolia</i>	Flax Lily	1 x 1
<i>Lomandra longifolia</i>	Spiny-head Mat-rush	1 x 1
<i>Themeda australis</i>	Kangaroo Grass	1 x 1

Landscape Tree Plan
1:2000



Landscape Tree Plan
1:1000
NOT FOR CONSTRUCTION

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The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

Issue	Revision Description	Drawn	Check	Date
F	Architectural Coordination	JM	NM	14.10.2020
E	For Comment	LM	NM	25.06.2020
D	For Comment	LM	NM	20.05.2020
C	For Comment	LM	NM	20.06.2019
B	For Comment	SM	NM	19.12.2018
A	For Comment	JW	NM	02.10.2018

LEGEND			
	<i>Pyrus</i> 'Aristocrat' (Type 1)		<i>Pyrus</i> 'Capital' (Type 4)
	<i>Ginkgo biloba</i> (Type 2)		<i>Nyssa sylvatica</i> (Type 5)
	<i>Lagerstromia indica</i> 'Natchez' (Type 3)		<i>Gleditsia tricanthos</i> 'Shademaster' (Type 6)
	<i>Fraxinus excelsior</i> 'Aurea' (Type 8)		<i>Pistacia chinensis</i> (Type 7)
	<i>Quercus palustris</i> (Type 9)		<i>Populus nigra</i> 'Italica' (Type 10)
	Proposed screening matrix planting		Existing tree



Client: **Baiada**
Project: **Oakburn Processing Plant Oxley Highway**

Drawing Name: **Landscape Tree Masterplan**

PRELIMINARY

Scale: **SS18-3745**
Drawing Number: **701**
Issue: **F**

31 July 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) – REQUEST FOR ADDITIONAL INFORMATION FOR TfNSW

I refer to your correspondence dated 23 July 2020 regarding a request for additional information from Transport for NSW (TfNSW). A response is provided below to each of the matters raised.

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>1. We are generally satisfied that matters raised in our correspondence dated 23 August 2019 have been addressed and will form the basis of the decision and aid in formulating conditions of any approval granted. Notwithstanding that, there are still a few matters that should be further considered and clarified during the assessment process and we ask that the Consent Authority be satisfied that they have been addressed. They are as follows:</i></p>	<p>Noted.</p>
<ul style="list-style-type: none"> <i>The new access road, which will connect to Armstrong Street should be constructed and provide the same or greater access for heavy vehicles (25/26m B-Double at HML), noting the objective of the Heavy Vehicle Access Policy Framework.</i> 	<p>The new access road connecting to Armstrong Street will be constructed to accommodate 25/26m B-Doubles. This can be conditioned accordingly.</p>
<ul style="list-style-type: none"> <i>Clarification of heavy vehicle type used to dispatch finished rendered products should be provided. Table 3.2 suggested large rigid, however Page 21 suggested B-Doubles. The proponent could investigate the use of vehicles that carry higher capacity noting the surrounding road network can support up to 25/26m B-Double at HML. Using vehicles with a higher carrying capacity will reduce the number of heavy vehicle movements for the given freight task.</i> 	<p>Both large rigids and B-Doubles will be used to transport finished rendered product. However, in response to ultimate production volumes, B-Doubles will be predominantly used for the dispatch of finished rendered products.</p>
<ul style="list-style-type: none"> <i>It is suggested that about 90 per cent of 140 finished product truck trips will travel west towards Gunnedah. However, there are only 14 trips to/from the west on Oxley Hwy. Trip numbers should be accurately provided.</i> 	<p>This matter has been checked with TTPP who have confirmed that there is a typographical error in the report. It should read “10 percent towards Gunnedah, 90 percent towards Tamworth” (i.e. the numbers are correct, just error in text).</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<ul style="list-style-type: none"> <i>There appears to be an anomaly in staff's nominal start time and nominal end time for loading docks (night shift). These times should be clarified as they could affect traffic numbers and movements.</i> 	<p>In practice, it is likely that only 5 of the night shift loading dock workers stay after midnight and that those 5 staff members start later than 3pm. However for the purposes of the assessment, it has been assumed they arrive with the others. The movement of the small number of vehicles (5 vehicles) does not occur during peaks and will not make any difference to peak hour or daily forecasts.</p>
<ul style="list-style-type: none"> <i>The applicant has noted that, given construction traffic will use the same access road and that traffic numbers will be lower than operational traffic, a construction traffic assessment is not warranted. However, the proponent should provide the details of heavy vehicle types to be used during construction phases and loading/unloading space requirements to show that it will be a safe and efficient operation.</i> 	<p>A Preliminary Staging Plan has been prepared and was submitted as part of the response to submissions. As shown on the plans, the development is expected to be constructed in 3 Stages as follows:</p> <ol style="list-style-type: none"> 1. Site Compound, Workshop Lane extension, Internal Access Roads connecting to the existing Rendering Plant. 2. Bulk Earthworks, site preparation, detention basins, perimeter landscaping, screening mounds and planting. 3. Processing Building, car park and roads, office building, maintenance , waste water treatment, plant buildings, evaporation ponds. <p>As indicated in the staging plan, the project will commence with the establishment of an on-site construction compound with sufficient space for equipment and staff parking, storage and manoeuvring of all construction vehicles.</p> <p>Initially, heavy vehicles and construction vehicles will access the site via the existing site entrance from the Oxley Highway. Construction of the Workshop Lane extension will commence from the north and proceed in a southerly direction. Once the access road is made suitable for construction vehicles, this will be used by all construction vehicles for the remainder of the construction phase.</p> <p>Heavy vehicles utilised during construction will include light vehicles, small to large rigid trucks, semi-trailers and occasional B-Doubles (if required).</p> <p>Final heavy vehicle requirements will be determined as part of the detailed design process for the project. It is recommended that a Construction Traffic Management Plan is prepared and submitted to RMS / TRC for approval prior to commencement of works on the site. This can be conditioned accordingly.</p>
<ul style="list-style-type: none"> <i>The receipt and dispatch areas for rendering raw materials and finished rendered products appear unclear in the site plan. This should include swept path analysis of the largest vehicle (it is unclear whether a B-Double or a large rigid will be used as noted previously).</i> 	<p>Additional plans showing the swept paths as requested are provided as Attachment 1.</p> <p>The plans show the following activities:</p> <p>Live Birds: incoming and outgoing B-Double Trucks delivering birds to the live bird shed, parking in the marshalling area, and existing the site.</p> <p>Rendering Plant: incoming trucks (small rigid and semi-trailers) bringing material to the site for</p>

MATTERS RAISED	APPLICANT'S RESPONSE
	<p>rendering. Please note that all by-products from the new processing plant will be pumped via pipelines to the rendering plant, negating a large majority of the incoming trips with fresh material to be rendered on-site.</p> <p>Rendering Plant: B-Doubles collecting finished rendered products for transport off site.</p>
<ul style="list-style-type: none"> • <i>Identification of the truck marshalling area for both inbound and outbound trucks should be shown in the site plan. So that traffic flow can be safely and efficiently managed.</i> 	<p>Additional plans showing the B-Double swept paths are provided as Attachment 1.</p>
<p>2. TfNSW highlights that in determining the application under the Environmental Planning and Assessment Act 1979, it is the Consent Authority's responsibility to consider the environmental impacts of any roadworks which are ancillary to the development. This includes any works which form part of the proposal and/or any works which are deemed necessary to include as requirements in the conditions of project approval.</p>	<p>Noted.</p>

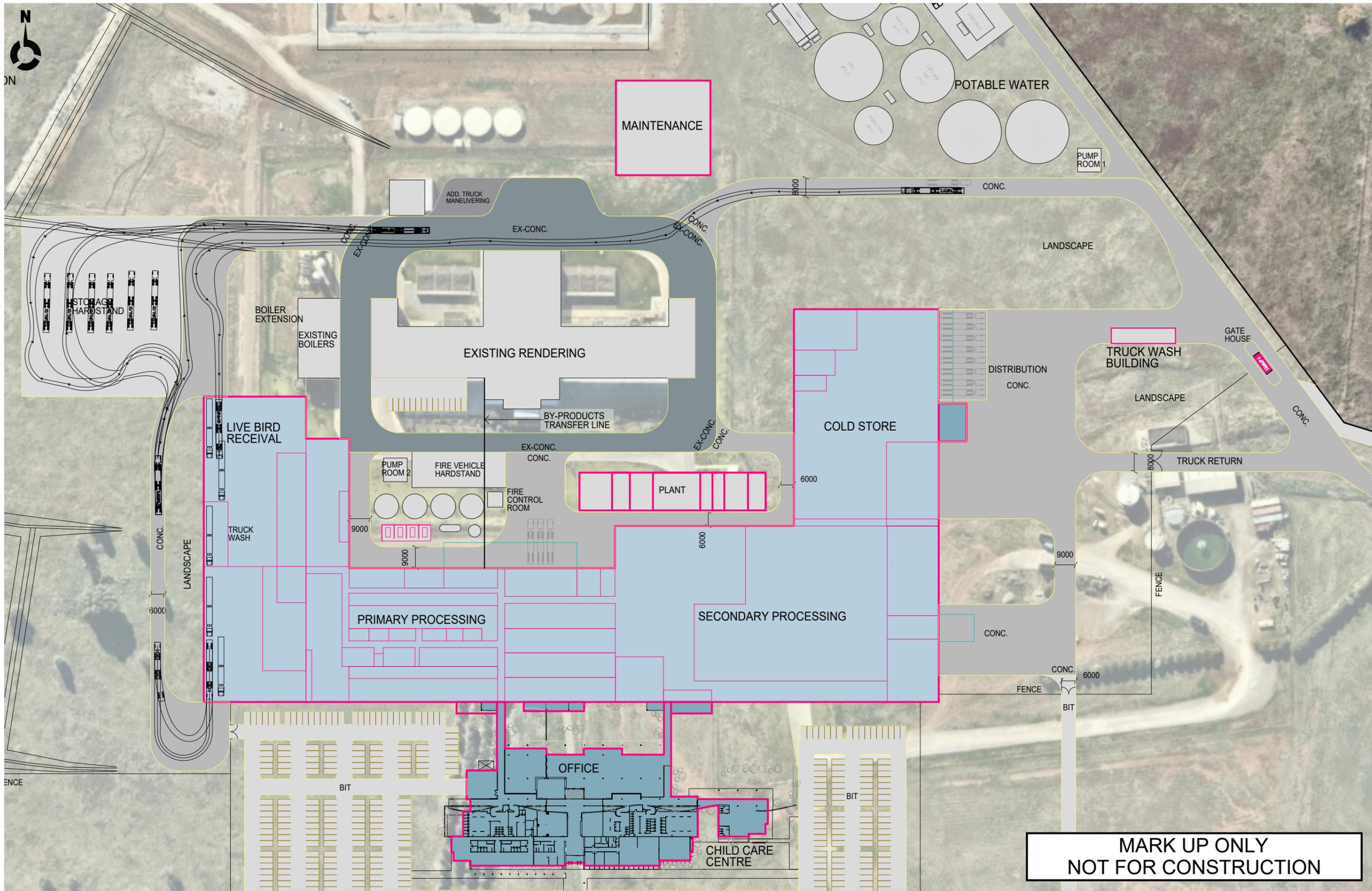
I trust this information provides a full response to the matters raised by TfNSW. Please do not hesitate to contact either myself or Nicole Boulton on telephone number (07) 3220 0288 should you have any questions or wish to discuss.

Regards,



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

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



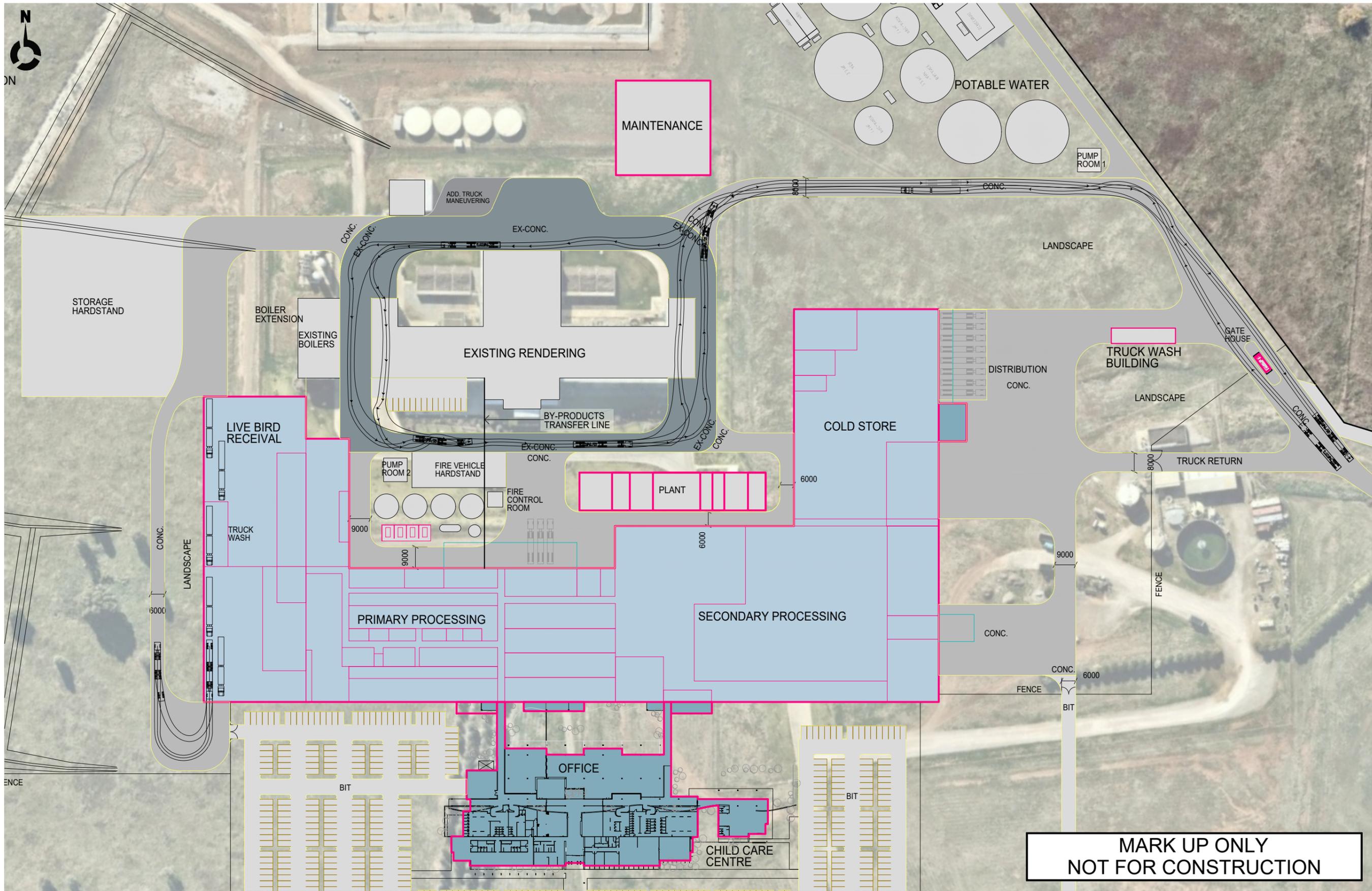
REVISION	DESCRIPTION	BY	DATE
1	ORIGINAL ISSUE	D.O	29.07.2020


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DRAWING TITLE B-DOUBLE SWEEP PATH (LIVE BIRD TRUCK ROUTE)
CLIENT BAIADA (TAMWORTH) PTY LIMITED
PROJECT OAKBURN PROCESSING PLANT
LOCATION 1154 GUNNEDAH ROAD, WESTDALE

DRAWING DATE	29 JULY 2020	DRAWN BY	D.O
ORIGINAL SIZE	A1	SCALE A3:	1:1500
SCALE			
APPROVED BY	D.I	DRAWING NO.	0788 SK07
PROJECT NO.		REVISION	1



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REVISION	DESCRIPTION	BY	DATE
1	ORIGINAL ISSUE	D.O	29.07.2020

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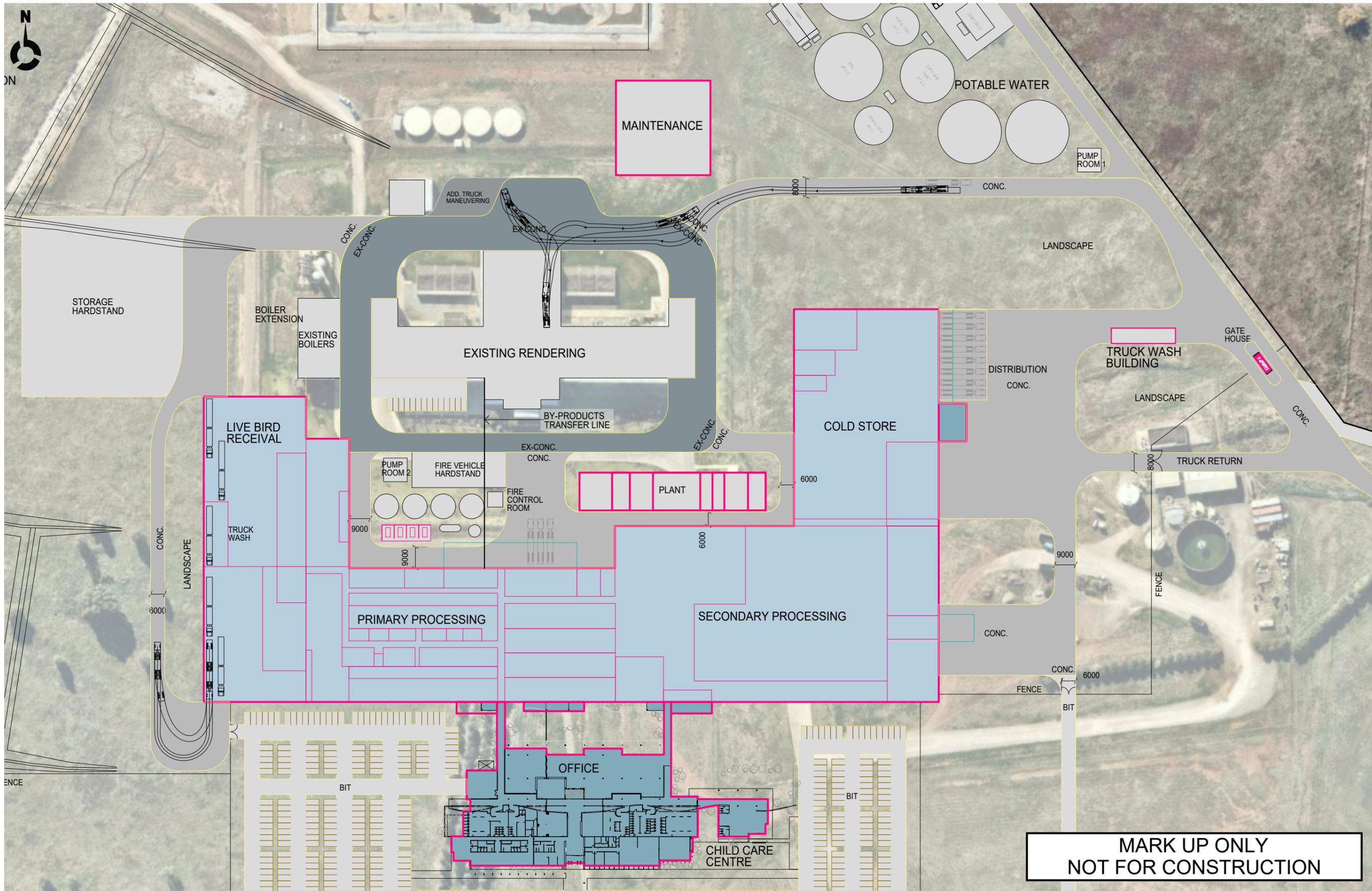
DRAWING TITLE: **B-DOUBLE SWEEP PATH (RENDERING TRUCK ROUTE)**

CLIENT: **BAIADA (TAMWORTH) PTY LIMITED**

PROJECT: **OAKBURN PROCESSING PLANT**

LOCATION: **1154 GUNNEDAH ROAD, WESTDALE**

DRAWING DATE: 29 JULY 2020	DRAWN BY: D.O
ORIGINAL SIZE: A1 SCALE A3: 1:1500	CHECKED BY: D.I
SCALE: 0 15 30 45m	APPROVED BY: D.I
SCALE 1:750(A1)	PROJECT NO. 0788
	DRAWING NO. SK08
	REVISION 1



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REVISION	DESCRIPTION	BY	DATE
1	ORIGINAL ISSUE	D.O	29.07.2020

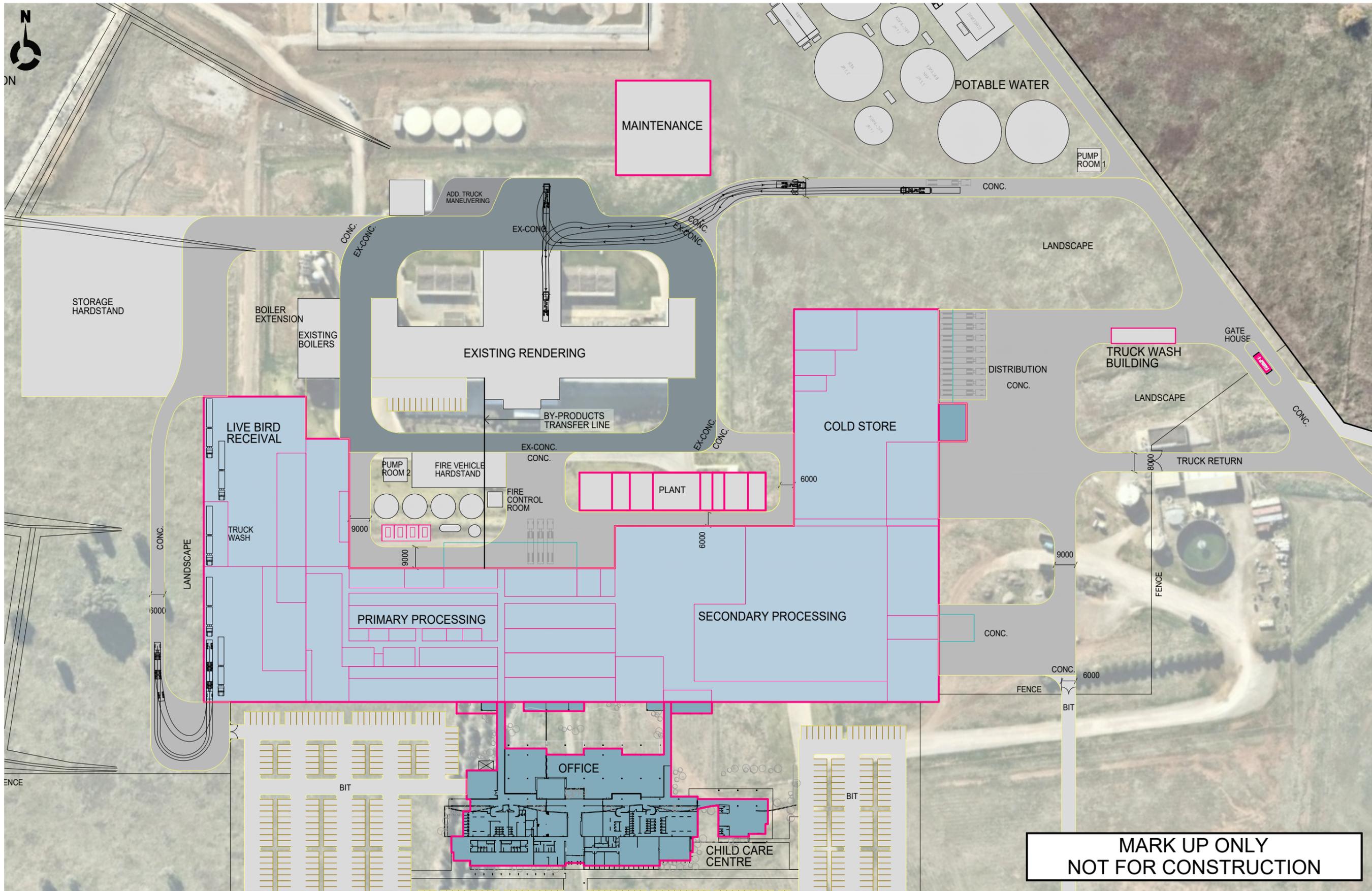
PSA CONSULTING

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DRAWING TITLE: SEMI TRAILER SWEEP PATH (RENDERING TRUCK ROUTE)
 CLIENT: BAIADA (TAMWORTH) PTY LIMITED
 PROJECT: OAKBURN PROCESSING PLANT
 LOCATION: 1154 GUNNEDAH ROAD, WESTDALE

DRAWING DATE: 29 JULY 2020	DRAWN BY: D.O
ORIGINAL SIZE: A1 SCALE A3: 1:1500	CHECKED BY: D.I
SCALE: 0 15 30 45m	APPROVED BY: D.I
SCALE 1:750(A1)	PROJECT NO. 0788
	DRAWING NO. SK09
	REVISION 1



**MARK UP ONLY
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REVISION	DESCRIPTION	BY	DATE
1	ORIGINAL ISSUE	D.O	30.07.2020

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DRAWING TITLE COMMERCIAL TRUCK SWEEP PATH (RENDERING TRUCK ROUTE)
CLIENT BAIADA (TAMWORTH) PTY LIMITED
PROJECT OAKBURN PROCESSING PLANT
LOCATION 1154 GUNNEDAH ROAD, WESTDALE

DRAWING DATE	30 JULY 2020	DRAWN BY	D.O
ORIGINAL SIZE	A1	SCALE A3:	1:1500
SCALE	0 15 30 45m		
SCALE	SCALE 1:750(A1)		
CHECKED BY	D.I	APPROVED BY	D.I
PROJECT NO.	0788	DRAWING NO.	SK10
REVISION	1		

25 August 2020

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

Attention: Ania Dorocinska@planning.nsw.gov.au

Dear Ania,

RE: BAIADA INTEGRATED POULTRY PROCESSING FACILITY (SSD 9394) – REQUEST FOR ADDITIONAL INFORMATION FOR HUNTER NEW ENGLAND LOCAL HEALTH DISTRICT

I refer to your correspondence dated 5 August 2020 providing additional comments from the Hunter New England Local Health District (Hunter New England Population Health), hereby referred to as HNE. We note that the HNE requested that the proponent address a number of matters and a response to each of these matters has been provided below.

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>Depending on reclaimed water quality, restrictions on end-uses are needed to control the exposure routes from residual pathogens and chemical contaminants to humans, food crops and/or livestock. It is therefore important that suppliers and users of reclaimed water work together to identify and assess the potential exposure routes associated with their reuse scheme.</i></p> <p><i>The degree of risk from each of the above pathogen groups will depend upon the Class of reclaimed water and the reuse application. Potential impacts both to and from reclaimed water of pathogen regrowth and disease transmission need to be assessed and appropriately controlled. This is particularly relevant where contamination via "vectors", such as birds (that could be attracted to reclaimed water ponds) is concerned. If not controlled, pathogens have the potential to be transmitted to humans or stock by (i) direct routes (that is through skin contact, ingestion or inhalation) or (ii) indirect contact (that is consumption of contaminated food or feed).</i></p>	<p>Noted. The water will be treated within the AWTP in accordance with the following NSW and Federal government guidelines:</p> <ul style="list-style-type: none"> • 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); • Australian Government (National Health and Medical Research Council, National Resource Management Ministerial Council) – Australian Drinking Water Guidelines. <p>Following treatment, the recycled water will be stored in enclosed tanks prior to use within the facility. At no point will the recycled water be left in open air ponds which can be exposed to wildlife such as birds.</p> <p>The ponds shown on the proposed site plans are evaporation ponds for the by-product (brine stream) produced by the advanced water treatment process. The complete treatment process is shown on the Process Flow Diagram in the previously submitted AWTP Design Report.</p>
<p><i>Reclaimed water schemes that require particular attention for health risk assessment include:</i></p> <ul style="list-style-type: none"> • <i>those that will result in consumption of reclaimed water (for example, indirect potable reuse);</i> 	<p>Noted. The recycled water will only be used within the processing plant and will not be accessible to the public. The Advanced Water Treatment Plant (AWTP) produces potable water that meets or exceeds the Australian Drinking Water Guidelines. Drinking quality water does not pose a risk to human health or to product quality or</p>



MATTERS RAISED	APPLICANT'S RESPONSE
<ul style="list-style-type: none"> • <i>irrigation of readily accessible public areas with potential for direct exposure to reclaimed water (for example, via spray drift);</i> • <i>discharging reclaimed water to surface waters that are used for fishing, or water contact sports; and</i> • <i>industrial reuses where workers may either come into direct contact with reclaimed water or ingest aerosols.</i> 	<p>safety. The water will be stored in sealed tanks and used for processing poultry within the processing facility.</p>
<p><i>Hunter New England Local Health District Population Health acknowledges that recycled water comes from an inherently unsafe source, therefore prevention is an essential feature of effective recycled water quality management. Preventive measures, in the context of managing recycled water schemes, are the actions, activities and processes used to prevent significant hazards from being present in recycled water schemes or to reduce any hazards to acceptable levels.</i></p>	<p>The proposed advanced water treatment plant will meet or exceed the water quality requirements noted in the following documents:</p> <ul style="list-style-type: none"> • 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); • Australian Government (National Health and Medical Research Council, National Resource Management Ministerial Council) – Australian Drinking Water Guidelines. <p>The AWTP will be operated in accordance with a Hazard Analysis and Critical Control Points (HACCP) Plan. Preparation and approval of the HACCP plan will be an integral part of the Food Authority approval process which is appropriately completed following detailed design and prior to production commencing.</p> <p>This can be reasonably and relevantly conditioned as part of a Development Approval.</p>
<p><i>Hunter New England Local Health District Population Health acknowledges that recycled water comes from an inherently unsafe source, therefore prevention is an essential feature of effective recycled water quality management. Preventive measures, in the context of managing recycled water schemes, are the actions, activities and processes used to prevent significant hazards from being present in recycled water schemes or to reduce any hazards to acceptable levels.</i></p> <p><i>NSW Health strongly recommends that the proponent determine maximum risk levels;</i></p> <ul style="list-style-type: none"> • <i>the entire recycled water system, including the water source, its characteristics and proposed end uses;</i> • <i>existing preventive measures, from source(s) to the user of recycled water, for each significant hazard or hazardous event;</i> 	<p>It is important to note the AWTP will be utilising proven, existing technology which is already being used in two major poultry production facilities in Australia.</p> <p>The comprehensive Hazard Assessment Critical Control Point (HACCP) based quality management system will be completed and implemented for the AWTP as part of the overall facility HACCP plan and this will be an integral part of the Food Authority approval process.</p> <p>The hazard identification and risk assessment will be undertaken by the HACCP team and facilitated by independent water quality specialists during the detailed process and prior to commencement of operations.</p> <p>The comprehensive Risk Assessment report addressing all the issues raised in the Department's letter will be furnished by the proponent and at a minimum will include:</p> <ul style="list-style-type: none"> • list of the team members involved; • a process flow diagram and description of the recycled water scheme (from source to end use)

MATTERS RAISED	APPLICANT'S RESPONSE
<ul style="list-style-type: none"> • <i>increased risk due to inadvertent or unauthorised actions;</i> • <i>ongoing operational monitoring needs to be identified (with response actions) to endure quality is maintained;</i> • <i>spatial aspects (these need to be considered when identifying preventive measures for environmental risks, because the sensitivity of receiving environments can vary over space);</i> • <i>areas where the use or discharge of recycled water is not appropriate due to, for example, environmental sensitivity or soil type or topography.</i> <p><i>Maximum risk (the risk with no preventive measures in place) and residual risk (the risk with the preventive measures in place) should be assessed for public health and environmental impacts e.g. assessment of harmful nutrient, salinity or sodicity build-up in any resource impacted by recycled water use and how this will be prevented, monitored and/or rectified.</i></p> <p><i>The risk assessment should identify actions for improvement such as introducing or enhancing preventive measures, as well as investigations to reduce uncertainties and further characterise risks. Actions identified in the risk assessment should be transferred to the Improvement Plan, prioritised and followed up. The Risk Assessment report must include:</i></p> <ul style="list-style-type: none"> • <i>a list of the team involved in the risk assessment;</i> • <i>a process flow diagram and description of the recycled water scheme (from source to end use) identifying the critical control points and monitoring points;</i> • <i>a risk register.</i> 	<p>identifying the critical control points and monitoring points; and</p> <ul style="list-style-type: none"> • a risk register. <p>The HACCP plan will be developed following a detailed hazard identification and risk assessment process based on the final AWTP detailed design. The detailed design phase for the AWTP will commence after development approval for the facility is granted.</p> <p>This can be reasonably and relevantly conditioned as part of a Development Approval.</p>

I trust this information is of assistance. Please do not hesitate to contact me on (07) 3220 0288 should you have any questions or wish to discuss.

Regards,



David Ireland
Director – Planning

VERSION	DATE	DETAILS	AUTHOR	AUTHORISATION
V2	25 August 2020	FINAL	NICOLE BOULTON	 PROJECT DIRECTOR

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
<p>1. Revised Noise Impact Assessment</p> <p><i>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.</i></p> <p><i>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.</i></p>	<p>Noted. Please see response below.</p>
<p>a) Adverse Meteorological Conditions – Effectiveness of Proposed Noise Mitigation Measures</p> <p><i>The Revised Noise Impact Assessment (RNIA) states the following regarding exceedance of the Project Noise Trigger Level (PNTL) under adverse meteorological conditions:</i></p> <p><i>“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</i></p>	<p>A Revised Acoustic Report is included in Attachment 1. Section 3.2.2. has been updated to read: <i>“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.”</i></p> <p>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</p>

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<p><i>and enable further noise control strategies to be implemented in the event of any non-compliance”, (RNIA – p19 – Section 3.2.2. – referencing Table 13 O Received Noise Levels – Render Plant).</i></p> <p><i>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)</i></p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>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.</i></p> <p>Additional information: <i>Confirmation of effectiveness of all feasible and practical mitigation measures and revision of accuracy of noise levels.</i></p>	<p>outlined in Section 3.2.2 of the Noise Report and are summarised below.</p> <table border="1" data-bbox="667 309 1380 1283"> <thead> <tr> <th rowspan="2">Strategy</th> <th colspan="2">Version of the Noise Impact Assessment</th> </tr> <tr> <th>Version 4 dated June 2020</th> <th>Version 5 dated August 2020</th> </tr> </thead> <tbody> <tr> <td>Erect acoustic mound around the west side of the Live Bird Module and Hardstand</td> <td>Yes – 2700mm above Finished Ground Level (FGL)</td> <td>Yes – 3000mm above FGL</td> </tr> <tr> <td>Erect acoustic barrier adjacent to Cooling Towers and Associated Pumps</td> <td>Yes – 2100mm above FGL</td> <td>Yes – 2100mm above FGL</td> </tr> <tr> <td>Erect acoustic barrier along north side of the Rendering Building loop road</td> <td>No</td> <td>Yes – 2100mm above FGL</td> </tr> <tr> <td>Erect acoustic barrier along the north side of the Cold Store Distribution Dock</td> <td>No</td> <td>Yes – 2400mm above FGL</td> </tr> </tbody> </table> <p>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:</p> <table border="1" data-bbox="667 1444 1396 1848"> <thead> <tr> <th rowspan="2">Residential Receiver</th> <th colspan="6">Received Noise Levels, dB(A),Leq</th> </tr> <tr> <th colspan="2">Neutral Conditions (Day)</th> <th colspan="2">3m/sec Wind Source to Rec (Day/Evening)</th> <th colspan="2">3°C/100m Inversion (Night)</th> </tr> <tr> <th>Report Version</th> <th>V4</th> <th>V5</th> <th>V4</th> <th>V5</th> <th>V4</th> <th>V5</th> </tr> </thead> <tbody> <tr> <td>Girrawheen</td> <td>32</td> <td>32</td> <td>34</td> <td>34</td> <td>35</td> <td>35</td> </tr> <tr> <td>Abbeylands</td> <td>33</td> <td>32</td> <td>36</td> <td>34</td> <td>35</td> <td>34</td> </tr> <tr> <td>The Billabong</td> <td>30</td> <td>28</td> <td>35</td> <td>33</td> <td>34</td> <td>32</td> </tr> <tr> <td>Airport South</td> <td>20</td> <td>20</td> <td>25</td> <td>25</td> <td>23</td> <td>23</td> </tr> </tbody> </table> <p>As can be seen from the above comparison, with the additional noise mitigations in place, the modelling demonstrates compliance with the NPfl criteria.</p>		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	Residential Receiver	Received Noise Levels, dB(A),Leq						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
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	Regardless demonstrated compliance, a noise monitoring program is still being recommended by Reverb Acoustics to provide verification of the compliance.																								
<p>b) Effectiveness of Proposed Noise Mitigation Measures – Physical Noise Controls</p> <p><i>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.</i></p> <p><i>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.</i></p> <p>Additional Information: Provision of a noise contour graph showing noise levels at each receiver and associated effect of physical noise control.</p>	<p>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:</p> <ul style="list-style-type: none"> - 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. <p>Table 13 of revised assessment (reproduced below) demonstrates compliance with the NPfl criteria nearest residential receivers under neutral and noise enhancing atmospheric conditions with the additional strategies in place.</p> <table border="1" data-bbox="667 954 1390 1397"> <thead> <tr> <th></th> <th colspan="3">Received Noise Levels, dB(A), Leq</th> </tr> <tr> <th>Residential Receiver</th> <th>Neutral Conditions (Day)</th> <th>3m/sec Wind Source to Rec (Day/Evening)</th> <th>3°C/100m Inversion (Night)</th> </tr> </thead> <tbody> <tr> <td>Girrawheen</td> <td>32</td> <td>34</td> <td>35</td> </tr> <tr> <td>Abbeylands</td> <td>32</td> <td>34</td> <td>34</td> </tr> <tr> <td>The Billabong</td> <td>28</td> <td>33</td> <td>32</td> </tr> <tr> <td>Airport South</td> <td>20</td> <td>25</td> <td>23</td> </tr> </tbody> </table> <p><i>Criteria: All Receivers Day=40, Evening=35, Night=35.</i></p>		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
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<p>c) Construction Noise – Effectiveness of Proposed Noise Mitigation Measures</p> <p><i>There appears to be conflicting advice regarding noise mitigations options during the construction phase.</i></p> <p><i>RNIA Section 3.2.6, relating to construction noise, states that:</i></p> <p><i>“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)</i></p> <p><i>Section 4 of the RNIA lists recommendations for temporary barriers and screening as well as quieter</i></p>	<p>Section 3.2.6 Predicted Noise Levels – Construction Plant and Equipment has been updated to state:</p> <p><i>“Received noise produced by anticipated construction activities is shown in Table 14 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...”</i></p> <p>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: <i>“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</i></p>																								

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>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.</i></p> <p><i>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.</i></p> <p>Additional Information: Clarification of mitigation measures to be implemented during construction phase.</p>	<p><i>power, 40dB(A) is expected at the closest residence during peak activity.”</i></p> <p>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.</p> <p>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.</p>
<p>d) Noise Mitigation – Night-Time Collection of Poultry</p> <p><i>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.</i></p>	<p>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:</p> <ul style="list-style-type: none"> - 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.
<p>e) Clarification of Relevant Road Traffic Noise Policy</p> <p><i>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.</i></p> <p><i>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.</i></p>	<p>This section of the report has been revised to read “<i>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.</i>” (refer to updated Revised Noise Impact Assessment in Attachment 1).</p>

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2. Waste Management	
<p>a) Concentrated Brine Waste from Accelerated Evaporation Ponds</p> <p>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.</p> <p>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 salt waste will be classified in accordance with the EPA's Waste Classification Guidelines.</p> <p>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.</p> <p>Additional Information: The proponent provides a waste management plan including, but not limited to, the following information:</p> <ul style="list-style-type: none"> - 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 salt 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. 	<p>1. Classification of the salt waste in accordance with the EPA's Waste Classification Guidelines</p> <p>The salt waste would be classified as general solid waste in accordance with the EPA's Waste Classification Guidelines.</p> <p>2. Identification of the concentration and quantities of salt waste generated including the anticipated frequency of pond desludging</p> <p>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.</p> <p>Each of the 3 evaporation ponds will be dried out periodically (approximately once every 1 – 2 years), the remaining solid waste will be collected and taken offsite to a licensed disposal facility.</p> <p>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</p> <p>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.</p> <p>4. Outline contingencies for the disposal of salt waste should landfills be unsuitable disposal facilities.</p> <p>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.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p>b) Mining for Minerals from Brine Stream</p> <p>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.</p>	<p>Noted. This may be pursued at such time that this technology becomes available.</p>
<p>3. Odour Impact Assessment</p>	
<p><i>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.</i></p>	<p>Noted. See responses below.</p> <p>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.</p> <p>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.</p> <p>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.</p>
<p>a) Uncertainty of Odour Risk and Applicable Mitigation Measures</p> <p><i>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.</i></p> <p><i>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</i></p>	<p>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:</p> <ul style="list-style-type: none"> ▪ Live bird receipt 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. <p>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</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>evaluation of odour risk must, as a minimum, consider the following:</i></p> <ul style="list-style-type: none"> • <i>Level of compliance with the odour assessment criterion;</i> • <i>Level of uncertainty in odour dispersion modelling results;</i> • <i>Results of any sensitivity analysis;</i> • <i>Reliability of any odour mitigation measures; and</i> • <i>Additional feasible mitigation measures that could be implemented if the facility emits offensive odour after it is operational.</i> <p><i>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.</i></p> <p>Additional Information: <i>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.</i></p>	<p>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.</p> <p>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 <i>Section 6.2</i> of the latest OIA report).</p>
<p>b) Odour Emissions – Loading Bay</p> <p><i>The outstanding issue from our previous advice to be addressed relates to the Protein Recovery Plant (PRP) increased production assessment.</i></p> <p><i>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.</i></p> <p><i>However, the revised odour impact assessment has not provided additional information to address the increased PRP throughput or odour sampling report, including operations when</i></p>	<p>The theoretical maximum production rates have been used for 24 hours, 7 days per week (refer to <i>Section 3.3.1</i> 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.</p> <p>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.m³/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</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>monitoring was undertaken, to validate the revised odour emissions rates for the loading bay.</i></p> <p><i>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.</i></p>	<p>Recovery Plant (PRP). Subsequently all measured volume sources had their odour emission rates (OERs) updated.</p> <p>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.</p>
<p>c) Odour Emissions – Wastewater Treatment Plant (WWTP)</p> <p><i>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.</i></p> <p>Additional Information: <i>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.</i></p> <p><i>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.</i></p>	<p>Refer to Section 3.2.1 of the latest OIA report (refer to Attachment 2).</p> <p>The June 2020 assessment is based upon the following:</p> <ul style="list-style-type: none"> ▪ 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. <p>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.</p> <p>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.</p>
<p>d) Odour Impacts – On-site Childcare Centre</p> <p><i>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</i></p>	<p>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.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>operational hours or the childcare centre.</i></p> <p><i>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.</i></p> <p><i>The EPA notes the following will be adopted as part of the Odour Management Plan with respect to the on-site childcare centre:</i></p> <ul style="list-style-type: none"> <i>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</i> <i>ii) Vegetative landscaping for the outdoor areas to provide a level of screening attenuation and visual disconnection for the PPF operations.</i> <p><i>EPA Comment:</i> <i>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.</i></p> <p><i>The revised Odour Impact Assessment has stated that the proponent will employ odour mitigation measures as part of the odour management plan, resulting in a low risk of odour impacts. These odour mitigation measures have not been included in the modelling of impacts.</i></p> <p><i>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</i></p>	

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>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.</i></p>	
4. Wastewater Assessment	
<p><i>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.</i></p> <p><i>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.</i></p> <p><i>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:</i></p> <ul style="list-style-type: none"> <i>• 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</i> <i>• Newly proposed accelerated evaporation ponds to manage (on-site) the concentrated brine stream.</i> <p><i>The three 10,000m² 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.</i></p>	<p>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.</p> <p>Discussions are ongoing in this regard with the Tamworth Regional Council. Reasonable and relevant conditions are expected in this regard.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p>a) Design and Management of Evaporation Ponds</p> <p><i>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.</i></p> <p>Additional Information: <i>The proponent is to provide the following:</i></p> <p><i>An evaporation pond management plan that includes, but is not limited to:</i></p> <ul style="list-style-type: none"> • <i>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</i> • <i>Contingency measures to prevent managed overflows are identified, e.g. if freeboard is not available and further significant rainfall is predicted; and</i> • <i>Operational measure to be implemented for salt removal, maintaining liner integrity and maintaining the leak detection system performance</i> 	<p>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 design 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.</p>
<p>b) Pond Linings</p> <p><i>The EPA submission recommended that the adequacy of liners for processing and treatment systems be confirmed through the response to submissions.</i></p> <p><i>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.</i></p>	<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> i) Installing liners for evaporation ponds that will achieve a hydraulic conductivity of 1×10^{-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
<p><i>The Response to Submissions states that:</i></p> <p><i>“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).</i></p> <p>The response to submission does not specify liner permeability or consider the risk of high salinity effluent reacting with the liner.</p> <p>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.</p> <p>Additional Information: The proponent is to provide the following:</p> <ul style="list-style-type: none"> i) A commitment to install liners for evaporation ponds that will achieve a hydraulic conductivity of 1×10^{-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 	<ul style="list-style-type: none"> 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. <p>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.</p> <p>This can be reasonably and relevantly conditioned as part of a development approval.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p>for the proposal will be constructed to achieve the above specified hydraulic conductivity.</p> <p>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.</p> <p>v) The QA/QC process to address leak detection systems and groundwater monitoring for potential pond leakage.</p> <p>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.</p>	
<p>c) WTP sludge management</p> <p><i>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.</i></p>	Noted.
<p>d) Stormwater and discharges to waters</p> <p><i>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:</i></p> <ul style="list-style-type: none"> • <i>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</i> • <i>A consent condition of approval be considered to require that</i> 	Noted.

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>all birds handling and associated cleaning activities are contained indoors.</i></p>	
<p>e) Truck wash <i>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.</i> <i>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.</i></p>	<p>Noted.</p>

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

**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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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.

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

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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 NPfl 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 NPfl. 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).

REVERB ACOUSTICS

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 NPfl. However, local Councils may also apply the criteria for land use planning, compliance and complaints management. The NPfl 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 NPfl 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:

$$\text{Recommended Amenity Noise Level (Table 2.2) – 5dB(A) +3dB(A)}$$

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 NPfl - Table 2.2)		

Minimum assumed RBL's EPA's NPfl 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 NPfl 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 NPfl 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:	Noise affected RBL +10dB(A) i.e. 45dB(A) day	<ul style="list-style-type: none"> - 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
Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public holidays	Highly noise affected 75dB(A)	<ul style="list-style-type: none"> - 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)	<ul style="list-style-type: none"> - 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 $L_{eq,T}$ noise level for intermittent traffic noise.

Equation 1:

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

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

Typical vehicle noise levels were sourced from our library of technical data, while background noise levels are those described in Section 2.2. The L_{max} 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 Bldg East	95			1 (S16)	
Refrig Truck Units x4	95			4 ((S18)	
Refrig Truck Reverse	104			1 (S19)	
Cold Storage Bldg 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 Bldg East	95			1 (S16)	
Refrig Truck Units x4	95			4 ((S18)	
Refrig Truck Reverse	104			1 (S19)	
Cold Storage Bldg 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**

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	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 recommend 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:

<i>Location</i>	<i>Height Above FGL (mm)</i>
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.

REVERB ACOUSTICS

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 $\geq 5\text{dB(A)}$.

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

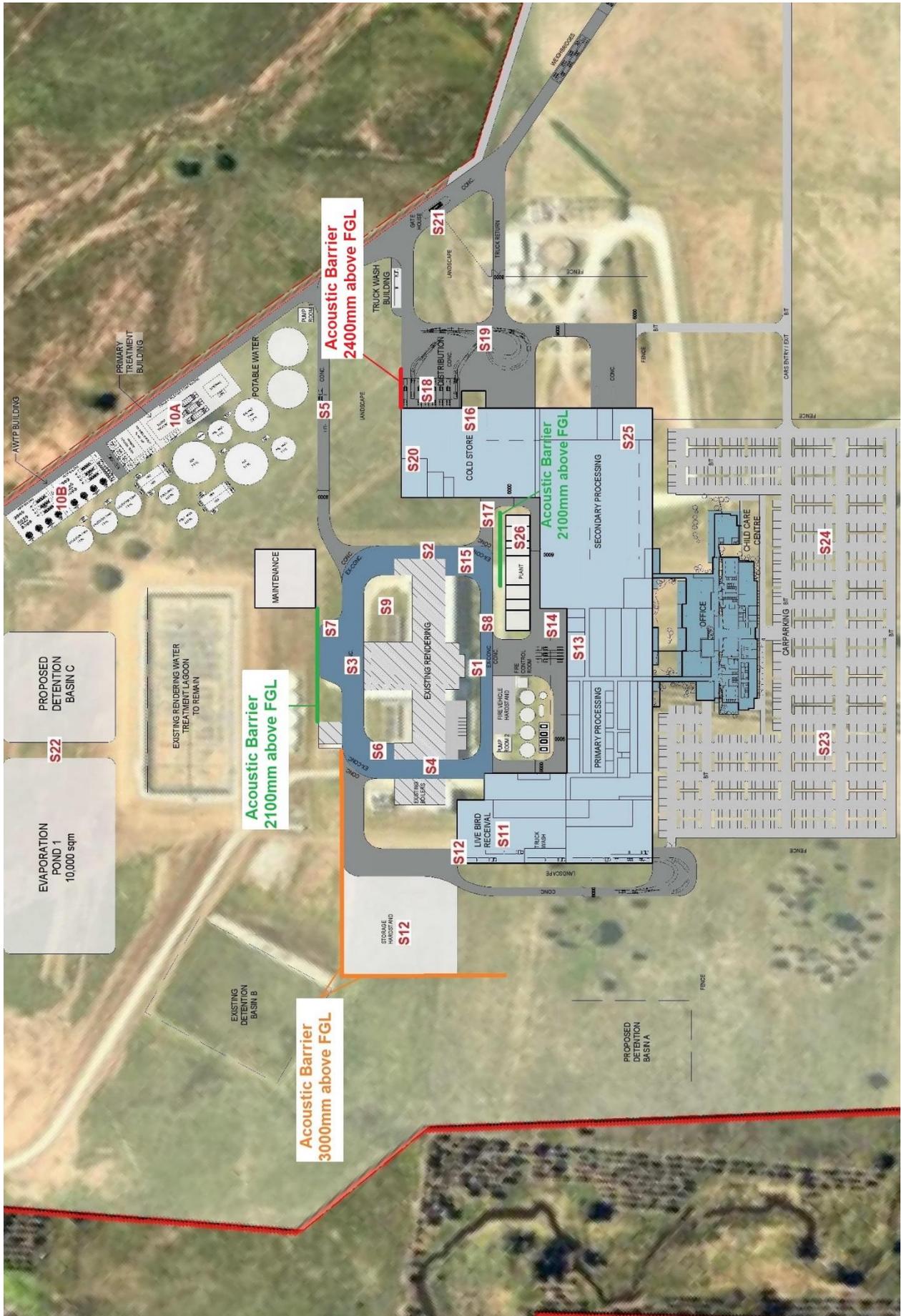
Definition of Acoustic Terms

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	<i>Assessment Background Level</i> – A single figure representing each individual assessment period (day, evening, night). Determined as the L90 of the L90's for each separate period.
RBL	<i>Rating Background Level</i> – 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).

Time

APPENDIX B

Noise Source Locations Acoustic Mound/Barrier



REVERB ACOUSTICS

APPENDIX C

Risk Assessment Checklist



**THE ODOUR
UNIT**



PSA
CONSULTING
AUSTRALIA



PSA CONSULTING

Baiada Poultry Pty Ltd –

**Proposed Poultry Processing Facility
Odour Impact Assessment**

Oakburn, NSW

Final Report

Version 2

August 2020

Child Care Centre

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Report Preparation		
Report Prepared By: S. Munro & S. Hayes		Reviewed & Approved By: M. Assal
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.

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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
m³/h	cubic metres per hour
m³/s	cubic metres per second
ML	megalitres
MW	megawatts
°C	degrees Celsius
ou	odour units
ou.m³/m².s	odour units by cubic metre per square metre by second
ou.m³/s	odour units cubic metre per second
Pa	Pascals

ppm parts per million, by volume

AIR POLLUTANTS & CHEMICAL NOMENCLATURE

CO carbon monoxide

CO₂ carbon dioxide

NO_x oxides of nitrogen

SO₂ 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**.

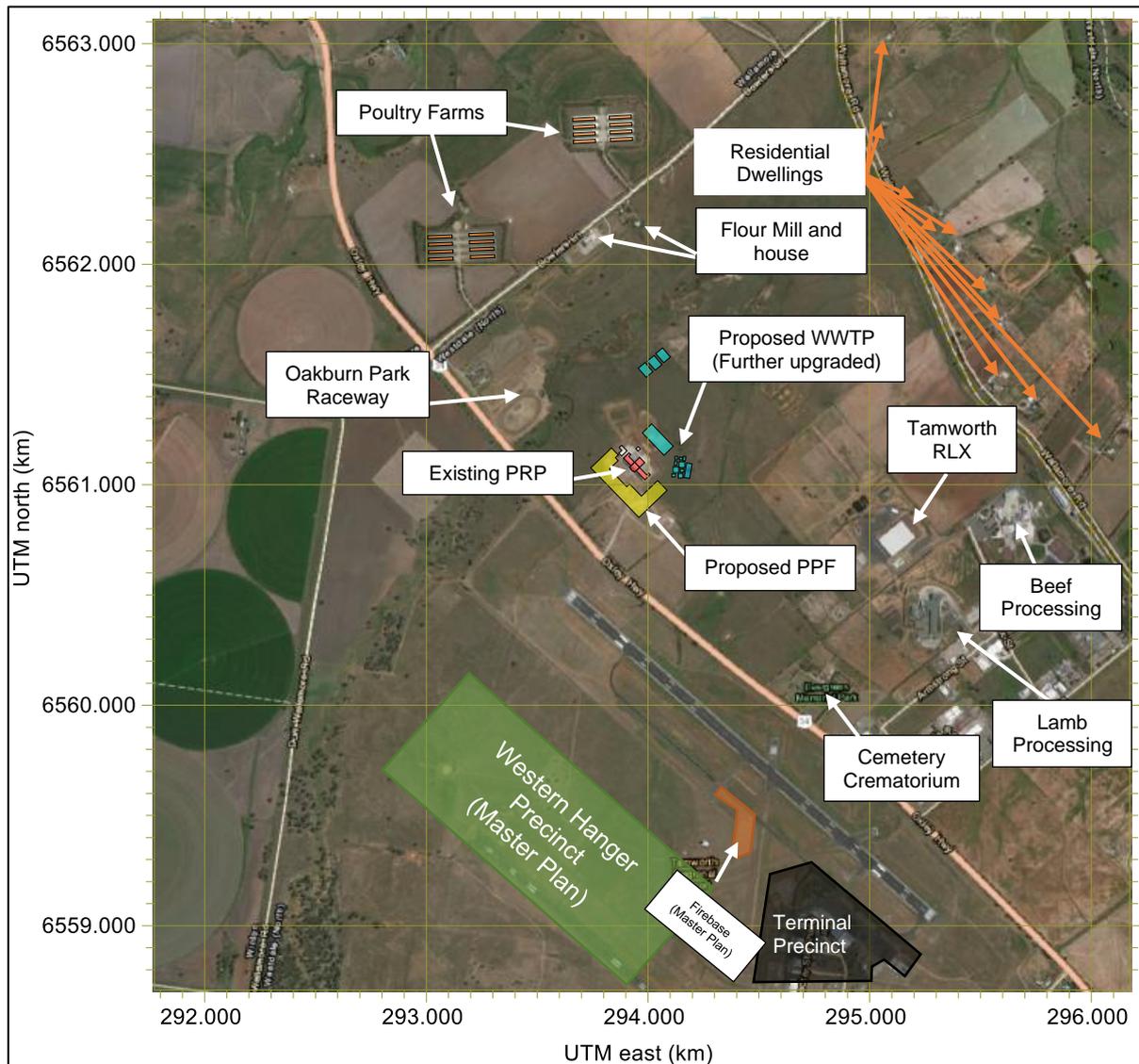


Figure 2.1 – Site location and surrounds

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 m² of Gross Floor Area providing for live bird storage, processing, chilling, cold store and distribution facilities;*
 - *1,600 m² workshop and store building;*
 - *4,100 m² 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 m²;
- Processing area: 30,273 m²;
- Office area: 4,848 m²;

- Childcare area: 346 m²;
- Maintenance 1,118 m²; and
- Wastewater Treatment area: 3,225 m².

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:

- Reveal 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:
 - Reveal 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.

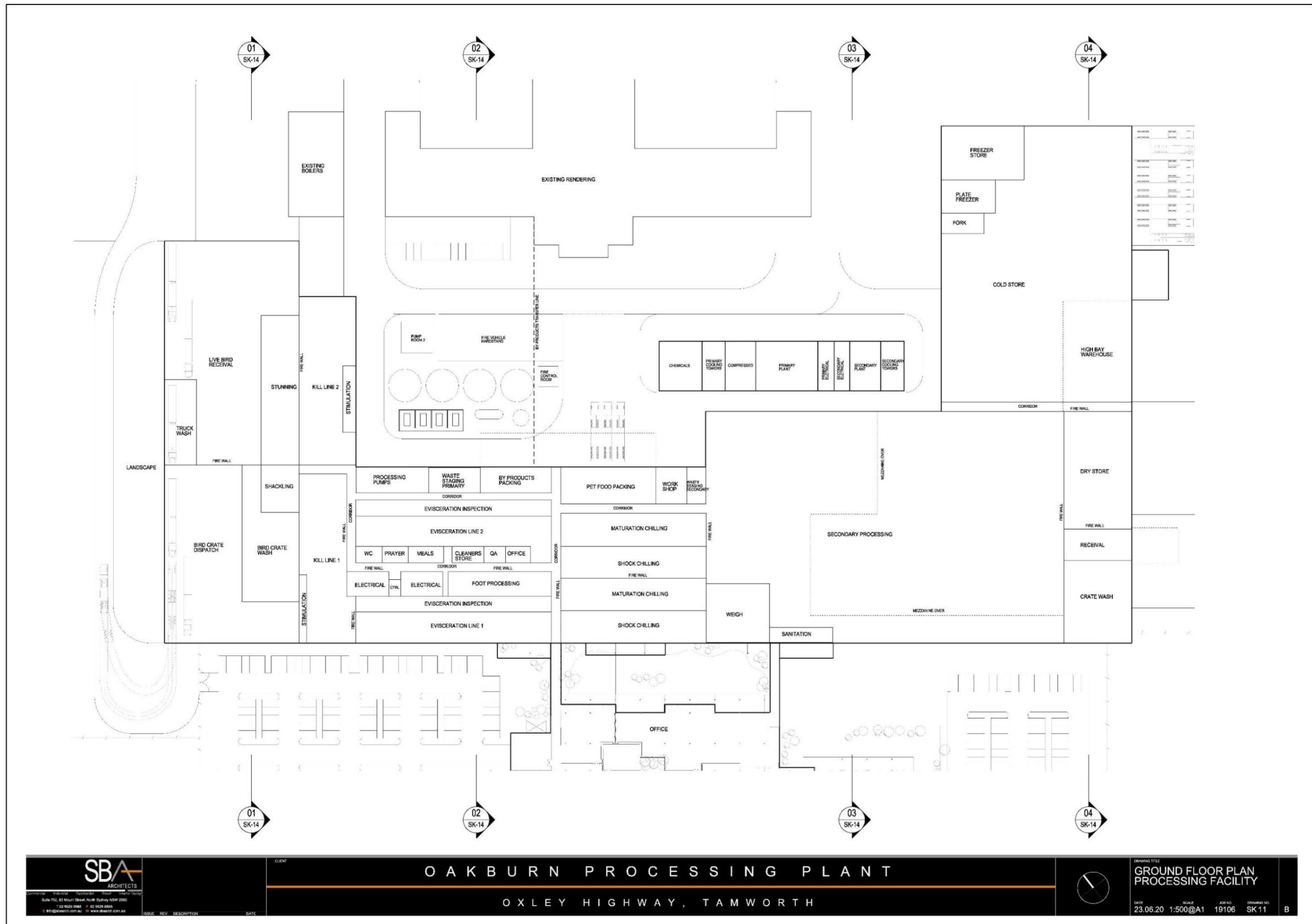


Figure 2.3 – Ground floor layout of the integrated PPF operations

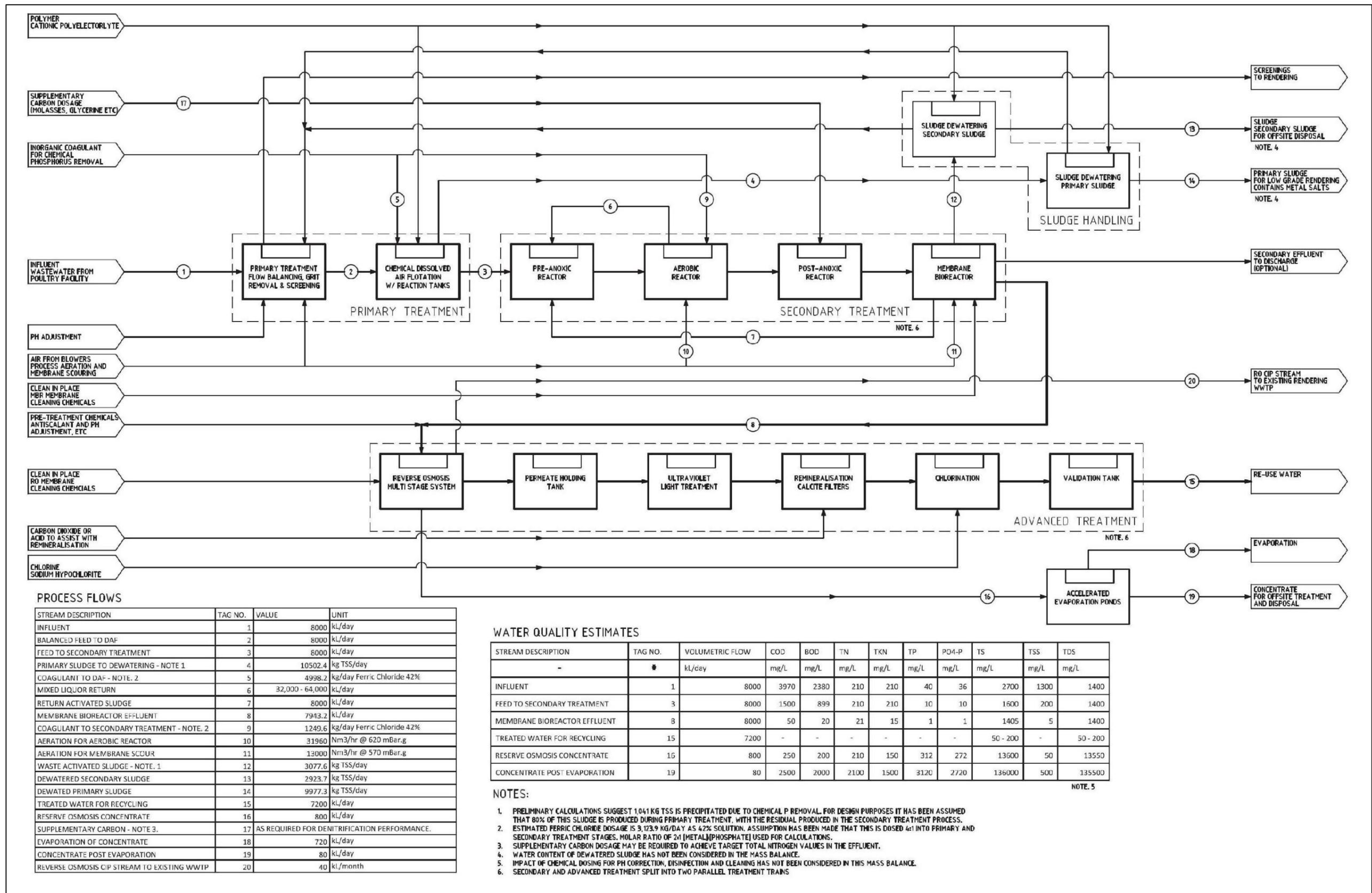


Figure 2.4 – Process flow diagram of PPF WWTP and AWTP

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 (**SO₂**) 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
CO₂%	5.9	9.5	7.5	9.2	6.3	9.5
O₂	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 compliant 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.m³/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 m³/h, based upon a design factor of 10 m³/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	6561.586	0.141	0.324	0.268	306	703	581
				294.0624	6561.544						
				294.0324	6561.519						
				293.9964	6561.56						
Covered Anaerobic Lagoon	CAL1	385	8,242	294.0162	6561.275	0.0518	0.119	0.098	427	982	811
				294.1141	6561.174						
				294.0723	6561.133						
				293.9744	6561.234						
Clear Well #2	CW2	380.8	2,167	293.9868	6561.554	0.141	0.324	0.268	306	703	581
				294.0218	6561.512						
				293.9918	6561.487						
				293.9558	6561.528						
Sequential Batch Reactor (Fill)	SBR1	380.8	2,167	294.0657	6561.62	3.89	8.95	7.39	8,430	19,388	16,016
				294.1007	6561.578						
				294.0707	6561.553						
				294.0347	6561.594						
Sequential Batch Reactor (Start cycle)	SBR1	380.8	2,167	294.0657	6561.62	0.224	0.52	0.43	485	1,116	922
				294.1007	6561.578						
				294.0707	6561.553						
				294.0347	6561.594						
Sequential Batch Reactor (Mid cycle)	SBR1	380.8	2,167	294.0657	6561.62	0.082	0.19	0.16	178	409	338
				294.1007	6561.578						
				294.0707	6561.553						
				294.0347	6561.594						
Sequential Batch Reactor (End cycle)	SBR1	380.8	2,167	294.0657	6561.62	0.03	0.069	0.057	65	150	124
				294.1007	6561.578						
				294.0707	6561.553						
				294.0347	6561.594						
Sequential Batch Reactor (Settling/Decant)	SBR1	380.8	2,167	294.0657	6561.62	0.018	0.041	0.034	39	90	74
				294.1007	6561.578						
				294.0707	6561.553						
				294.0347	6561.594						
Proposed WWTP/AWTP to service PPF											
Balance Tank	BAL1	384.3	416	294.1366	6561.05	0.3	0.69	0.57	125	287	237
				294.157	6561.05						
				294.157	6561.03						
				294.1366	6561.03						
Pre-anoxic Tank #1	PRAX1	384.3	213	294.1464	6561.071	0.224	0.515	0.426	48	110	91
				294.161	6561.071						
				294.161	6561.056						
				294.1464	6561.056						

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:

$$OERs = 0.025 K V^{0.5} \quad \text{Equation 3.1}$$

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 point 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.

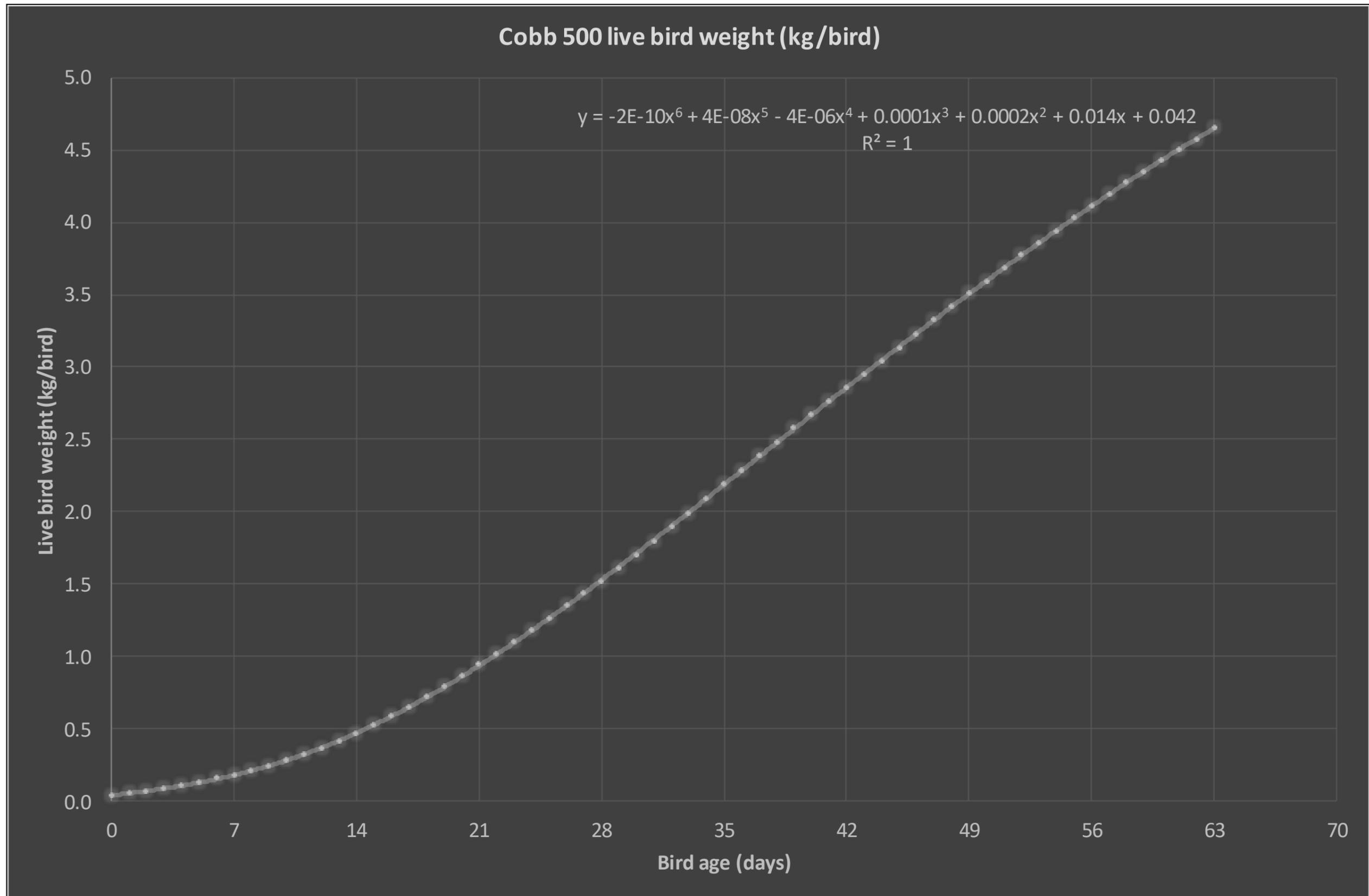


Figure 3.3 – Cobb 500 live bird weight performance objective (Source: supplied)



Figure 3.4 – Bowers 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

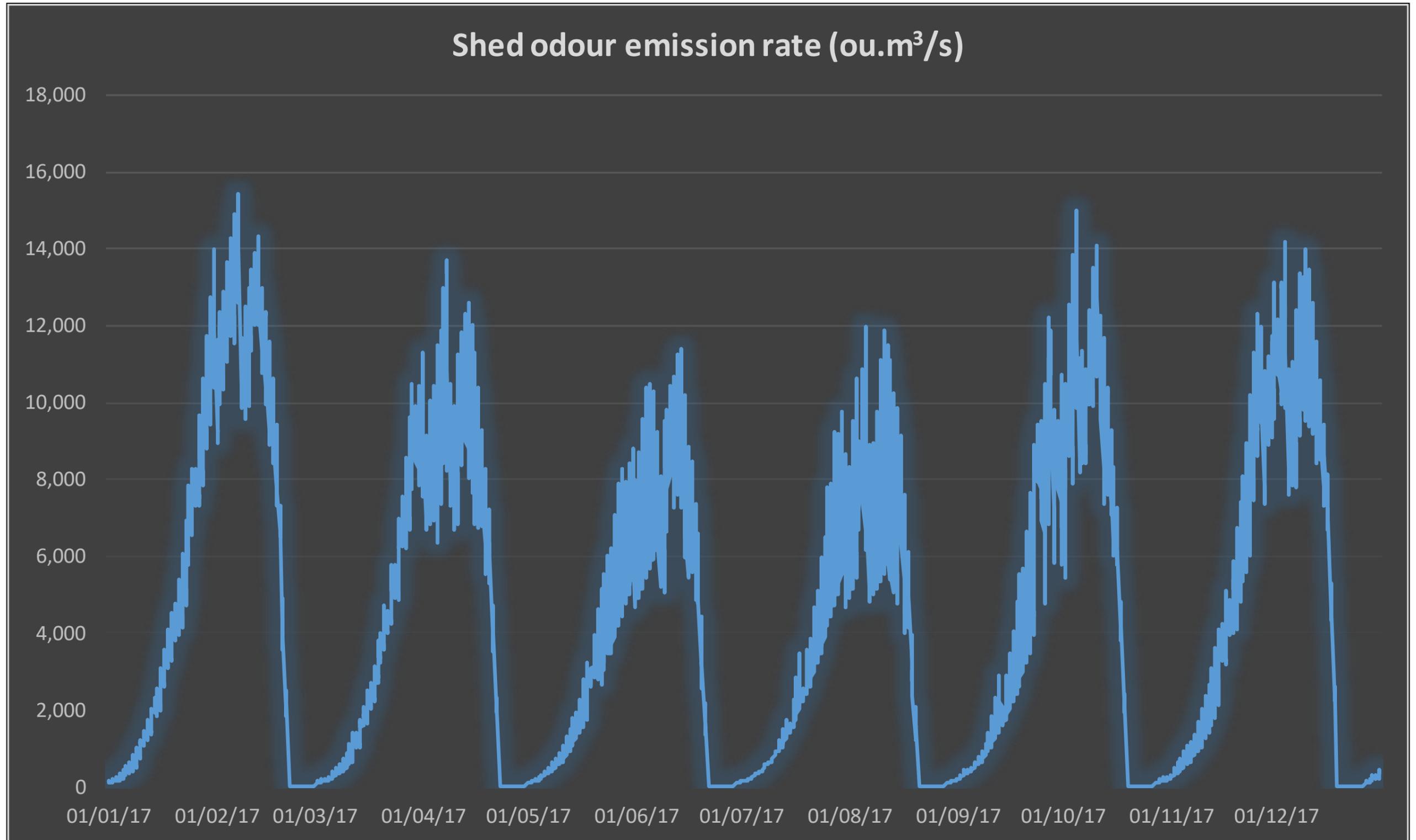


Figure 3.5 – Example of hourly varying shed OER for 2017

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:

- 99.0th 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):

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

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 ($\geq \sim 2000$) and/or schools or hospitals	2.0
~500	3.0
~125	4.0
~30	5.0
~10	6.0
Single rural residence ($\leq \sim 2$)	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.

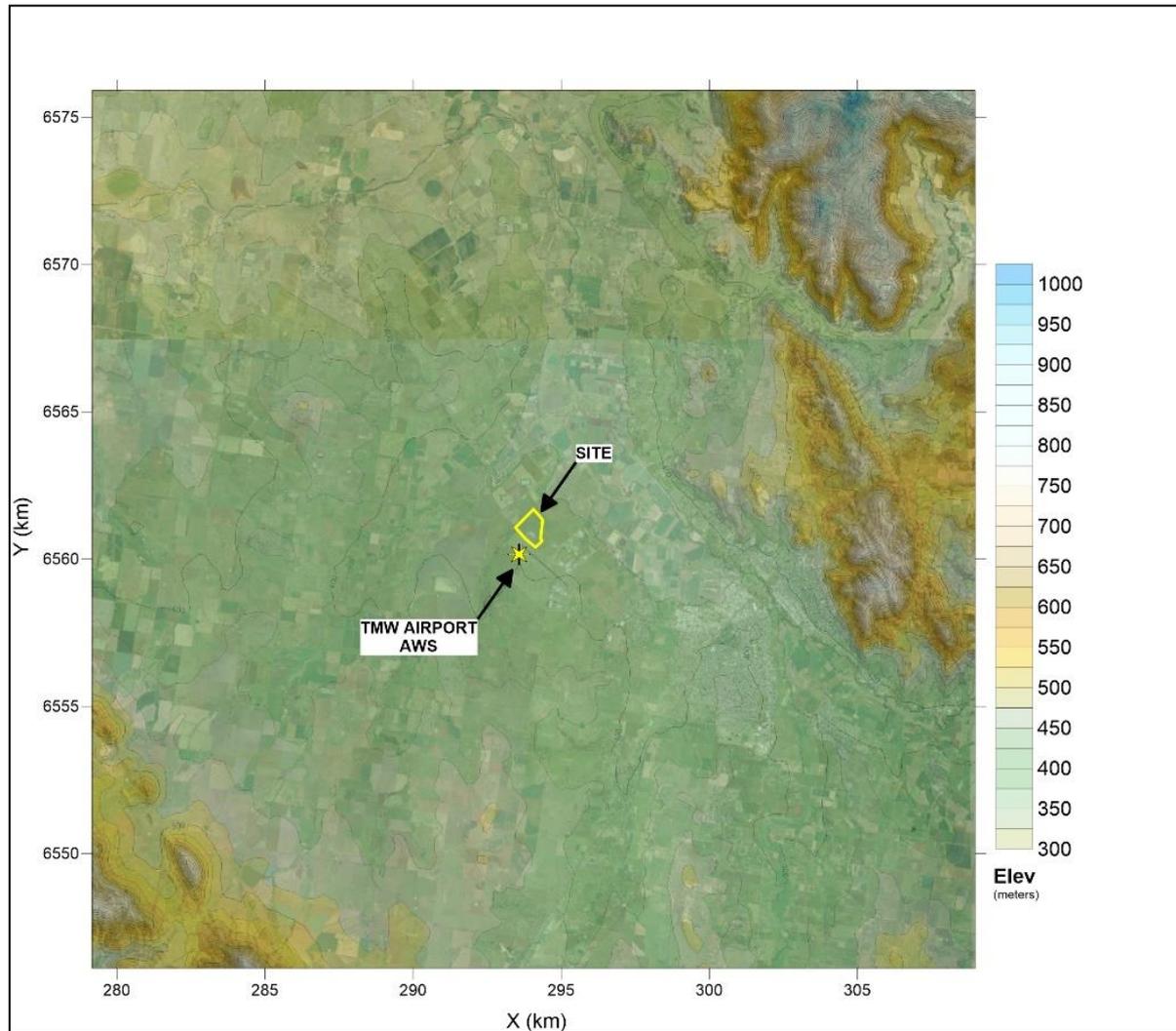


Figure 4.1 – Terrain dataset of Oakburn PRP and surrounds

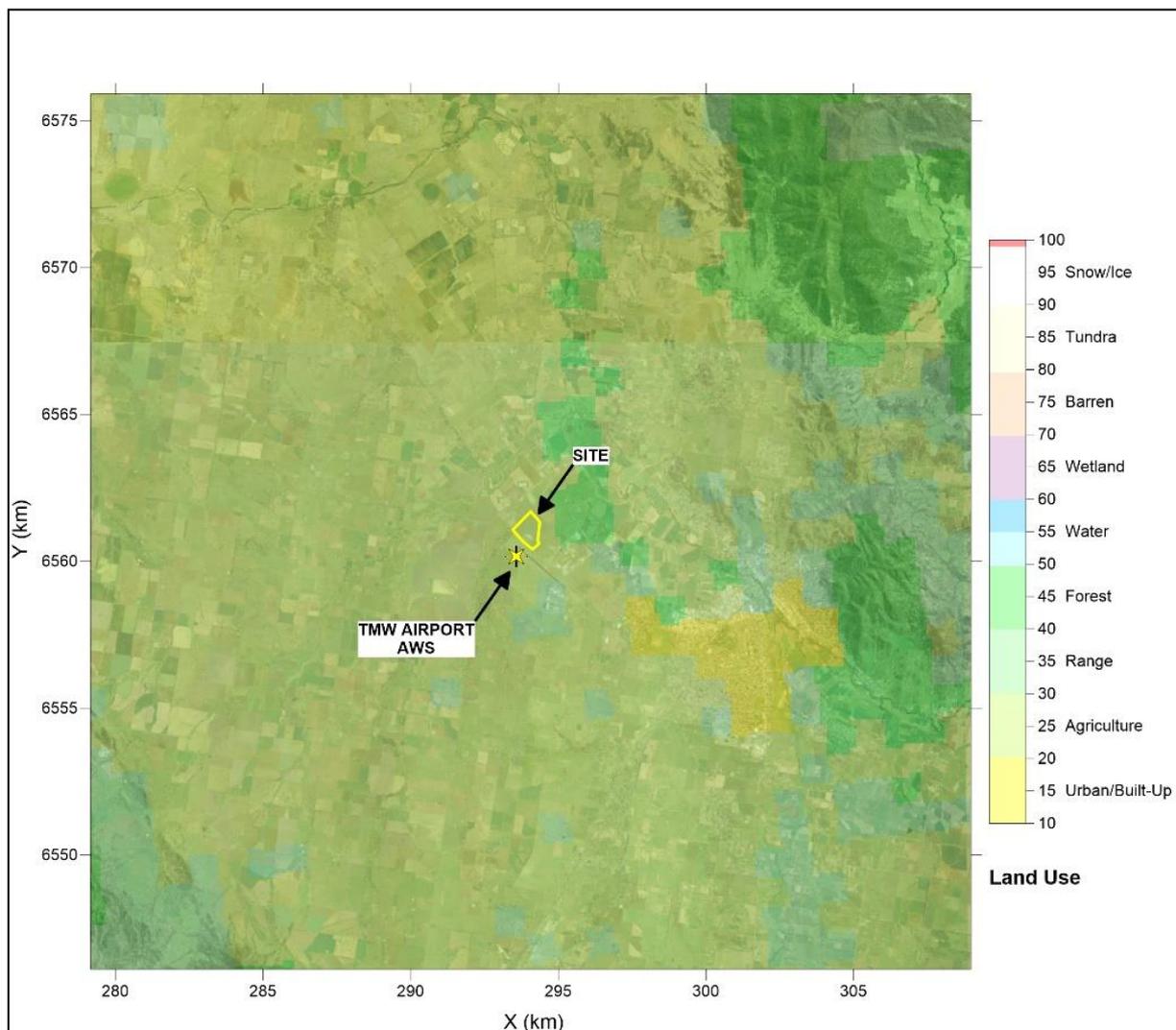


Figure 4.2 – Land use dataset of Oakburn PRP and surrounds

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

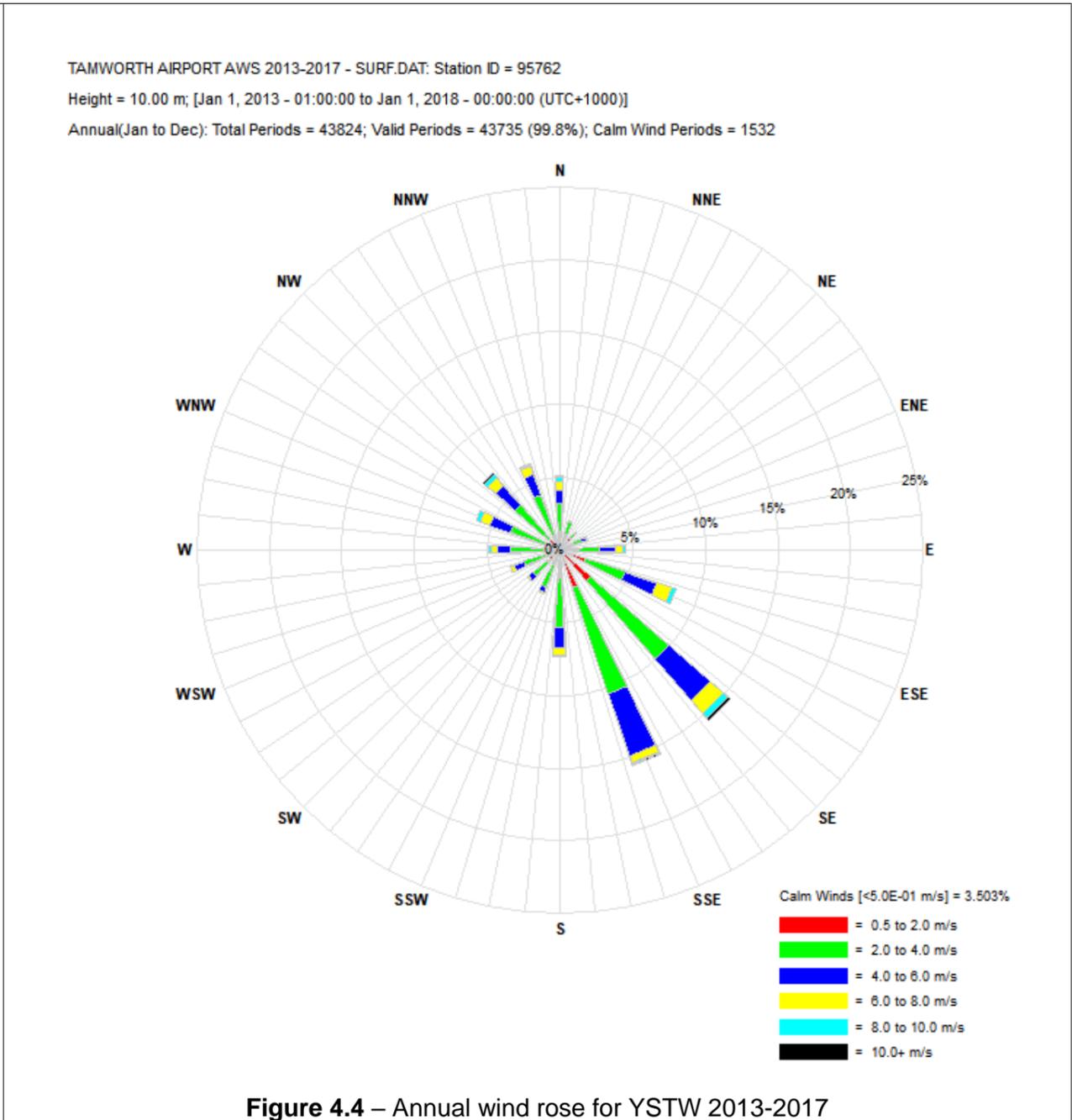
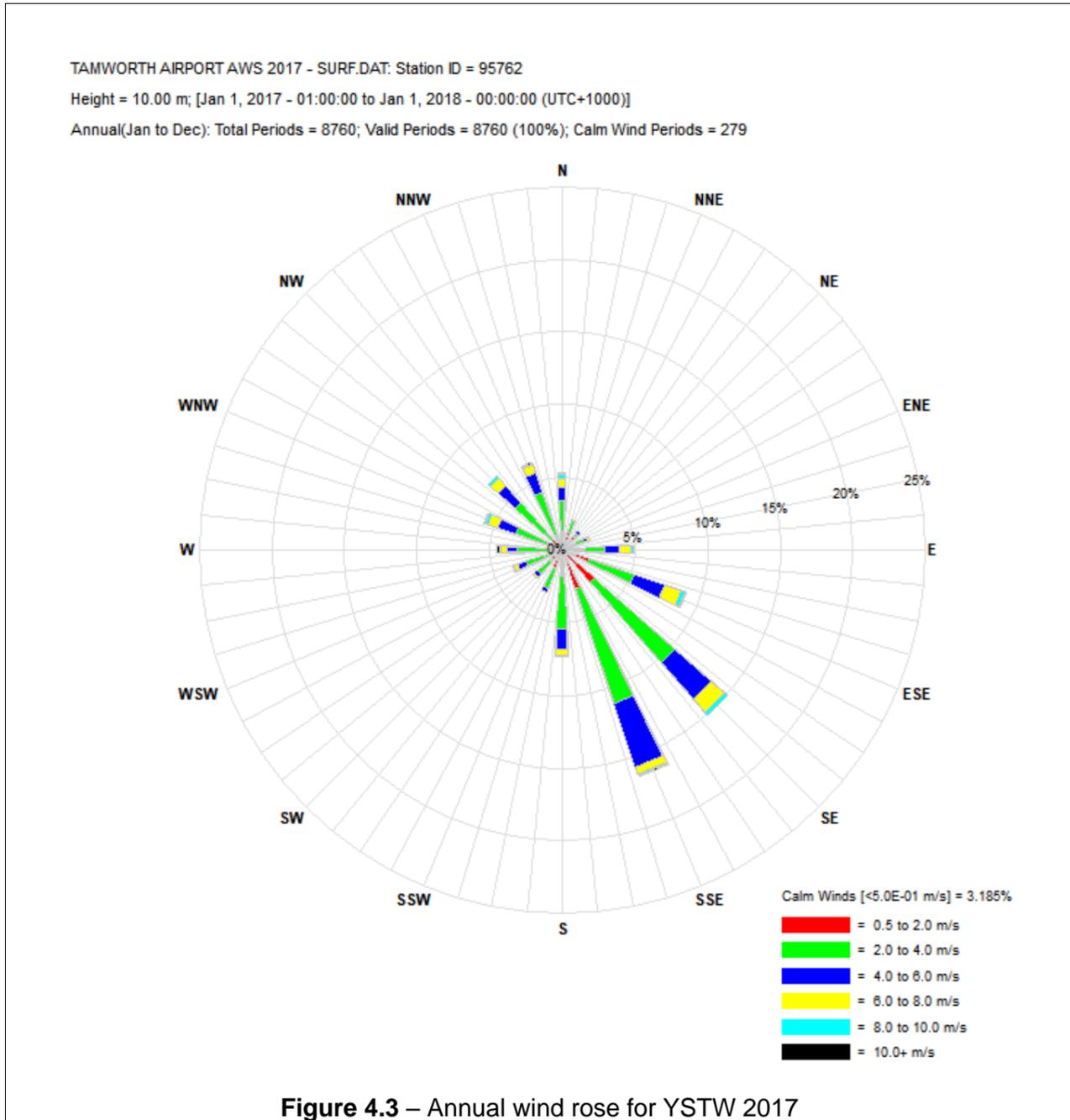
Grid Configuration (WGS-84 UTM Zone 56S)												
150						NX Cells						
150						NY Cells						
0.20						Cell Size (km)						
279.073			6546.008			SW Corner (km)						
11						Vertical Layers						
ZFACE (m)	0	20	40	80	160	320	640	1000	1500	2000	2500	3000
LAYER	1	2	3	4	5	6	7	8	9	10	11	
MID-PT (m)	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.



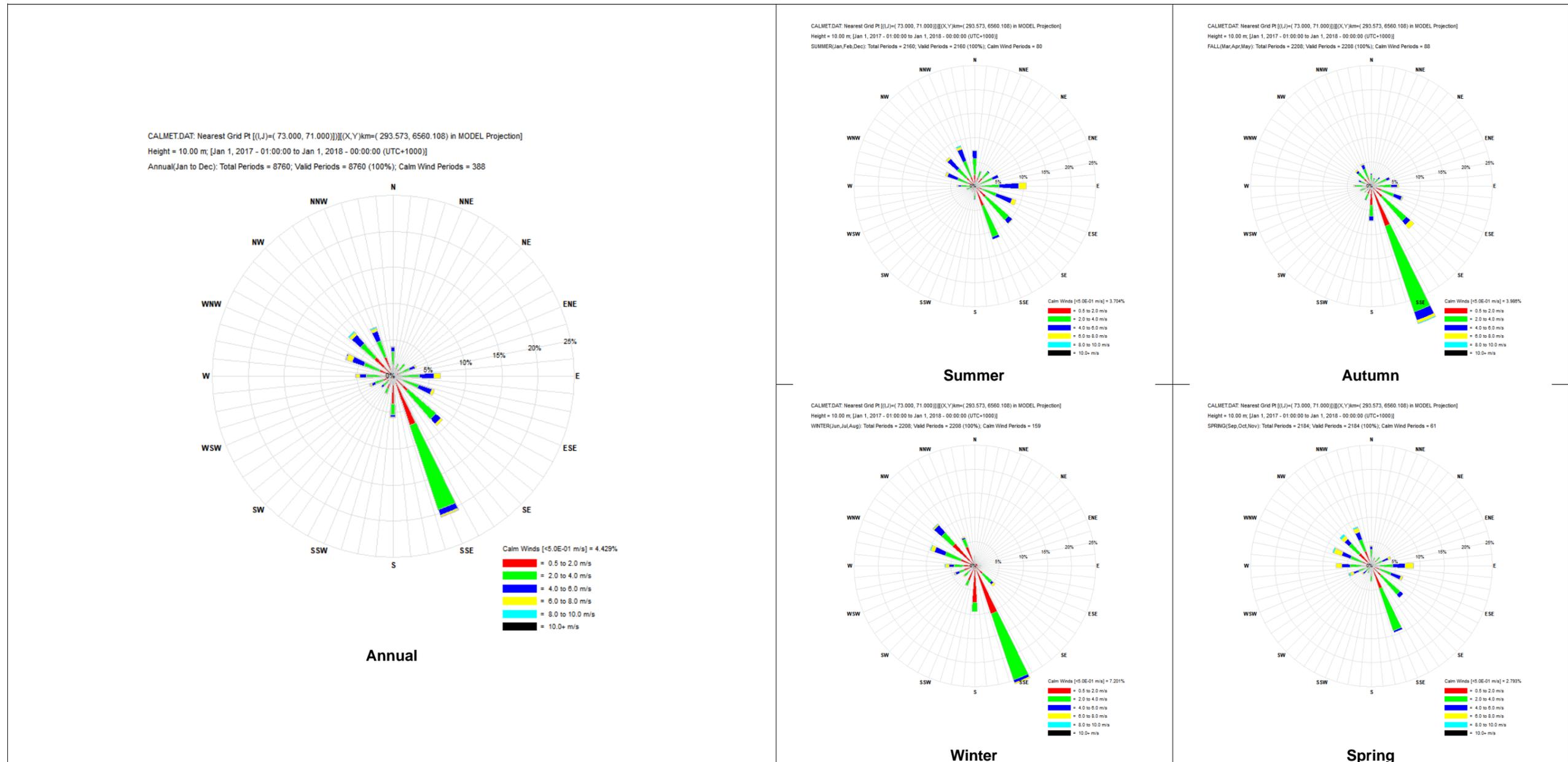


Figure 4.5 – Annual wind rose for nearest CALMET grid point to YSTW

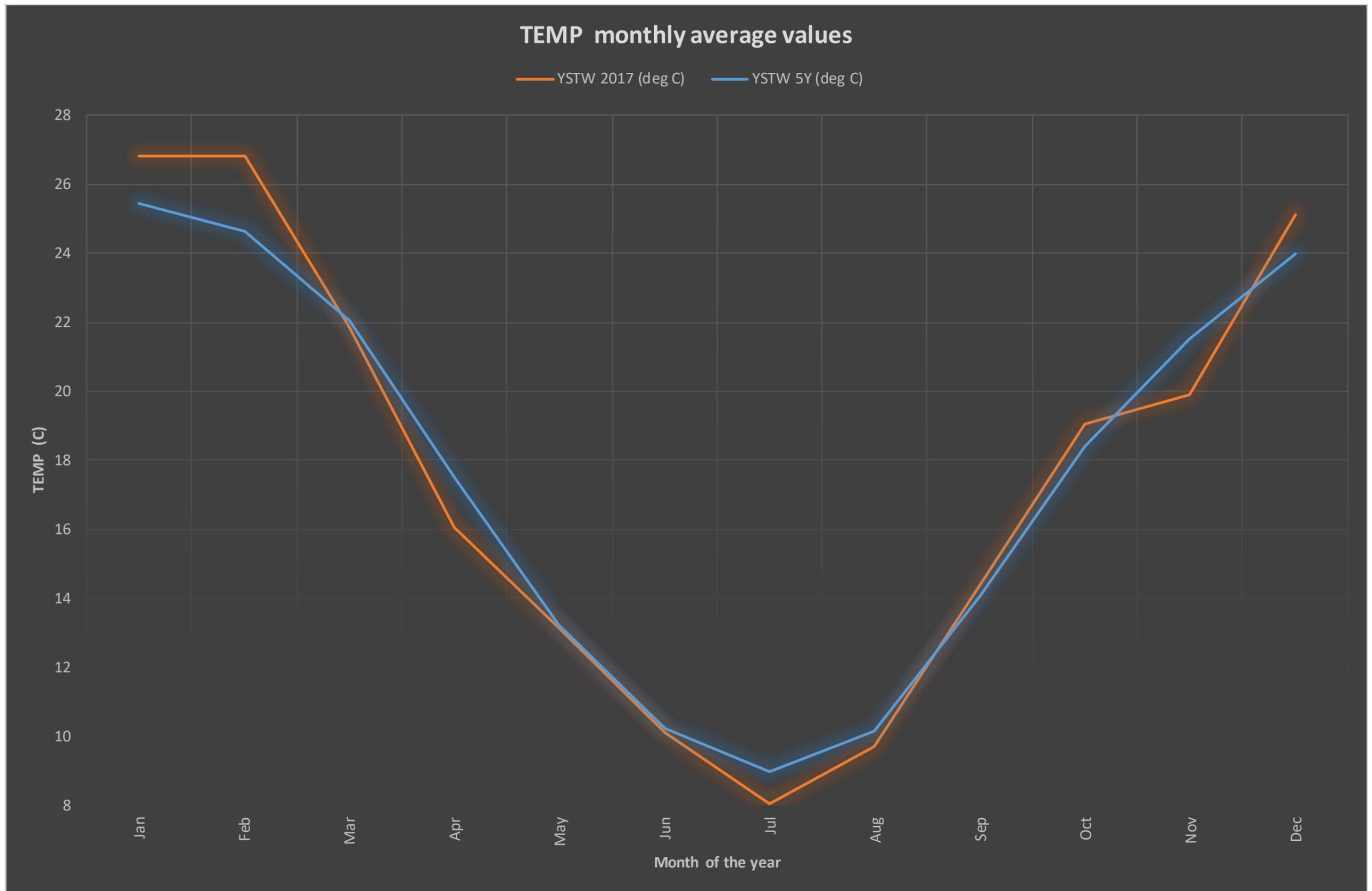


Figure 4.6 – Monthly average temperatures for YSTW 2017 and recent 5-years

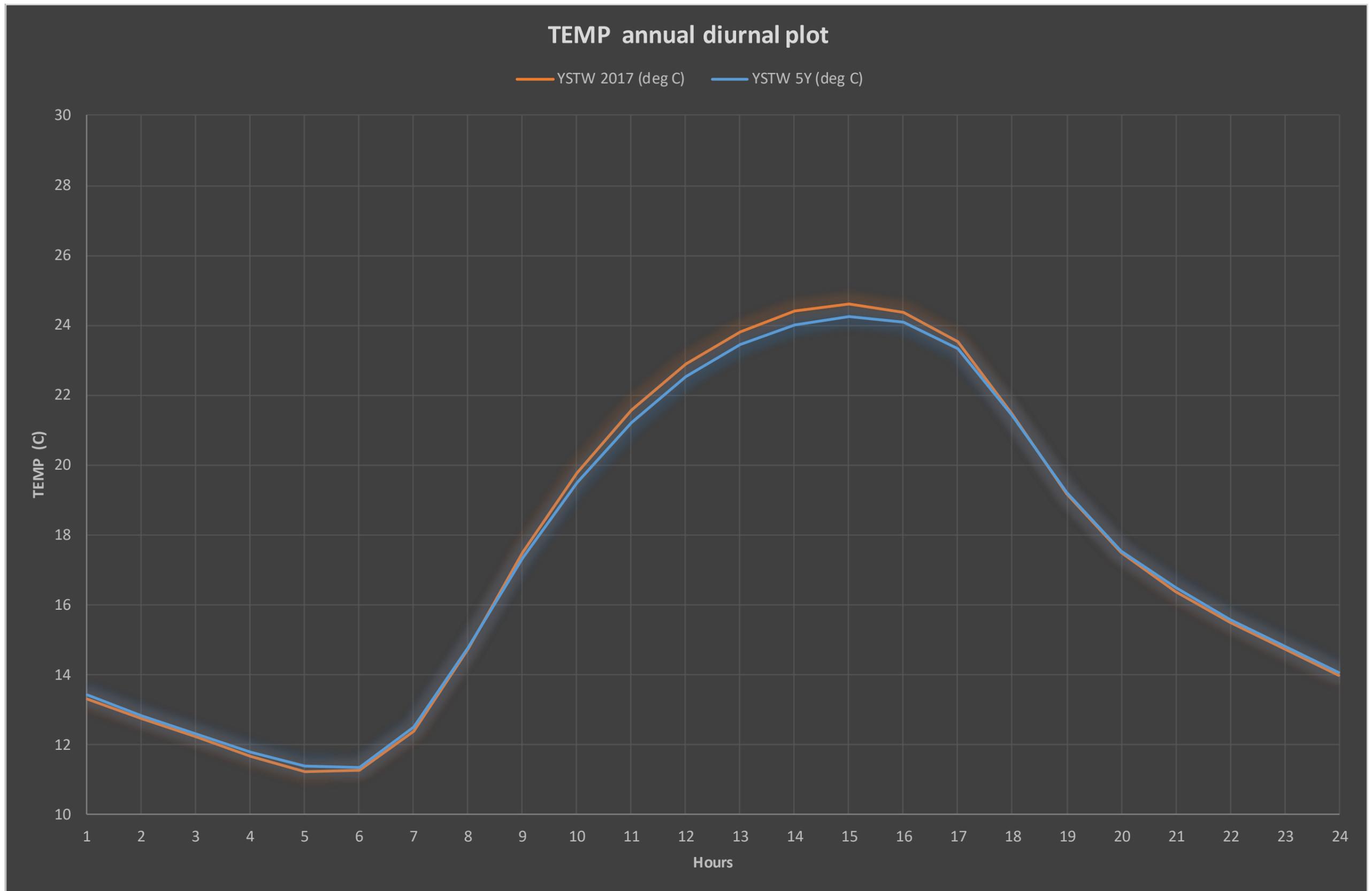


Figure 4.7 – Annual diurnal temperature for YSTW 2017 and 5-years

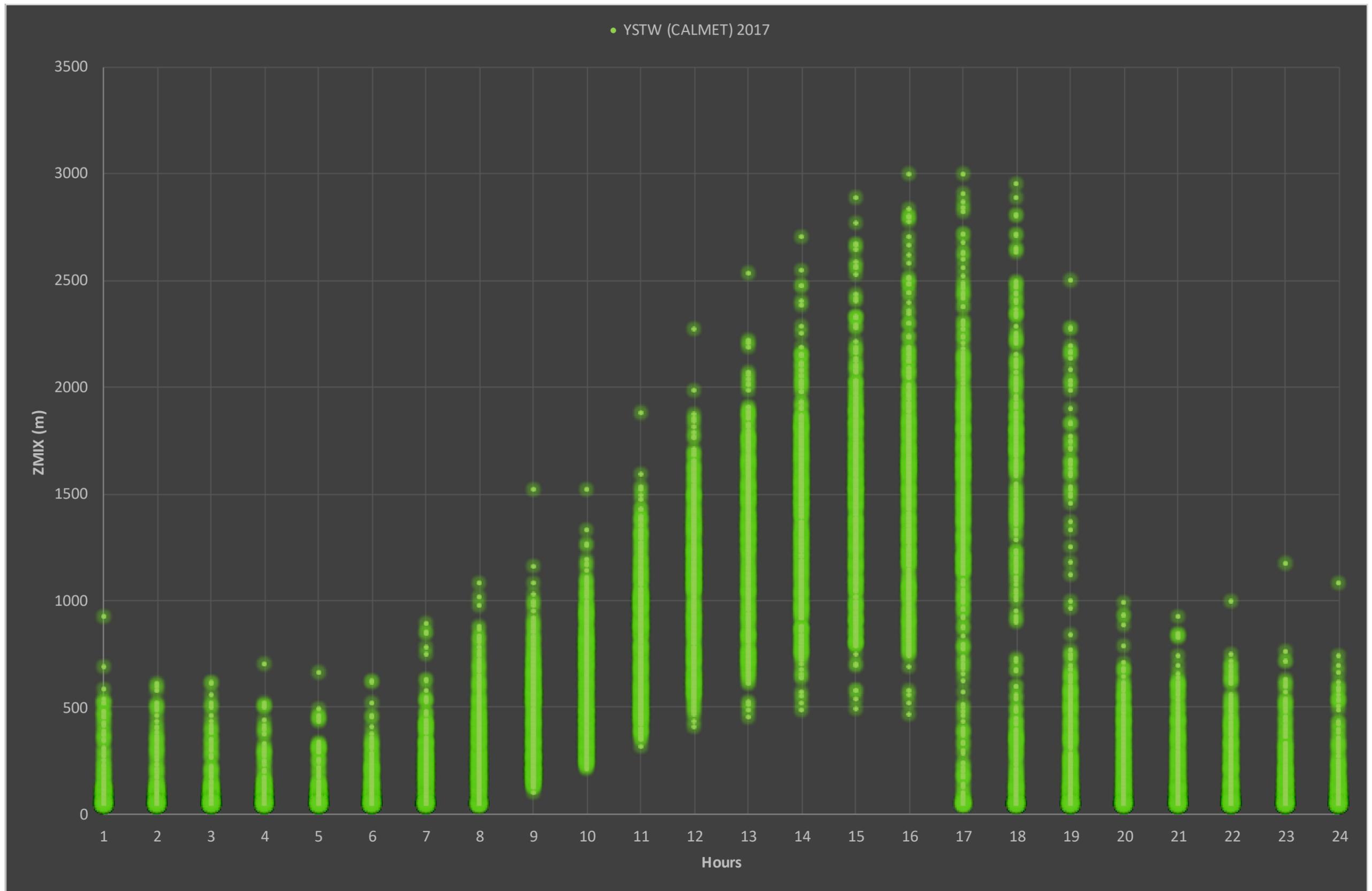


Figure 4.8 – Annual X-Y scatter plot diurnal mixing height for YSTW (CALMET) 2017

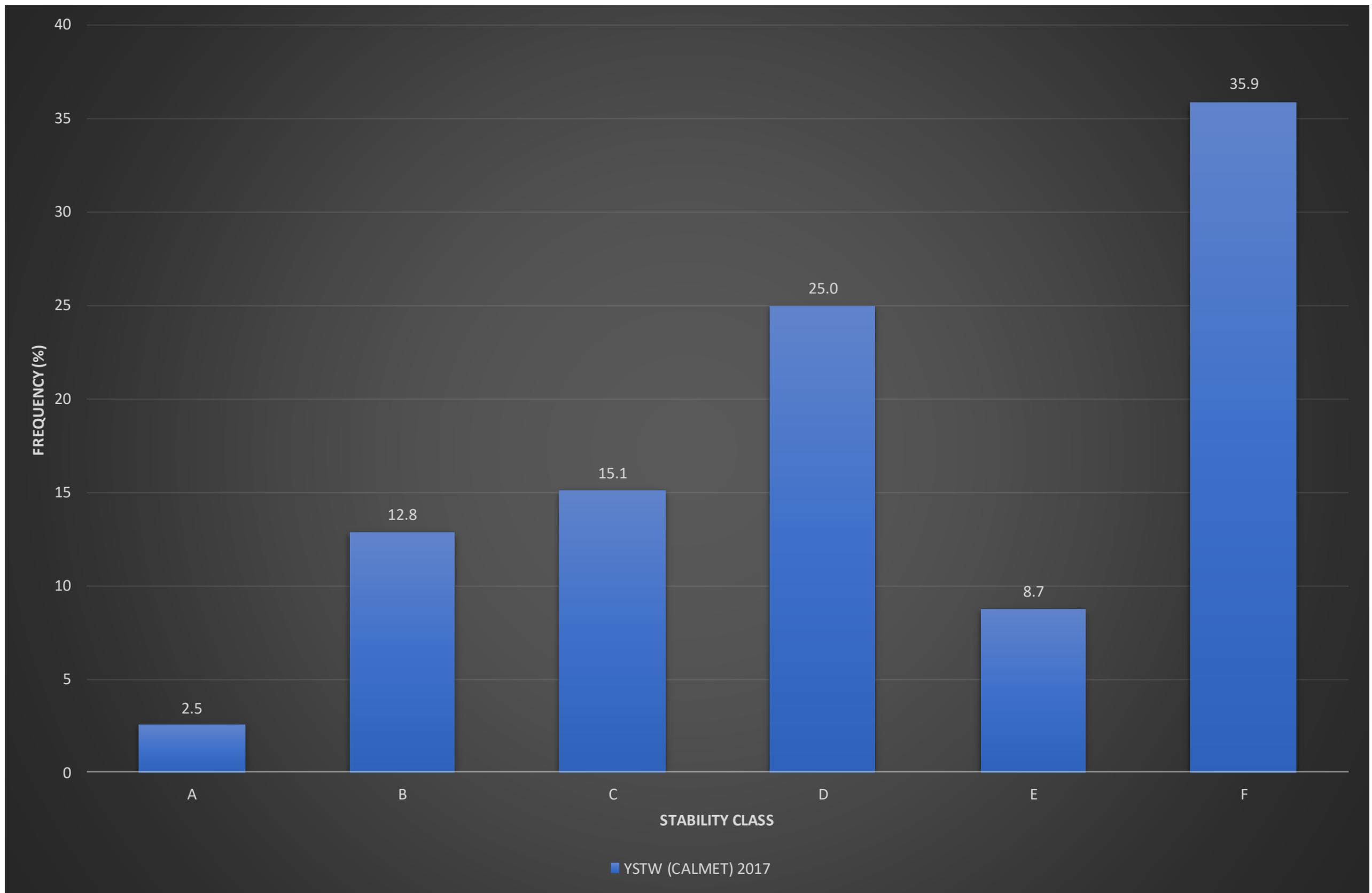


Figure 4.9 – Annual stability class frequency for YSTW (CALMET) 2017

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.

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.

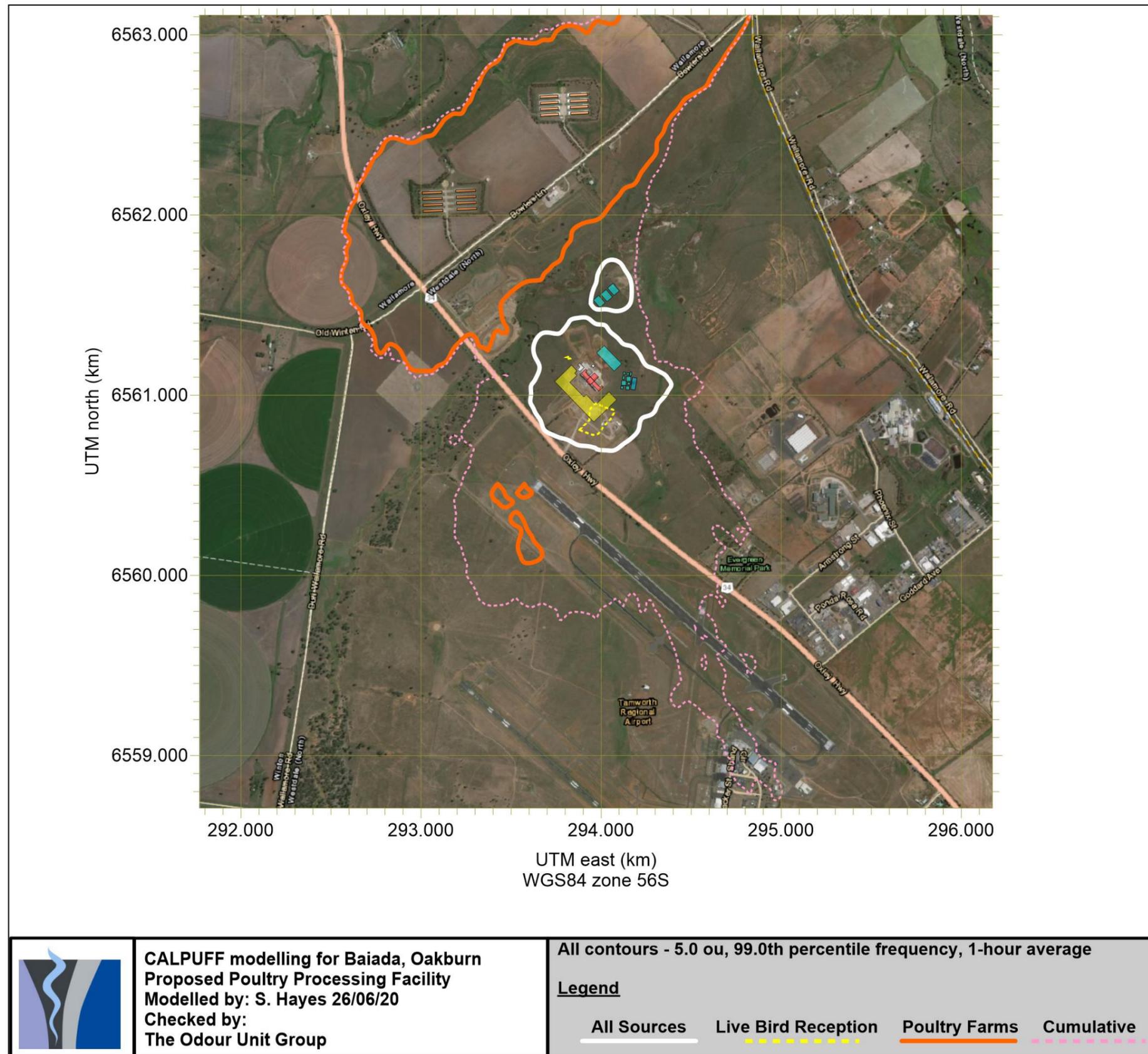


Figure 5.2 – Predicted ground level odour concentration – Sensitivity Analysis

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 proposed 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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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	<i>Baiada Poultry, Oakburn – Proposed Poultry Processing Facility Odour Impact Assessment</i> 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
m²	square metres
m³/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.

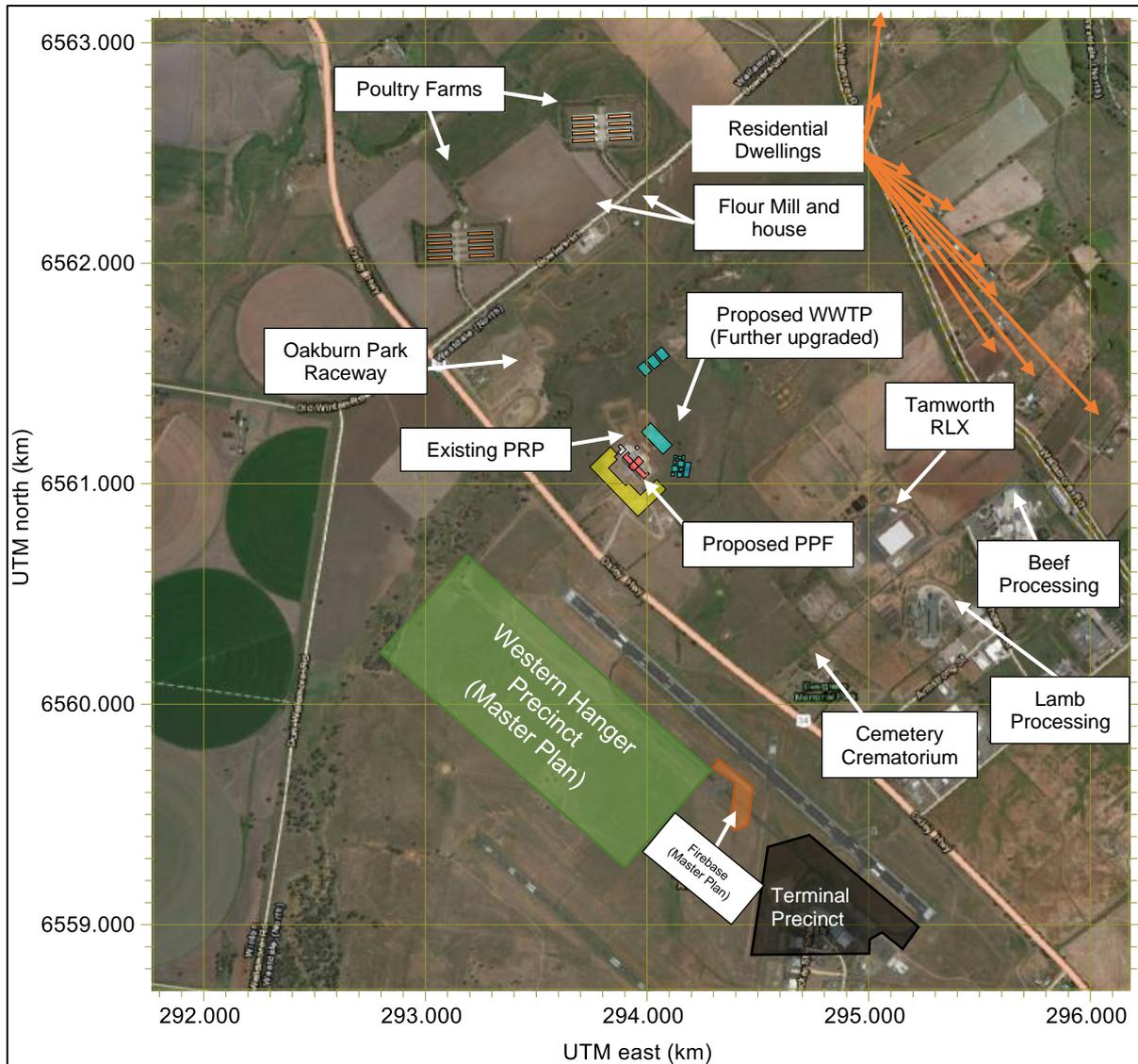


Figure 1.1 – Proposed PPF location, context and surrounds

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.

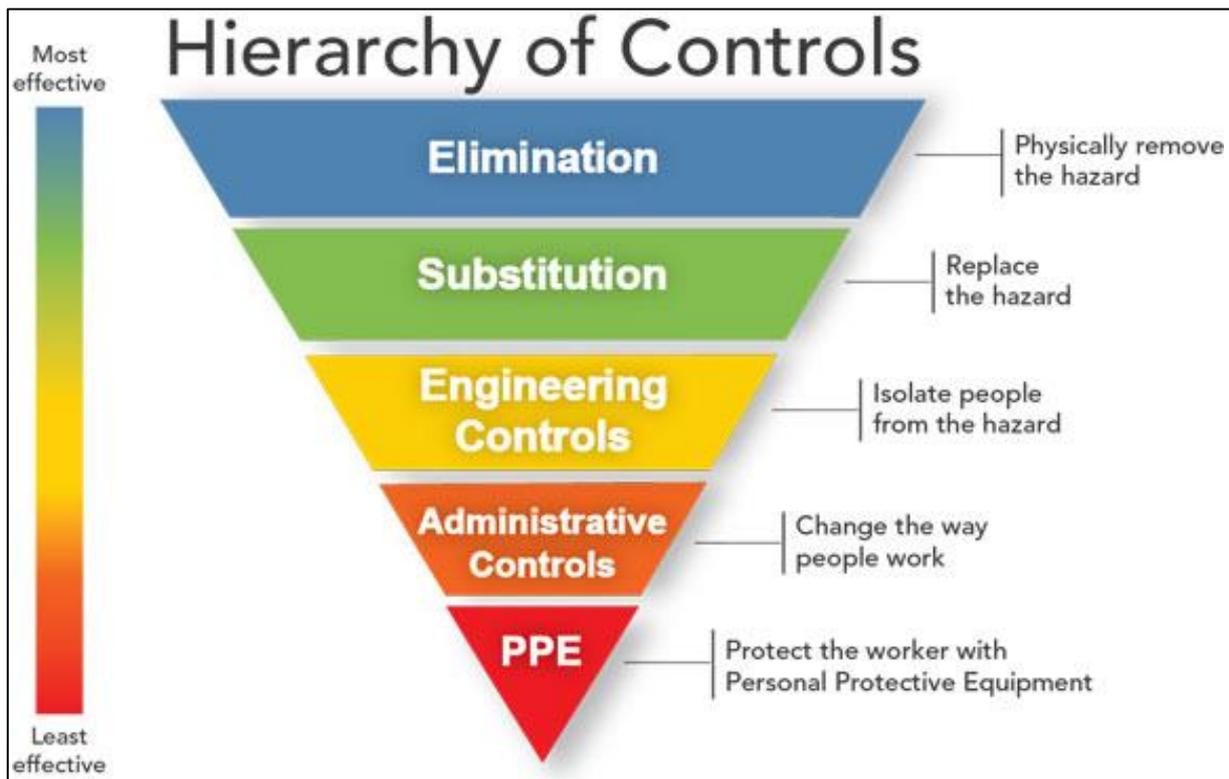


Figure 1.2 - Hierarchy of controls for the proposed PPF

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 (m²) of gross floor area providing for live bird storage, processing, chilling, cold store and distribution facilities;
 - 1118 m² workshop and store building;
 - 4,848 m² 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:

- Receiving 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 – NRMCC – 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

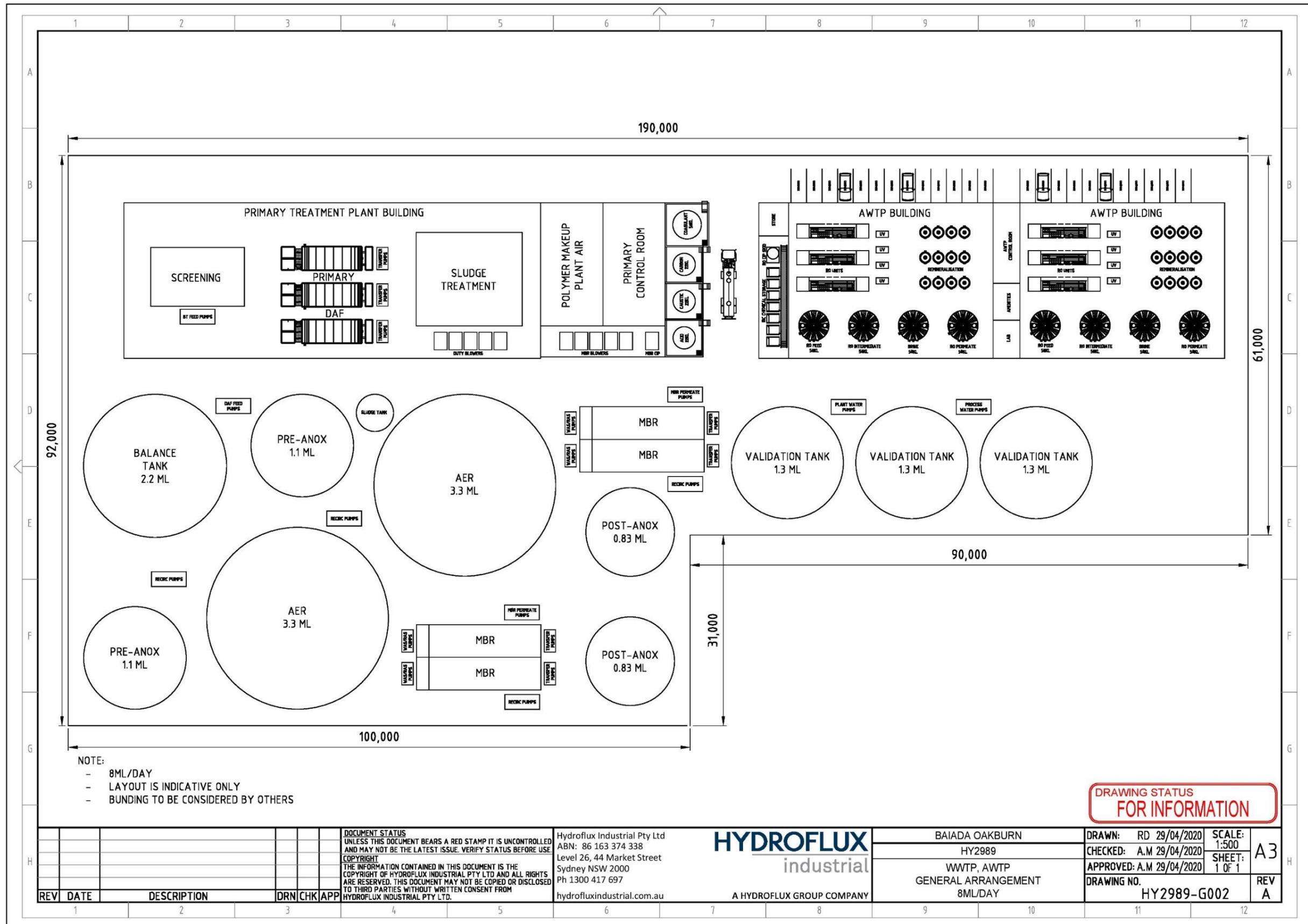


Figure 2.3 – Proposed PPF: General arrangement for the WWTP and AWTP

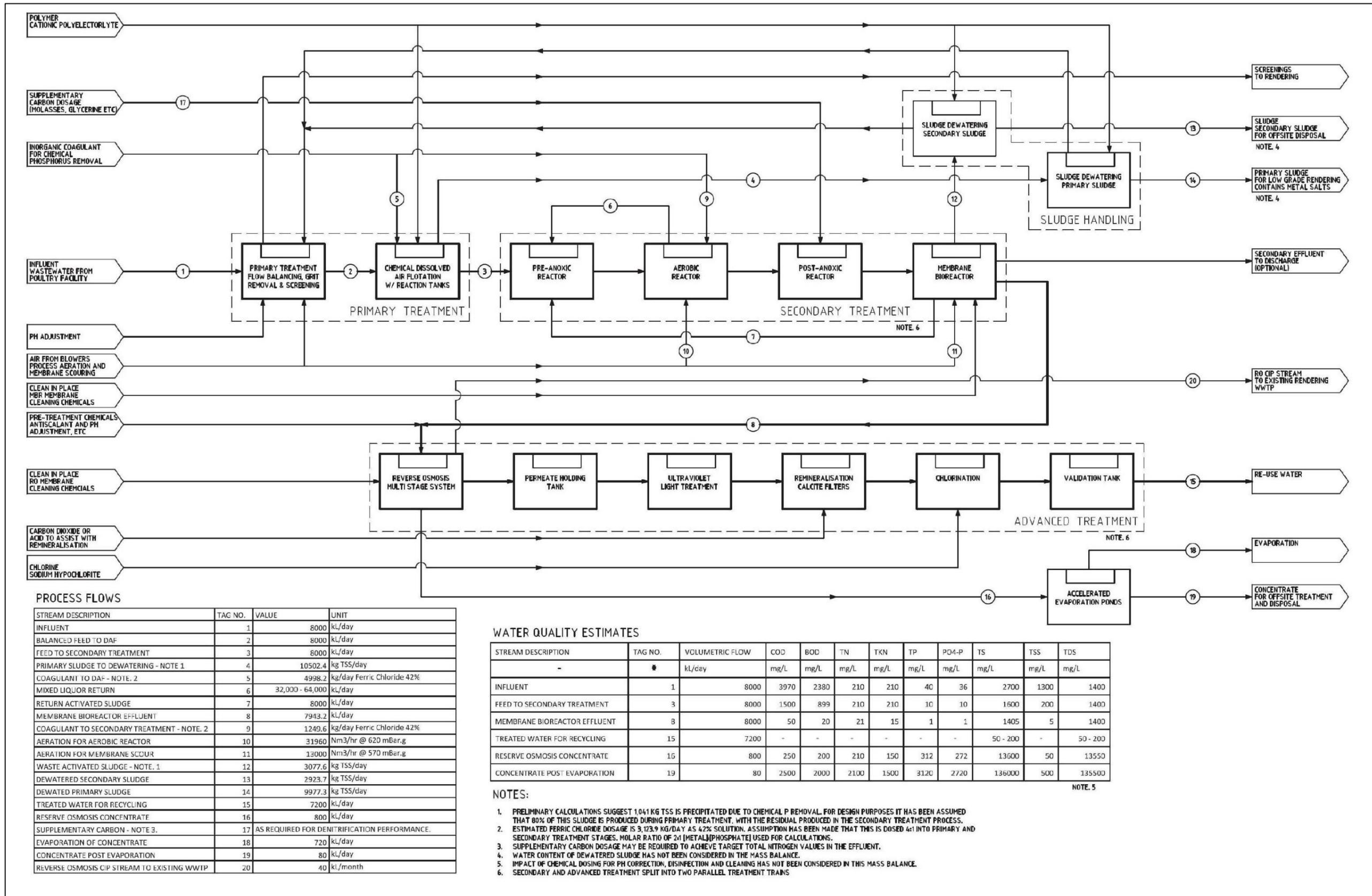


Figure 2.4 - Process flow diagram of PPF WWTP and AWTP (Source: Hydroflux)

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.

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	<ul style="list-style-type: none"> Implementation of a preventative maintenance schedule. 	Low
WWTP & AWTP							
Screening failure	Screen inoperative	High solids load to buffer tanks.	Negligible	Likely	Low	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 or rupture or overflow	Escape/loss of wastes	Causes contamination of ground or stormwater system sludge on the building floor.	Moderate	Very Unlikely	Medium	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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**.

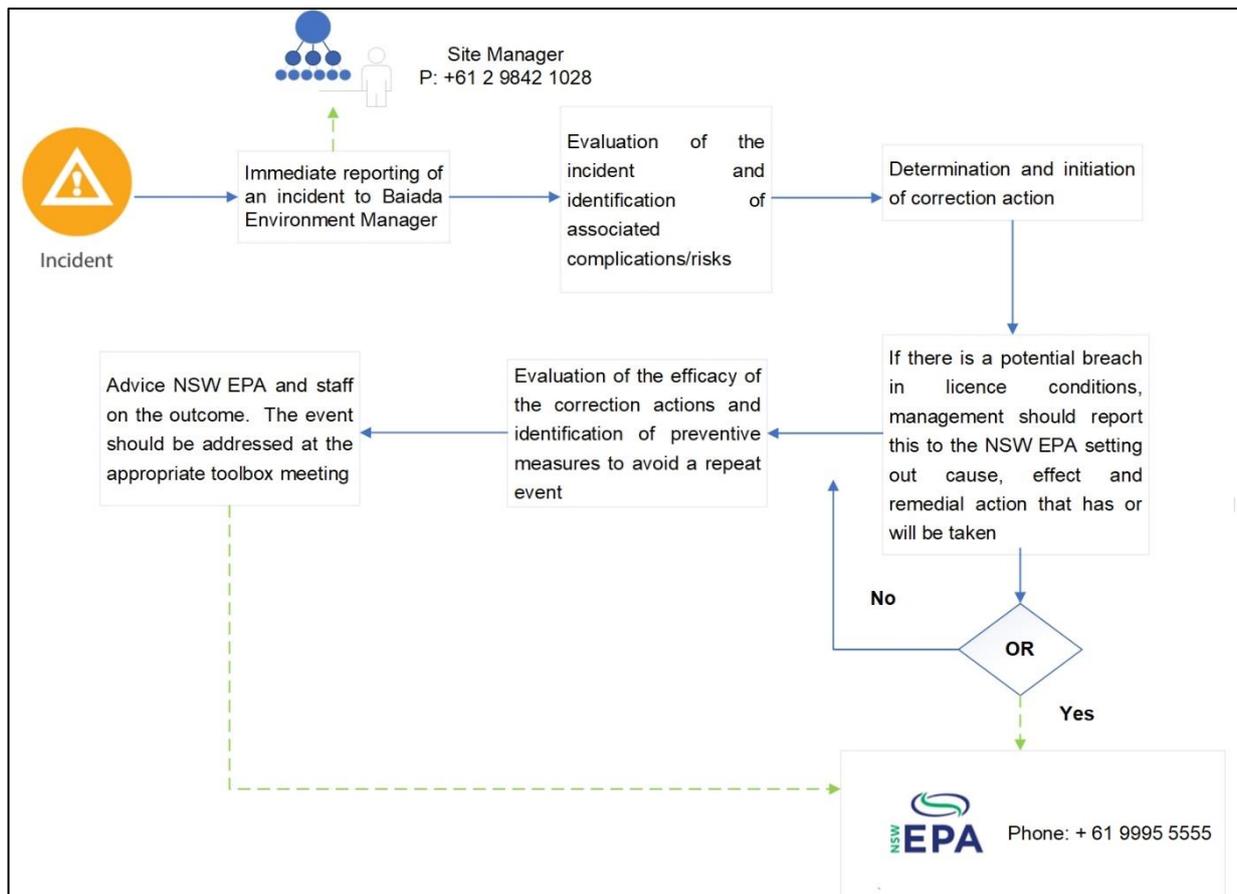


Figure 4.1 – Emergency/contingency plan workflow

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 Baiada'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 Logsheets							
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 Logsheets

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





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)

Child Care Centre



Commercial Industrial Residential Precinct Specialist Design
 Suite 702, 83 Mount Street, North Sydney NSW 2060
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 E info@sbaarch.com.au W www.sbaarch.com.au

CLIENT

OAKBURN PROCESSING PLANT

OXLEY HIGHWAY, TAMWORTH



DRAWING TITLE
SITE PLAN

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

ISSUE	REV.	DESCRIPTION	DATE



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:
=====

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 UTM variable is set to UTM. 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 X	COORDINATES 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 X	COORDINATES Y
---------------	-------------	------------------	-------------	----------------	----------	---------------

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

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

(673.50 2199.20) meters

F1S4 has 1 tier(s) with a base elevation of 382.10 METERS

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

(470.40 2010.10) meters

F2S1 has 1 tier(s) with a base elevation of 394.80 METERS

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

(-201.80 1411.90) meters

F2S6 has 1 tier(s) with a base elevation of 397.70 METERS

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

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

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



Appendix D -

Example CALPUFF List File

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
mrrough = 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
jecomps = 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
xlain   = 3.00000000
elevin  = 0.00000000E+00
xlatin  = -999.000000
xlonin  = -999.000000

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

s12pf = 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								
xptlgrd	= 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				
yptlgrd	= 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	13.0000000	2.0000000
	2.0000000	2.0000000	2.0000000	2.0000000	2.0000000	6.0000000	6.0000000	6.0000000				
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	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	1.14999998
	0.629999995	0.629999995	0.529999971	0.529999971	0.620000005	0.860000014	0.629999995	0.519999981	0.500000000	0.759999990	0.759999990	0.759999990
	8.239999977	8.239999977	8.239999977	8.239999977	8.239999977	8.239999977	1.090000003	1.090000003	1.090000003			
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	15.0000000	5.20000011E-02
	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	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
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	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	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	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	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 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 = -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 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 = -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
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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 = -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 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
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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 = -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 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
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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 = -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 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 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

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
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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 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

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 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 = -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 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

xbadjl = -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
ybadjl = -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 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 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
xbadjl = -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
ybadjl = -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 12.8000002 16.0000000 16.0000000 16.0000000 16.0000000
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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 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
xbadjl = -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 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 = -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 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 = -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
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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 = -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
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

12.8000002 12.8000002 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 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 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
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 4.1700008 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
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
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
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
elarl1	= 380.799988	385.000000	380.799988	380.799988	384.299988	384.299988	384.299988	384.299988
sz0arl1	= 2.00000000	2.00000000	2.00000000	2.00000000	2.00000000	2.00000000	2.00000000	2.00000000

area source: CW1 number: 1
qarl = 2167.51562
areal = 2167.51562
[x,y]arlgrd = 74.7720337 77.8906250
[x,y]arlgrd = 74.9470520 77.6806641
[x,y]arlgrd = 74.7970581 77.5561523
[x,y]arlgrd = 74.6170044 77.7612305

qarl = 418.692749
areal = 418.692749
[x,y]arlgrd = 75.3179932 75.2124023
[x,y]arlgrd = 75.4200745 75.2124023
[x,y]arlgrd = 75.4200745 75.1098633
[x,y]arlgrd = 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

qarl = 214.129684
areal = 214.129684
[x,y]arlgrd = 75.3669739 75.3149414
[x,y]arlgrd = 75.4400635 75.3149414
[x,y]arlgrd = 75.4400635 75.2416992
[x,y]arlgrd = 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

qarl = 213.682663
areal = 213.682663
[x,y]arlgrd = 75.1765442 75.2075195
[x,y]arlgrd = 75.2494812 75.2075195
[x,y]arlgrd = 75.2494812 75.1342773
[x,y]arlgrd = 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

qarl = 672.877014
areal = 672.877014
[x,y]arlgrd = 75.3320312 75.4760742
[x,y]arlgrd = 75.4620361 75.4760742
[x,y]arlgrd = 75.4620361 75.3466797
[x,y]arlgrd = 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

qarl = 672.877014
areal = 672.877014
[x,y]arlgrd = 75.1989746 75.3613281
[x,y]arlgrd = 75.3289795 75.3613281
[x,y]arlgrd = 75.3289795 75.2319336
[x,y]arlgrd = 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

qarl = 209.838181
areal = 209.838181
[x,y]arlgrd = 75.4365540 75.6005859
[x,y]arlgrd = 75.4879761 75.5932617
[x,y]arlgrd = 75.4719543 75.4931641
[x,y]arlgrd = 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

qarl = 208.705658
areal = 208.705658
[x,y]arlgrd = 75.2404785 75.4980469
[x,y]arlgrd = 75.2920532 75.4882812
[x,y]arlgrd = 75.2760315 75.3906250
[x,y]arlgrd = 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

qarl = 161.558395
areal = 161.558395
[x,y]arlgrd = 75.3474426 75.5810547
[x,y]arlgrd = 75.4110718 75.5810547
[x,y]arlgrd = 75.4110718 75.5175781
[x,y]arlgrd = 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

qarl = 161.170914
areal = 161.170914
[x,y]arlgrd = 75.2430725 75.5981445
[x,y]arlgrd = 75.3065491 75.5981445
[x,y]arlgrd = 75.3065491 75.5346680
[x,y]arlgrd = 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 -----

nv11 = 9
 ivlu = 5 units = OUV/s
 converted to g/s, odour_units*m3/s, or Bq/s
 by factor: 1.00000000
 nsv11 = 0
 nv12 = 0

cnamv11	HST	HPR	CPR	CST	LOAD	MILL	SCR	DAF	
SLG									
xv11grd	= 74.1600037	74.2449951	74.4349670	74.5150757	74.4300842	74.3449402	75.5209351	75.5389404	75.5569458
yv11grd	= 75.5322266	75.4541016	75.2539062	75.1684570	75.4638672	75.3540039	75.1708984	75.2807617	75.3906250
htv11	= 6.40000010	6.40000010	6.40000010	6.40000010	7.19999981	8.00000000	3.00000000	3.00000000	3.00000000
elv11	= 385.000000	385.000000	385.000000	385.000000	385.000000	385.000000	384.299988	384.299988	384.299988
sy0v11	= 12.0600004	12.0600004	12.0600004	12.0600004	12.0600004	12.0600004	10.3699999	10.3699999	10.3699999
sz0v11	= 5.94999981	5.94999981	5.94999981	5.94999981	6.69999981	7.44000006	2.78999996	2.78999996	2.78999996

volume source: HST number: 1
 qv11 = 2.29999995

volume source: HPR number: 2
 qv11 = 2.29999995

volume source: CPR number: 3
 qv11 = 2.29999995

volume source: CST number: 4
 qv11 = 2.29999995

volume source: LOAD number: 5
 qv11 = 2.29999995

volume source: MILL number: 6
 qv11 = 2.29999995

volume source: SCR number: 7
 qv11 = 2.29999995

volume source: DAF number: 8
 qv11 = 2.29999995

volume source: SLG number: 9
 qv11 = 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

2 September 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) – RESPONSE TO DPIE WATER AND NATURAL RESOURCES ACCESS REGULATOR

I refer to your correspondence dated 1 September 2020 regarding matters identified by the Department of Planning, Industry and Environment (DPIE) and Natural Resources Access Regulator (NRAR) relating to stormwater modelling and groundwater monitoring. A response is provided below to each of the matters raised.

MATTERS RAISED	APPLICANT'S RESPONSE
Prior to Approval	
<p><i>The proponent should reassess the storm water rainfall runoff model using the complete rainfall record and most up to date methodology.</i></p> <p><i>The rainfall-runoff modelling used to design the stormwater management infrastructure has not used the full period of available rainfall records and has not used the latest Australia Rainfall and Runoff (ARR) framework. ARR was thoroughly revised in 2016 and a digital update in 2019 – refer to this link: http://arr.ga.gov.au/home</i></p>	<p>MPN Consulting have advised that the MUSIC model has been prepared using pluviograph rainfall data from rainfall station 55054 Tamworth Airport, which only includes rainfall data from 16 August 1958 to 31 December 1992. This was the same data used to model and construct the existing stormwater management infrastructure on site associated with the replacement rendering plant DA53/97 Modification 5.</p> <p>Additional modelling using the recently revised data can be undertaken, however MPN Consulting has advised that the alternate rainfall data is unlikely to result in any fundamental changes to the layouts or the wholesale changes to the sizes of the stormwater infrastructure.</p> <p>As such it is considered, that the current modelling is fit for purpose and that DPIE include a condition of approval that revised stormwater modelling using the ARR data (as suggested) is provided prior to issue of a Construction Certificate for development on the site.</p>
<p><i>The proponent should commit to the development of a groundwater monitoring plan to manage the risk of leakage from the lagoons.</i></p> <p><i>The treatment plant will use the existing “Rendering Water Treatment Lagoon” that will deliver waste brine to three</i></p>	<p>As noted in our Response to Submissions to DPIE dated 3 July 2020 (page 36), the applicant is willing to prepare and implement a groundwater monitoring plan for the lagoons.</p>



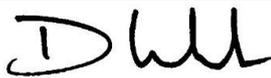
MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>new "Evaporation Ponds" that wil hold water to a depth of about 1.5 below the surface. The proponent states that the ponds will be lined and designed to eliminate any leakage. The proponent has not responded directly to the recommendation for groundwater monitoring. DPIE Water maintains the view that monitoring bores will be required to monitor impacts of any lagoon leakage.</i></p>	<p>This can be included as a condition of approval.</p>
Condition of Consent Recommendation	
<p><i>As a condition of consent groundwater monitoring bores should be installed around the three new Evaporation Basins and the Existing Rendering Water Treatment Lagoon and a Water Management Plan be developed in consultation with DPIE; This is to also include:</i></p> <ul style="list-style-type: none"> - <i>An incident response plan with triggers for the National Water Quality Management Strategy (NWQMS) guideliens (ANZECC/ARMCANZ latest issue) should the lagoons be found to be leaking.</i> - <i>Adequate groundwater sampling is undertaken (e.g. including routine and event based).</i> - <i>Ongoing reporting is scheduled in the plan.</i> 	<p>As noted in our Response to Submissions to DPIE dated 3 July 2020 (page 36), the applicant is willing to prepare and implement a groundwater monitoring plan for waste water treatment facility, including groundwater monitoring bores. This can be included as a condition of approval.</p>

I trust this information provides a full response to the matters raised by DPIE regarding the Hazards. 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
V1	2 September 2020	FINAL	Nicole Boulton	 David Ireland

9 September 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) – TAMWORTH REGIONAL COUNCIL SUBMISSION

I refer to your correspondence dated 3 August 2020 regarding a submission by Tamworth Regional Council. A response is provided below to each of the matters raised.

MATTERS RAISED	APPLICANT'S RESPONSE
<u>Water and Waste</u>	
<p>A teleconference (8 July 2020) between representatives of Tamworth Regional Council (TRC) and Baiada Pty Ltd, along with subsequent correspondence, has resolved the following items:</p> <ol style="list-style-type: none"> 1. A revised Process Drawing for wastewater treatment and the Advanced Wastewater Treatment Plant has been issued and is attached. This revised Drawing confirms that trade waste and domestic sewage wastewater streams will be separate. The revised Process Drawing also confirms the removal of the effluent discharge pathway noted as "Secondary Effluent to Discharge (Optional)". 2. The Hydroflux Industrial "Concept Process Design Report for Wastewater/Advanced Water Treatment Plant" (April 2020) inferred that 80KL/day of residual brine concentrate would be removed from the brine ponds. Baiada Pty Ltd has confirmed that it is not intended that 80KL/day is to be extracted from the brine ponds. 3. Baiada Pty Ltd has confirmed the capability of the Advanced Water Treatment Plant to recover 90% of the input water. 4. Baiada Pty Ltd has confirmed that the CIP streams will not impact on treatment processes. 	<p>Noted.</p>
<p>For the information of the Proponent, Tamworth Regional Council advises the following:</p>	



MATTERS RAISED	APPLICANT'S RESPONSE
<p>1. <i>Although it has been stated previously, TRC reiterates the advice that its current water reticulation infrastructure would not be able to supply 8ML/day to the proposed facility without significant augmentation of the water reticulation network.</i></p>	<p>Noted. The purpose of the Advanced Water Treatment Plant (AWTP) is to enable significant re-use of water (up to 7.2ML per day) and as such ensure water demand for Oakburn will be less than the existing "Out Street" facility.</p>
<p>2. <i>TRC does not have the capability to accept concentrated brine at its landfills or into its sewerage system.</i></p>	<p>The advanced water treatment plant will discharge 800kL of brine per day at full capacity. This will not be discharged to Council's sewerage system but will be held in the proposed evaporation ponds and concentrated by 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.</p> <p>Each of the 3 evaporation ponds will be dried out periodically (approximately once every 1 – 2 years), the remaining solid waste will be collected and will be trucked offsite to a licensed disposal facility.</p> <p>The salt waste would be classified as general solid waste in accordance with the EPA's Waste Classification Guidelines and is readily accepted at the following disposal facilities:</p> <ul style="list-style-type: none"> • Muswellbrook Waste Management Facility • Summerhill Waste Management Centre - Newcastle • Raymond Terrace Resource Recovery Park • Clyde transfer station - Parramatta Sydney • Banksmeadow transfer station - Sydney <p>The proponent has commenced discussions in relation to waste disposal with major waste management operators (including Council) 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 commencement of operations at the site and formal applications will be made (if required) in accordance with regulatory requirements.</p> <p>It is recommended that a condition of approval be included requiring that the Applicant document waste disposal arrangements prior to issue of an Occupation Certificate for the new processing plant.</p>
<p><i>The volume of DAF sludge that will be generated by the Proposal will be substantial and the Proponent advises that there is an intention to dispose of this sludge at a composting facility. TRC advises that, at this point in time, it is unlikely that this volume of DAF sludge will be able to be accepted at Council's proposed Organics Recycling Facility.</i></p>	<p>Sludge from the DAF and Membrane bioreactor will be dewatered and collected on site before being transported in a sealed trailer (daily) for composting at a licensed facility. At full operation, it is estimated the sludge produced will be approximately 40 Tonnes (1 -2 truck loads) per day.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
	<p>Similar to the concentrated brine waste, the proponent has commenced discussions in relation to waste disposal with major waste management operators (including Council) 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 will be undertaken prior to commencement of operations at the site and formal applications will be made (if required) in accordance with regulatory requirements.</p> <p>It is recommended that a condition of approval be included requiring that the Applicant document waste disposal arrangements prior to issue of an Occupation Certificate for the new processing plant.</p>
<i>Developer Contributions</i>	
<p><i>Upon review of the CIV Report prepared by Wilde and Woollard, Issue 2.0 dated 24 June 2020 it is noted that GST is not included. In accordance with the Tamworth Regional Council Section 94A (Indirect Development Contributions Plan 2013, GST must be included for the purposes of calculating development contributions.</i></p> <p><i>It should be noted that the Tamworth Regional Council Section 94A (indirect) Development Contributions Plan 2013, GST must be included for the purposes of calculating development contributions.</i></p> <p><i>It should also be noted that the Tamworth Regional Council Section 94A (Indirect) Development Contributions Plan 2013 applies to all forms of development other than:</i></p> <ul style="list-style-type: none"> <i>• Where the proposed cost of carrying out the development is \$100,000 or less;</i> <i>• Development for the purpose of disabled access;</i> <i>• Development for the sole purpose of providing affordable housing;</i> <i>• Development for the purpose of reducing a building's use of potable water (where supplied from water mains) or energy;</i> <i>• Development for the sole purpose of the adaptive reuse of an item of environmental heritage;</i> <i>• Development that has been the subject of a condition requiring monetary contributions under a previous development consent relating to the subdivision of the land on which the development is to be carried out.</i> 	<p>At this stage, the detailed elements of the project, such as disabled access, are unknown and as such it is requested that a condition be included with the approval which requires the proponent to provide a detailed CIV breakdown for the purposes of calculating the Section 94A Development Contributions at a later date once the finer details of the development are known.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p><i>Therefore, it is recommended that a more detailed breakdown of the overall CIV be provided to Council to determine whether any further reductions in the contributions are available. Such as for any development works that is for the purpose of disabled access or for the purpose of reducing the building use of potable water or energy.</i></p> <p><i>It is requested that a condition of consent be included as part of any forthcoming consent requiring payment of development contributions in accordance with the EPA Act 1979 be made to Council prior to the issuing of a construction certificate.</i></p>	

I trust this information provides a full response to the matters raised by Tamworth Regional Council. 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	9 September 2020	FINAL	Nicole Boulton	 David Ireland

21 September 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) – DPIE HAZARDS

I refer to your correspondence dated 27 July 2020 regarding matter identified by the Department relating to potential hazards and risks due to the storage of LNG and the proposed refrigeration system.

In response to the request from DPIE, the applicant commissioned a Preliminary Hazard Assessment Report, which has been prepared by SLR Consulting (**Attachment 1**). The SLR Report undertook a Preliminary Risk Screening, which found the following:

- the substances within Hazardous Class 2.1 being stored on site consist of 240,000 litres (or 122.4 tonnes) of Liquefied Natural Gas and 12 x 40kg tanks of Liquefied Petroleum Gas (LPG). The total of these gases is the equivalent of 122.9 tonnes. This exceeds the SEPP33 Threshold of 10 tonnes or 16m³ (above ground storage) and therefore requires further assessment;
- the substances within Hazardous Class 2.2 being stored on site consist of 10,000 litres of nitrogen gas, 10,000 litres of oxygen gas and 10,000 litres of carbon dioxide, which totals 30,000 litres of Hazardous Class 8 III substances (which is the equivalent of 45.22 tonnes). There is no SEPP33 threshold for these substances and as such requires no further assessment;
- the substances within Hazardous Class 8 III being stored on site consist of 15,000 litres (or 19.5 tonnes) of ferric sulphate, 13,800 litres (or 17.62 tonnes) of hypochlorite solution and 5,400 litres (or 8.1 tonnes) of sodium hydroxide solution. The total equivalent tonnage for this class of substances is 45.22 tonnes which is below the SEPP33 Threshold of 50 tonnes;
- the substances within Hazardous Class 2.3 being stored on site consists of 10,200 litres (or 6.97 tonnes) of Ammonia Anhydrous. This exceeds the SEPP33 Threshold of 5 tonnes and therefore requires further assessment; and
- the substances within Hazardous Class 8 II being stored on site consist of 4,000 litres (or 5.04 tonnes) of Sulphuric Acid. This is below the SEPP 33 Threshold of 25 tonnes and as such requires no further assessment.

The SLR Report also addresses the transportation of dangerous goods to/from the site. The report found that the transportation of LNG, Ammonia Anhydrous and Hypochlorite, sodium hypochlorite solution and sodium hydroxide solution were each under the SEPP33 Thresholds. As such, no further assessment of the transportation of dangerous goods was required.

The SLR Report then undertook a Hazard Identification (as recommended in HIPAP). The assessment involved step 1 – hazard identification; step 2 – hazard analysis (consequence and probability estimation); and risk evaluation and assessment.

Assessment of the risk of LNG fire found that *“The proposed facility is installed in an open area and the confinement within unit is not significant. Hence any explosion overpressure generated is likely to be small”*. Based on the example of heat flux in the BOC LNG Design Dossier it was concluded that the heat flux from the LNG tanks would not exceed the site boundary.

The SLR report was unable to comment on the impact of an LNG fire upon the proposed child care centre on the site.

With respect to the impact of Ammonia Anhydrous, the SLR report found with a range of controls in place, the likelihood of a major incident was within an acceptable residual risk level.

From the assessment undertaken, SLR was able to conclude that the following further assessments were not considered necessary:

- further consequence analysis of an incident involving explosion over pressure from a fire on site;
- a consequence analysis of an incident involving toxic gas emissions from a fire on-site; and
- a further consequence analysis of an incident involving toxic releases into the biophysical environment is not considered necessary.

The report concludes that the development “would not cause any risk, significant or minor to the community”.

As the SLR report was unable to comment on the impact of an LNG fire upon the proposed child care centre, a further report was commissioned by the applicant from Lote Consulting to specifically address this matter.

The Lote Consulting report (**Attachment 2**) identified a range of potential hazardous scenarios which could occur. The report then carried forward some of these scenarios for consequence analysis. Of these scenarios, only the LNG release and ignition causing an explosion was carried forward for frequency analysis and risk assessment.

The assessment found that the probability of fatality observed at the childcare would be 0 chances per million per year. Further, the analysis is considered conservative as the calculations do not take into consideration the impact of the building between the tanks and the childcare, which would divert and dissipate the overpressure resulting in lower observed overpressures at the childcare centre.

In addition, the estimated fatality risk at the site boundary would be 0.5%. Given that there is unlikely to be a person located at the boundary due to the rural nature of surrounding land, the probability of a fatality from an LNG explosion at the site boundary was considered almost negligible.

Notwithstanding these findings, the report provides the following recommendations:

- a) the hoses for the transfer of LNG shall be inspected monthly and pressure tested annually in accordance with the Australian Dangerous Goods Code;
- b) all equipment shall be inspected and tested in accordance with the Australian Dangerous Goods Code; and
- c) The over pressurisation shut off for the supply will be set at not more than 200kPa.

These recommendations can be reasonably and relevantly included as part of the conditions package of an approval.

A response is provided below to each specific item raised by DPIE in the following table. The specialist consultant reports referred to are included as **Attachment 1** and **Attachment 2**.

MATTERS RAISED	APPLICANT’S RESPONSE
1. <i>The storage and transport of LNG must be included as part of the preliminary risk screening assessment as described in the Department’s Applying SEPP33 guideline.</i>	The storage and transport of LNG has been included in the Preliminary Risk Screening and Hazard Analysis in the SLR Report Attachment 1 .
2. <i>Indication of the location/s for the filling of LNG’s tanks on-site.</i>	The LNG tanks are existing on site (refer to Figure 1) and will remain. They are located adjacent to the boiler house. LNG is used to supplement the natural gas supply for use in the boiler house. There will no change to the process and filling of the tanks.

MATTERS RAISED	APPLICANT'S RESPONSE
	 <p data-bbox="632 739 1027 766">Figure 1: Existing LNG Tanks on the site</p>
<p data-bbox="245 788 603 913">3. <i>Verification of the standards and codes of practice to which LNG facilities will be designed and operated.</i></p>	<p data-bbox="632 788 1375 882">The LNG storage and delivery system has been designed by BOC Limited (BOC) for Elgas following the following applicable Australian Standards:</p> <ul data-bbox="632 891 1385 1303" style="list-style-type: none"> • AS3961 – The storage and handling of liquefied natural gas • AS1210 – Unfired pressure vessels • AS4041 – Pressure piping (on pad pipework, vaporiser) • AS5601 – Gas installations (gas pipeline) • AS1271 – Safety valves, other valves, liquid level gauges and other fittings for boilers and unfired pressure vessels • AS1345 – Identification of the contents of pipes, conduits and ducts • AS/NZS3000 – Electrical installations • AS/NZS60079.10 – Classification of Areas – Explosive Gas Atmospheres
<p data-bbox="245 1326 603 1518">4. <i>Indication of the materials of the secondary refrigerant and if these are dangerous goods, include this material as part of the preliminary risk screening.</i></p>	<p data-bbox="632 1326 1388 1451">The only secondary refrigerants on site will be small amounts in domestic split type air-conditioners that may be installed in some offices. These domestic split type air-conditioners are not considered in dangerous goods assessments.</p>
<p data-bbox="245 1541 603 1792">5. <i>Verification of the refrigeration system(s) proposed for the facility and clarify if anhydrous ammonia and/or the secondary refrigerant will be distributed throughout the facility.</i></p>	<p data-bbox="632 1541 1337 1603">Regarding refrigerants used on site, SLR has noted in the SEPP33 Preliminary Risk Screening and Hazard Analysis that:</p> <ul data-bbox="632 1612 1378 1783" style="list-style-type: none"> • The only bulk refrigerant used will be ammonia anhydrous. • The only secondary refrigerants on site will be small amounts in domestic split type air-conditioners that may be installed in some offices. These domestic split type air-conditioners are not considered in dangerous goods assessments.

I trust this information provides a full response to the matters raised by DPIE regarding the Hazards. 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	21 September 2020	FINAL	Nicole Boulton	 David Ireland

**APPENDIX 1: SEPP33 PRELIMINARY RISK SCREENING AND
HAZARD ANALYSIS (SLR CONSULTING)**

ATT01

SEPP 33 - PRELIMINARY RISK SCREENING & HAZARD ANALYSIS

**Proposed Baiada Oakburn Poultry Processing Facility
1154 Gunnedah Road, Westdale NSW 2340
SSD-9394**

Prepared for:

PSA Consulting (Australia) Pty Limited
PO Box 10824 Adelaide Street
Brisbane QLD 4000

SLR Ref: 610.19171-R02
Version No: -v1.2
September 2020



PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with PSA Consulting (Australia) Pty Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.19171-R02-v1.2	18 September 2020	Craig Simpson	Peter Georgiou	Neil Kumar

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1 Introduction

SLR Consulting Australia Pty Ltd (SLR Consulting) has been engaged by PSA Consulting (Australia) Pty Ltd (PSA) to assess the potential impacts of the proposed construction and operation of the Baiada Oakburn Poultry Processing Facility, Westdale, New South Wales (NSW) 2340.

The Development is located at 1154 Gunnedah Road, Westdale, in the Tamworth local government area and comprises the property titles listed in **Table 1**.

Table 1 Site Identification*

Street Address	Legal Description
1154 Gunnedah Road, Westdale	Lot 100 DP 1097471
	Lot 101 DP 1097471
	Lot 102 DP 1097471

Note: * Source CITEC Confirm

The site is within the local government area of Tamworth Regional Council (Council) - refer **Figure 1**. The Development Site covers two land zonings. Lot 100 and Lot 102 are zoned RU1 Primary Production while Lot 101 is zoned E3 Environmental Management under Tamworth Regional Local Environmental Plan 2010.

Figure 1 Location of Proposed Development



1.1 Development Application re SEPP 33

The Project is undergoing a State Significant Development (SSD) Application in accordance with the NSW Department of Planning, Industry and Environment's (DPIEs) Secretary's Environmental Assessment Requirements (SEARs).

This Preliminary Risk Screening assessment forms part of the supporting documentation for the Development Application (DA) for the Proposal in accordance with Council's Requirements, which included the following in relation to Land Use Safety:

A preliminary risk screening completed in accordance with Applying SEPP 33 - Hazardous and Offensive Development Application Guidelines (DoP 2011). Should the screening indicate that the development is "potentially hazardous", a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011). The PHA should estimate the cumulative risks from the existing and proposed development.

The purpose of this report is to provide a screening assessment of the hazards associated with the storage of dangerous goods on the site in accordance with *NSW State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33). The purpose of the initial SEPP 33 risk screening is to exclude from more detailed studies those developments which do not pose significant risk.

Where SEPP 33 identifies a development as potentially hazardous and/or offensive, developments are required to undertake a Preliminary Hazard Analysis (PHA) to determine the level of risk to people, property and the environment at the proposed location and in the presence of controls.

If the risk levels exceed the criteria of acceptability and/or if the controls are assessed as inadequate, or unable to be readily controlled, then the development is classified as 'hazardous industry'. Where it is unable to prevent offensive impacts on the surrounding land users, the development is classified as 'offensive industry'.

A development may also be considered potentially hazardous with respect to the transport of dangerous goods. A proposed development may be potentially hazardous if the number of generated traffic movements (for significant quantities of hazardous materials entering or leaving the site) is above the cumulative annual or peak weekly vehicle movements. *Table 3* in the document *Applying SEPP 33: Hazardous and Offensive Development Application Guidelines* (NSW Department of Planning, 2011), outlines the screening thresholds for transportation.

This report presents information pertaining to the presence of any hazardous materials, flammable substances, and compressed or liquefied gases proposed to be stored or handled in relation to the Development Site, including on site storage, or transported to or from the site.

2 PROPOSED DEVELOPMENT

2.1 Overview

Baiada is seeking a development consent to develop an poultry processing facility known as the Baiada Oakburn Poultry Processing Facility (PPF), within a rural property at Westdale, New South Wales (NSW).

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:

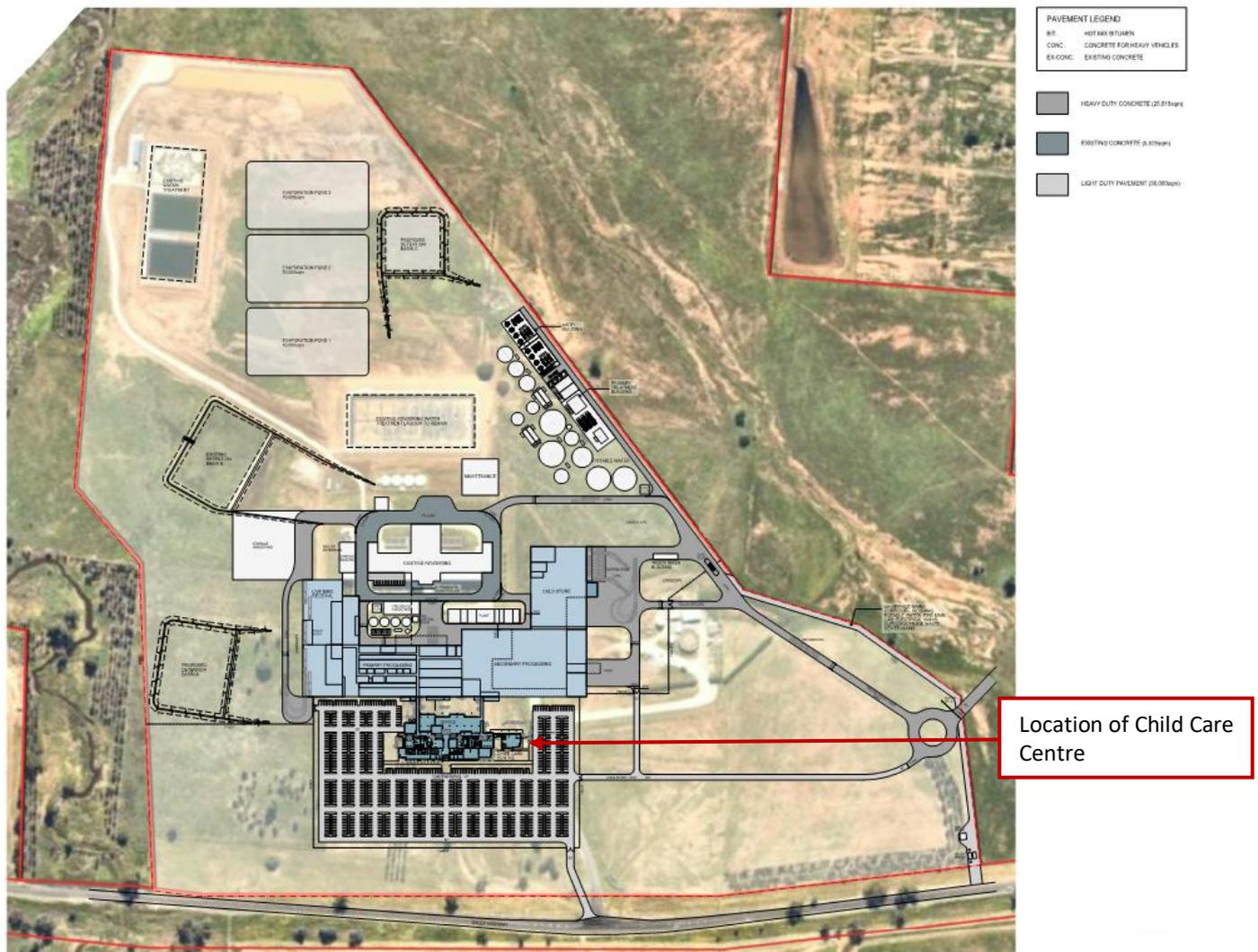
- *Construction of an integrated poultry processing plant consisting of:*
- *35,145 m² of Gross Floor Area providing for live bird storage, processing, chilling, cold store and distribution facilities;*
- *2,930 m² of ancillary structures and waste water treatment plant;*
- *2,930m² of ancillary administration, staff amenities and childcare space (further details will be set out below);*
- *Expanded Waste Water Treatment Plant;*
- *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)*

As mentioned above the proposal includes an onsite Childcare Centre. The child care centre will provide services between 7am-6pm and accommodate a maximum of 85 children.

The Childcare Centre will have a floor space of 360m². Of the 360m² of Childcare Centre, 80m² of this space is proposed to be used for storage, toilets, changing rooms, staff amenities and administration. This will allow approximately 280m² of indoor space for play and learning.

The proposed site plan including location of the Child Care Centre can be seen in **Figure 2**.

Figure 2 Proposed Site Plan



Source: Extracted from SKA Site Plan Drawing No. SK 10 dated 22.06.20

2.2 Hours of Operation

The proposed poultry development will operate 24 hours a day, seven days a week.

2.3 Vehicular Access and Parking

Access to the Development Site will be via an extension to Workshop Lane which connects to the Oxley Highway via Goddards Lane-refer **Figure 1**.

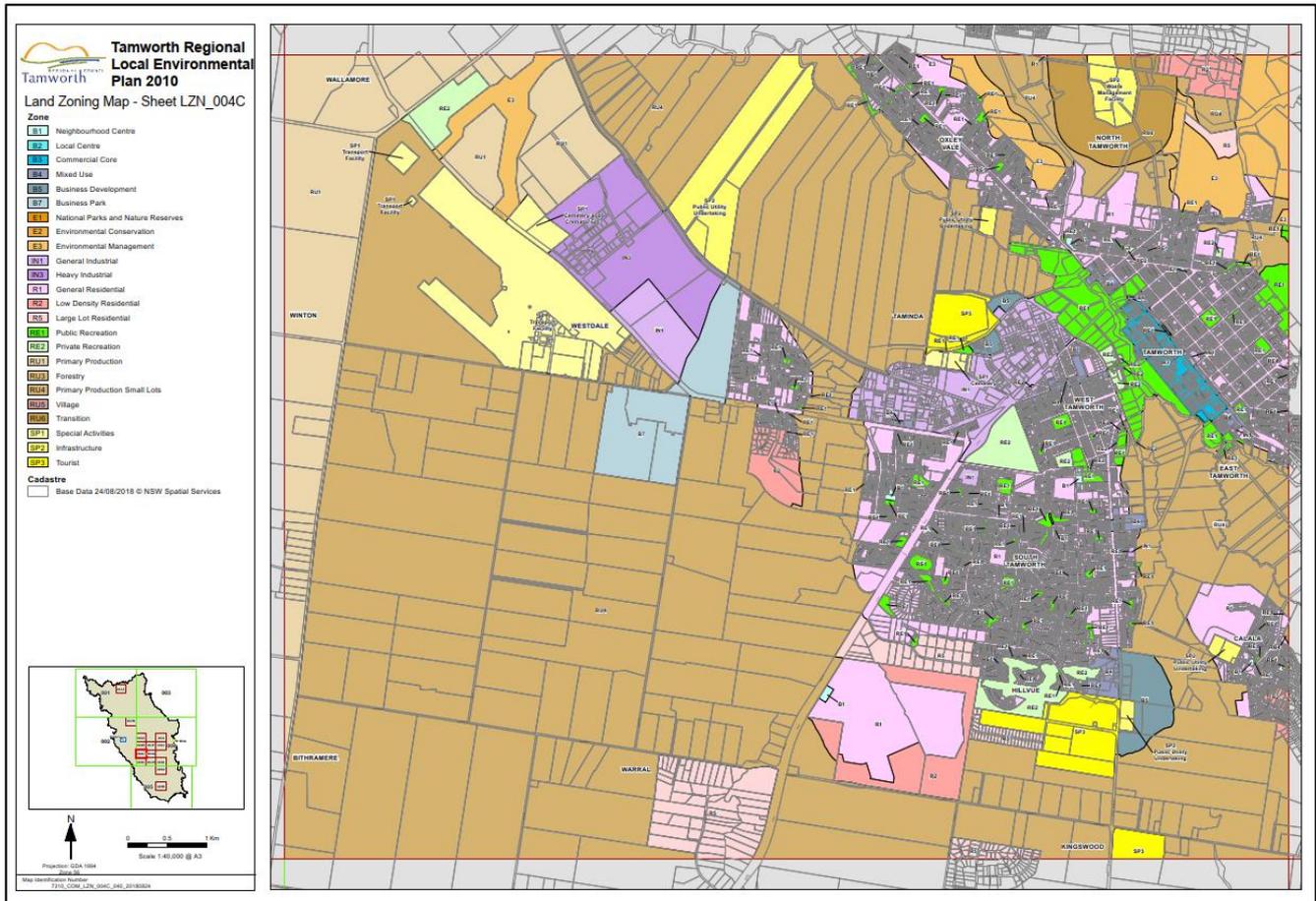
2.4 Surrounding Land Uses and Zoning

The lots surrounding the site have various land zonings – refer **Figure 3**.

- To the south the adjoining land is zoned as SP1 Special Activities and is a transport facility being the airport;

- To the west the adjoining land is zoned RE2 Private Recreation. To the north, the adjoining land is Zoned RU1 Primary Production; and
- To the east, the adjoining land is zoned RU4 Primary Production Small Lots.

Figure 3 Land Zoning Applicable to the Subject Site under Tamworth Regional Local Environmental Plan 2010



Details of neighbouring properties and approximate distance to residential properties have been set out in **Table 2**.

Table 2 Neighbouring Properties and Distance to Properties

Direction	Approximate Distance from Boundary of Development Site	Company/Operations	Use of Premises
North	Adjoining	Rural properties	Primary production
East	300 m	Tamworth Regional Livestock Exchange	Livestock
Southeast	3,800 m	Residential land	
South	180 m	Tamworth Airport	Airport

Direction	Approximate Distance from Boundary of Development Site	Company/Operations	Use of Premises
Southwest	180 m	Tamworth Airport	Airport
Northwest	85 m	Speedway and Motor cycle club	Public recreation

3 PRELIMINARY RISK SCREENING

Preliminary risk screening of the proposed development is required under SEPP 33 to determine the need for a Preliminary Hazard Analysis (PHA). The preliminary screening assesses the storage of specific dangerous goods classes that have the potential for significant, off-site effects. Specifically, the assessment involves the identification of classes and quantities of all dangerous goods to be used, stored or produced on site with respect to storage depot locations as well as transported to and from the site.

3.1 Dangerous Goods Storage

The proposed inventory of Dangerous Goods (DG) in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) is provided in **Table 4**.

Regarding refrigerants used on site, SLR has been advised that:

- The only bulk refrigerant used will be ammonia anhydrous.
- The only secondary refrigerants on site will be small amounts in domestic split type air-conditioners that may be installed in some offices. These domestic split type air-conditioners are not considered in dangerous goods assessments.

The proposed dangerous goods planned to be stored on site is above the screening thresholds and therefore is considered potentially hazardous.

The technical and management safeguards required in place for LNG systems and ammonia refrigerant system are self-evident and readily implemented as part of plant safety engineering.

Despite consideration of the above engineering controls, the Project may require the preparation of a Preliminary Hazard Analysis.

It should be noted that the above listed dangerous goods are a total inventory for the entire site. However, the storage will be divided into multiple locations.

Natural gas is currently provided to the site via the reticulated gas supply located in the Oxley Highway road reserve. The internal pipeline runs from the street to the Boiler House at the northern end of the Existing Rendering Plant. However, as a result of the unreliability of current reticulated natural gas supply, this is supplemented by LNG which is trucked the site. The LNG is stored within 3 x 80,000L tanks (240,000L) next to the boiler house equating to 122.4 tonnes or 64,8000m³. This bulk LNG storage already exists on site and is in use on site.

A small amount of LPG is used on site for forklift fuel. The forklifts for the existing rendering plant require 3 x 40kg LPG tanks. The forklifts for the future processing plant will require 12 x 40kg LPG tanks. 80% of these will be stored in a secured enclosure inside the live bird shed, for exchange/use in the forklifts used in that area. The remaining 20% will be in the workshop for exchange/use in the general grounds.

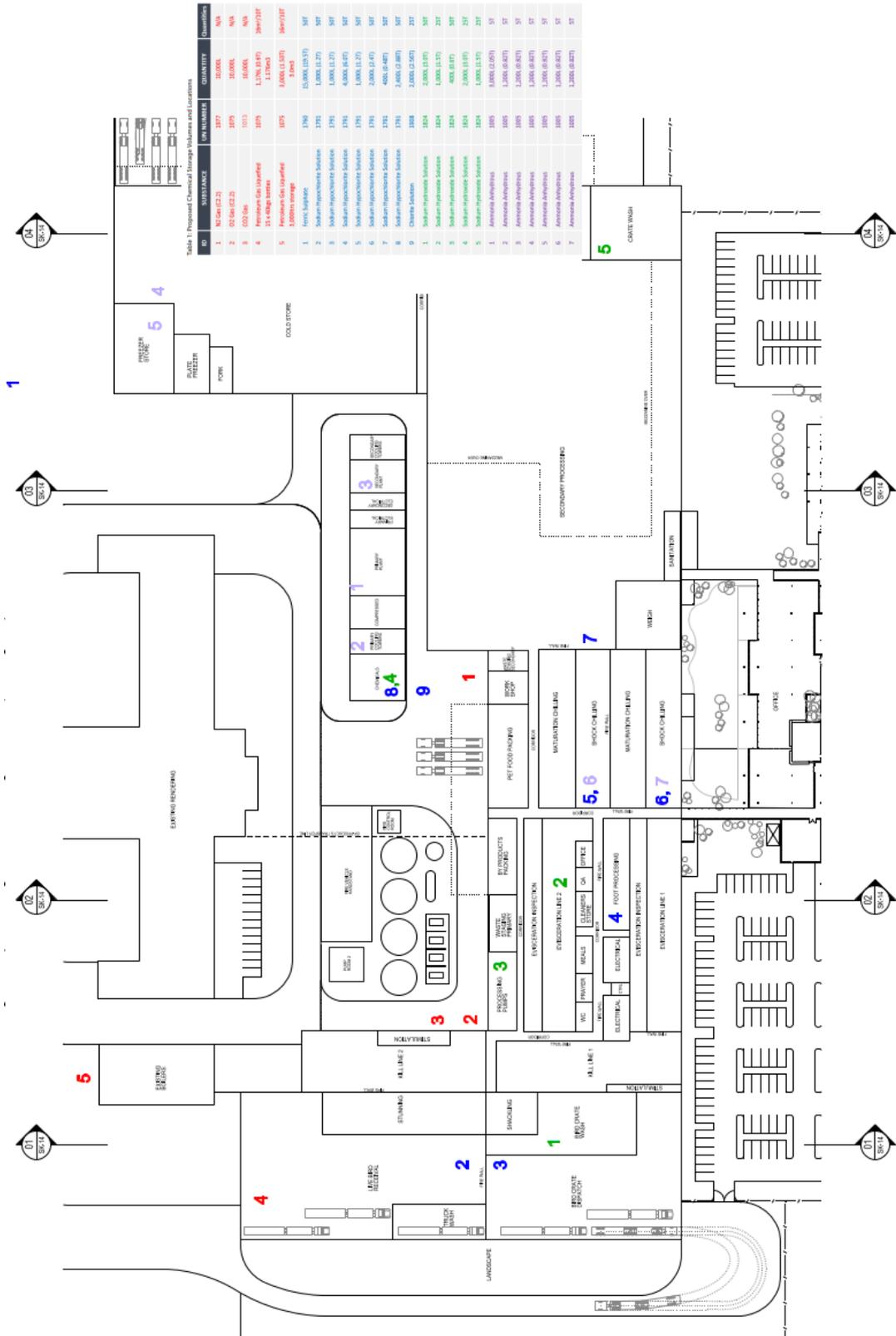
The locations of dangerous good storage have been set out in **Figure 4** and **Figure 5**.

Table 3 Classification of Dangerous Goods Classes in Storage*

Substance	Hazardous Class	Packing Group	Total Storage on Site	Threshold Quantity	SEPP 33 Threshold Level Findings
Liquefied Natural Gas (LNG)	2.1	-	240,000 litres equivalent to 122.4 tonnes or 64,800m ³		
Liquefied Petroleum Gas (LPG)	2.1	-	12 x 40kg tanks		
Total	2.1		122.9 tonnes	10 tonne or 16m³ (above ground storage)	Exceeds Threshold
Nitrogen gas	2.2		10,000 litres		
Oxygen gas	2.2		10,000 litres		
Carbon dioxide	2.2		10,000 litres		
Total	2.2		30,000 litres	Not applicable	Not applicable
Ferric Sulphate	8	III	15,000 litres equivalent to 19.5 tonnes		
Hypochlorite solution	8	III	13,800 litres equivalent to 17.62 tonnes		
Sodium hydroxide solution	8	III	5,400 litres equivalent to 8.1 tonnes		
Total	8	III	45.22 tonnes	50 tonnes	Below Threshold
Ammonia Anhydrous	2.3		10,200 litres equivalent to 6.97 tonnes	5 tonnes	Exceeds Threshold
Sulphuric Acid (35%)	8	II	4,000 litres equivalent to 5.04 tonnes	25 tonnes	Below Threshold

* Information provided by PSA Consulting Australia.

Figure 4 Proposed Storage Locations of Dangerous Goods (excluding LNG)



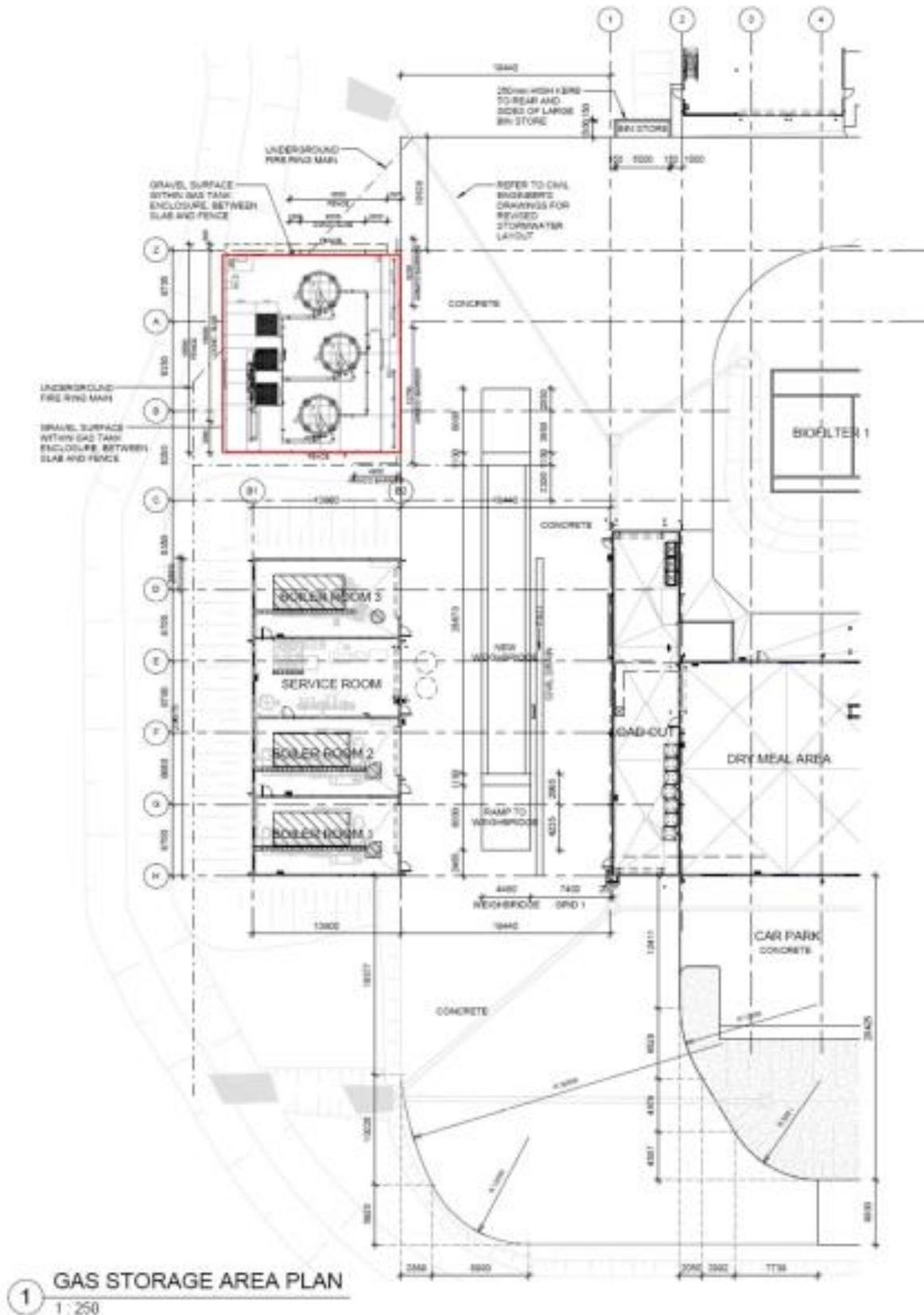
OXLEY HIGHWAY, TAMWORTH

OAKBURN PROCESSING PLANT

Chemical Storage Plan

1:5000 (GAI)

Figure 5 Proposed Storage Locations of LNG



3.2 Dangerous Goods Transport

In applying SEPP 33, a proposed development may be deemed potentially hazardous if the numbers of generated traffic movements for significant quantities of dangerous goods entering and leaving the site, are above the cumulative vehicle movements shown in Table 2 of the SEPP 33 guideline. The levels of maximum proposed movements at the site per week are provided below in **Table 4**. Note that the annual levels directly reflect the weekly vehicle movements.

Table 4 Dangerous Goods Vehicle Movements*

ADG Class	Substance	SEPP 33 Threshold Vehicle Movements (per annum)	SEPP 33 Threshold Minimum Quantity (per load)	Load Type	Vehicle Movements per Annum	SEPP 33 Threshold Level Findings
2.1	LNG	>500	2 tonne	Bulk	156	Below threshold
2.3	Ammonia Anhydrous	>100	1 tonne	Bulk	24	Below threshold
8	Hypochlorite, sodium hypochlorite solution, sodium hydroxide solution	>500	5 tonne	Package	234	Below threshold

* Information provided by PSA Consulting Australia.

3.3 Preliminary Risk Screening Conclusion

This report has reviewed and applied the requirements of SEPP 33 in order to determine whether the policy applies to the Project.

The SEPP 33 screenings for storage of dangerous goods indicate that the development may be classified as a hazardous or offensive industry based on the amount of LNG and ammonia anhydrous stored on site.

A Preliminary Hazard Assessment is therefore indicated to determine risk, if any, to adjoining properties near the facility, or surrounding areas.

4 HAZARD IDENTIFICATION

The hazard analysis and quantified risk assessment approach developed and recommended in HIPAP relies on a systematic and analytical approach to the identification and analysis of hazards and the quantification of off-site risks to assess risk tolerability and land use safety implications. HIPAP advocates a merit-based approach, the level and extent of analysis must be appropriate to the hazards present and therefore, need only progress to the extent necessary for the particular case.

4.1 Methodology

The procedures adopted by this study for assessing hazardous impacts involve the following steps:

- Step 1: Hazard identification;
- Step 2: Hazard analysis (consequence and probability estimations); and
- Step 3: Risk evaluation and assessment against specific criteria.

The following sections of the report discuss the hazard identification and analysis process as prescribed in HIPAP.

4.2 Step 1: Hazard Identification

The first step in the risk assessment involves the identification of all theoretically possible hazardous events as the basis for further quantification and analysis. This does not in any way imply that the hazard identified or its theoretically possible impact will occur in practice. Essentially, it identifies the particular characteristics and nature of hazards to be further evaluated in order to quantify potential risks.

To identify hazards, a survey of operations was carried out to isolate the events which are outside normal operating conditions, and which have the potential to impact outside the boundaries of the Site. In accordance with HIPAP 4, these events do not include occurrences that are a normal part of the operation cycles of the Site but rather the atypical and abnormal, such as the occurrence of a significant liquid spill during product transfer operations.

4.3 Step 2: Hazard Analysis

After a review of the events identified in the hazard identification stage and the prevention/protection measures incorporated into the design of the Site, any events which are considered to have the potential to result in impacts off-site or which have the potential to escalate to larger incidents are carried to the next stage of analysis.

4.3.1 Consequence Estimation

This aspect involves the analysis and modelling of the credible events carried forward from the hazard identification process in order to quantify their impacts outside the boundaries of the Site. In this case these events typically include explosion, fire fume, dispersion/propagation and their potential effects on people and/or damage to property.

4.3.2 Probability Likelihood Estimation

Where necessary, the likelihood of incidents quantified in the hazard analysis as a result of Section 4.3.1 are determined by adopting probability and likelihood factors derived from published data.

4.3.3 Risk Evaluation and Assessment

The risk analysis includes the consequences of each hazardous event and the frequencies of each initiating failure. The results of consequence calculations (radiation and overpressure contours, and toxic exposure levels) together with the probabilities and likelihood's estimated are then compared against the accepted criteria, as specified by the Department of Planning, Infrastructure and Environment applicable for the Site. Whether it is considered necessary to conduct the predictions would depend on the probabilities and likelihood estimated and if the risk criteria are exceeded.

4.4 Step 3: Assessment Criteria

The risk criteria applied is specified by *Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning* (HIPAP 4). Following is a general discussion of the criteria that is used to assess the risk of a development on the surrounding community and environment.

4.4.1 Individual Fatality Risk Levels

The following paragraphs are reproduced from HIPAP 4 relating to individual fatality risk levels:

“People in hospitals, children at school or old-aged people are more vulnerable to hazards and less able to take evasive action, if need be, relative to the average residential population. A lower risk than the one in a million criteria (applicable for residential areas) may be more appropriate for such cases. On the other hand, land uses such as commercial and open space do not involve continuous occupancy by the same people.

The individual's occupancy of these areas is on an intermittent basis and the people present are generally mobile. As such, a higher level of risk (relative to the permanent housing occupancy exposure) may be tolerated. A higher level of risk still is generally considered acceptable in industrial areas”.

The risk assessment criteria for individual fatality risk are presented below.

Table 5 Risk Criteria

Land Use	Risk Criteria x 10 ⁻⁶
Hospitals, Schools, etc	0.5
Residential	1
Commercial	5
Sporting and Active Open Space	10
Industrial	50

4.4.2 Injury Risk Levels

Injury risk levels from HIPAP 4 are stated below for heat of radiation.

- Incident heat flux radiation at residential areas should not exceed 4.7 kW/m^2 , at frequencies of more than 50 chances in a million per year.
- Incident explosion overpressure at residential areas should not exceed 7 kPa, at frequencies of more than 50 chances in a million per year.

The requirements for toxic exposure are stated as follows:

- Toxic concentrations in residential areas should not exceed a level that would be seriously injurious to sensitive members of the community following a relatively short period of exposure at maximum frequency of 10 in a million per year.
- Toxic concentrations in residential areas should not cause irritation to the eyes or throat, coughing or other acute physiological responses in sensitive members of the community over a maximum frequency of 50 in a million per year.

It should be noted that a risk hazard assessment only examines events that are considered to have the potential for significant off-site consequences.

4.4.3 Risk of Property Damage and Accident Propagation

HIPAP 4 indicates that siting of a hazardous installation must account for the potential for propagation of an accident causing a “domino” effect on adjoining premises. This risk would be expected within an industrial estate where siting of hazardous materials on one Site may potentially cause hazardous materials on an adjoining premise to further develop the size of the accident.

The criteria for risk to damage to property and of accident propagation are stated as follows:

- Incident heat flux at neighbouring potentially hazardous installations or at land zones to accommodate such installations should not exceed a risk of 50 in a million per year for the 23 kW/m^2 heat flux level.
- Incident explosion overpressure at neighbouring potentially hazardous installations, at land zoned to accommodate such installations or at nearest public buildings should not exceed a risk of 50 in a million per year for the 14 kPa explosion overpressure level.

4.4.4 Criteria for Risk Assessment to the Biophysical Environment

HIPAP 4 indicates that siting of potentially hazardous developments also needs to consider the risk from accidental releases into the biophysical environment. Acute and chronic toxicity impacts are considered to be of most relevance.

The assessment of the ultimate effects from toxic releases into the natural ecosystem is difficult, particularly in the case of atypical accidental releases. Consequence data is limited and factors influencing the outcome variable and complex. In many cases, it may not be possible or practical to establish the final impact of any particular release. Because of such complexity, it is inappropriate to provide generalised criteria to cover any scenario. The acceptability of the risk will depend upon the value of the potentially affected zone or ecosystem to the local community and wider society.

The suggested criteria for sensitive environmental areas relate to the potential effects of an accidental release or emission on the long-term viability of the ecosystem or any species within it and are expressed as follows:

- Industrial developments should not be sited in proximity to sensitive natural environmental areas where the effects or consequences of the more likely accidental emissions may threaten the long-term viability of the ecosystem or any species within it; and
- Industrial developments should not be sited in proximity to sensitive natural environmental areas where the likelihood or probability of impacts that may threaten the long-term viability of the ecosystem or any species within it is not substantially lower than the existing background level threat to the ecosystem.

4.5 Potentially Hazardous Incidents Identified for Further Discussion

Following a review of neighbouring properties, a series of potentially hazardous events or scenarios were considered to identify if further comprehensive qualitative analysis is required. Each event or scenario shall be discussed in detail and the need for a further quantitative analysis considered.

The following current potential hazards could not be eliminated through the first review and require further examination:

- LNG Fire
- Ammonia release

These scenarios are discussed below.

4.5.1 LNG

The proposed development will have LNG tanks are required to be at quantities classified as an industrial or commercial site. At the facility, the LNG storage consists of 3 above ground tanks each of 80,000 L capacity, giving a maximum LNG storage at the facility of 240,000 L.

The Elgas Emergency Management Plan states the location of the LNG storage is approximately 600m north from the Oxley Highway and approximately 1,200m from Tamworth Airport runway. It also states that *“Adequate distance is between both infrastructure points to allow for dispersion of any misting or vapour cloud in the case of a major release. Additionally, the prevailing wind direction will push any migration away from the highway and airport.”*

BOC have been installing similar LNG storage and delivery systems in locations across Victoria, Tasmania, NSW and Queensland. The systems are standardised and the technology well understood. Elgas will operate and maintain the storage and delivery system.

The LNG storage and delivery system has been designed by BOC Limited (BOC) for Elgas following the following applicable Australian Standards:

- AS3961 – The storage and handling of liquefied natural gas
- AS1210 – Unfired pressure vessels
- AS4041 – Pressure piping (on pad pipework, vaporiser)
- AS5601 – Gas installations (gas pipeline)

- AS1271 – Safety valves, other valves, liquid level gauges and other fittings for boilers and unfired pressure vessels
- AS1345 – Identification of the contents of pipes, conduits and ducts
- AS/NZS3000 – Electrical installations
- AS/NZS60079.10 – Classification of Areas – Explosive Gas Atmospheres
- AS/NZS60079.14 – Explosive atmospheres, electrical installations design, selection and erection
- AS1768 – Lightning Protection

The location of the above-ground storage shall comply with the following requirements for ventilation and access and set up:

- a. Above-ground storage tanks shall be in the open air, outside buildings.
- b. Nearby construction, fences, walls, vapour barriers, or the like shall permit free access around and cross-ventilation for the tank.

The BOC LNG Design Dossier v1, LNG Storage, Vaporiser and Pressure Control Installation set out all design and maintenance procedures, details hazard assessments and controls for the site. Indicative engineering schematic for the proposed development are set out in Appendix I and Appendix II. Detailed hazard assessments and associated controls for the site are set out in Appendix III. ELgas's detailed Emergency Management Plan for the site is set out in Appendix VII. The Hazardous Areas Classification have been set out in Appendix VIII.

The above documents provide detailed discussion of the hazards, risks and controls. Plus evidence of the technical and management safeguards required in place for LNG systems and readily implemented as part of plant safety engineering.

The BOC LNG Design Dossier has detailed information relating to potential fires. In summary it states three types of fires are possible with NG, LNG.

1. A jet fire. This could occur if a gas leak or a liquid leak from a pipe is ignited.
2. A flash fire. A flash fire is the result of ignition of a well-mixed air-methane cloud. A liquid/two-phase leak of LNG would evaporate and disperse into atmosphere forming a flammable air-vapour mixture on ignition, depending on the degree of congestion and confinement in the flame front, a vapour cloud explosion may result. In its absence, a flash fire would be the result.
3. A pool fire. After flashing off a portion, the remaining leaked LNG may form a pool and if ignited, would form a pool fire.

The above also discusses Vapour Cloud Explosion (VCE) where if a liquefied flammable gas is released to atmosphere, there is a possibility that the ignition of the flammable cloud may result in an explosion, and it is referred to as a Vapour Cloud Explosion (VCE). For a VCE to occur the cloud must have sufficient mass and confinement.

The proposed facility is installed in an open area and the confinement within unit is not significant. Hence, any explosion overpressure generated is likely to be small.

The BOC LNG Design Dossier provides an example of heat flux radiation from a similar storage facility with the difference of two LNG storage tanks, instead for three.

A site specific risk assessment for the Baiada development, relating to fire hazards arising from the development and the adequacy of fire protection systems was undertaken by Lote Consulting. Therefore SLR will not comment further on the risk assessment relating to LNG storage. Rather the risk assessment conclusions should be sourced from the Lote Consulting report, *Risk Assessment 1154 Gunnedah Road, Westdale, NSW 2340, Report Number: 370593-LOteRA-Baiada Poultry Plant RevB, dated 17/09/2020*.

4.5.2 LNG Transportation

The quantities and frequency of LNG transported to site do not exceed SEPP 33 threshold levels for the number of trucks as set out in **Table 5**. As such a further consequence analysis for transport risks is not considered necessary.

4.5.3 Ammonia Anhydrous

The proposed development will have ammonia on site as part of the refrigeration systems. The technical and management safeguards required in place for ammonia refrigerant system are self-evident and readily implemented as part of plant safety engineering.

The AS/NZS 5149 series requires the installation and maintenance of number of safety features for ammonia-based refrigeration plant and equipment specifically designed to reduce the overall risk of operations. The correct operation and maintenance of this equipment has been assumed as part of the likelihood assessments.

Table 6 sets out a summary of potential major incident scenarios relating to ammonia, controls and the residual risks.

Table 6 Summary of Potential Major Incident Scenarios – Ammonia

Major Incident	Description	Potential Outcome	Frequency Estimate	Likely Consequence	Controls	Residual Risk Level
Ammonia Release – Pipe Rupture	Pipe rupture post condenser side ruptures leading to ammonia leak. Plant will shutdown on pressure drop leading to short – ‘plug’ release of ammonia	Ammonia release over a short period (minutes)	Rare - Very Rare	Some potential for minor, short term off site impacts downwind from a release. Some medical treatment may be required in a worst case scenario Localised evacuation may be required	Automated compressor shutdown on loss of pressure Plant complies with AS/NZS 5149 series. Early level leak detection in plant room Periodic Maintenance and Inspections Ammonia gas detectors to detect lea	Acceptable
Ammonia Release – Vessel Failure	Ammonia release inside building/plant room from surge tank. Surge tank contains vapour/liquid mixture of ammonia.	Slow leak from closed building as ammonia vaporises	Very Rare	Some potential for minor, short term off site impacts downwind from a release. Some medical treatment may be required in a worst case scenario Localised evacuation may be required	Periodic vessel inspection and system maintenance	Acceptable

Major Incident	Description	Potential Outcome	Frequency Estimate	Likely Consequence	Controls	Residual Risk Level
Ammonia Release – and fire	Release of ammonia and then ignition to start a fire	Site wide fire	Very Rare	Potential for downwind irritation if unburned ammonia is part of smoke plume, potential for generation of high NOx	Ammonia Gas Detection system triggers plant shutdown Plant complies with AS/NZS 5149 series	Acceptable
Ammonia Release – pipe leak (corrosion)	Small ammonia leak, local odour noticed on site	Minor leak/plant shutdown and isolation	Rare	Minor irritation/injury to staff present – No off site impacts expected	Periodic Maintenance and Inspections	Acceptable
Ammonia Release – Overpressure	Leak or release of ammonia gas		Rare	Minor irritation/injury to staff present – No off site impacts expected	Pressure Safety Valves, Plant design pressure rated	Acceptable
Ammonia Release – Pipework Flange/weld failure	Small leak of ammonia gas or liquid under pressure. Will continue until leak is stopped	Localised odour/irritation	Rare	Minor irritation/injury to staff present – No off site impacts expected	Periodic Maintenance and Inspections	Acceptable
Ammonia Release Maintenance Operations	Maintenance error or accident	Small localised release of ammonia – most likely inside plant room	Very Rare	Minor irritation/injury to staff present – No off site impacts expected	All maintenance work on refrigeration equipment carried out by licenced and accredited personnel	Acceptable

Major Incident	Description	Potential Outcome	Frequency Estimate	Likely Consequence	Controls	Residual Risk Level
Ammonia Release – Fire Impact (external)	Fire starts in another section of the building and impinges on the plant room	Potential for fire to spread to refrigeration system – ammonia would then likely be released and burn/act as additional fumes	Very Rare	Potential for downwind irritation if unburned ammonia is part of smoke plume, potential for generation of high NOx	Plant room is separate from operations.	Acceptable
Site Fire	Fire starts in another section of the building and impinges on the plant room	Potential for fire to spread to refrigeration system – ammonia would then likely be released and burn/act as additional Acceptable fumes	Rare	Potential for downwind irritation if unburned ammonia is part of smoke plume, potential for generation of high NOx		Acceptable
Ammonia Release mechanical impact on pipe/vessel	Impact causes pipe rupture or leak	Minor leak/plant shutdown and isolation	Very Rare	Minor irritation/injury to staff present – No off site impacts expected	Pipes are lagged and this afford a significant degree of protection from mechanical impact. Pipe work Plant separated from normal operations.	Acceptable
Ammonia release heat exchanger leak	Leak at plate heat exchanger of ammonia	Localised ammonia leak in plant room	Very Rare	Minor irritation/injury to staff present	Periodic inspections and maintenance	Acceptable

4.6 Assessment Criteria Applicable to the Proposed Development Application

In accordance with HIPAP 4 Risk Criteria for Land Use Safety Planning, the following is a discussion of the risk assessment criteria that shall be applied to the proposed development application.

4.6.1 Heat-Flux Radiation Criteria

As discussed above, further consequence analysis of an incident involving heat radiation from a fire from neighbouring sites should be sourced from the Lote Consulting report, Risk Assessment 1154 Gunnedah Road, Westdale, NSW 2340, Report Number: 370593-LOteRA-Baiada Poultry Plant RevB, dated 17/09/2020.

4.6.2 Explosion Over-Pressure Criteria

As discussed above, further consequence analysis of an incident involving explosion over pressure from a fire on-site should be sourced from the Lote Consulting report, Risk Assessment 1154 Gunnedah Road, Westdale, NSW 2340, Report Number: 370593-LOteRA-Baiada Poultry Plant RevB, dated 17/09/2020.

4.6.3 Toxic Exposure Criteria

The proposed development does store LNG and ammonia at quantities to be classified as an industrial or commercial site. The technical and management safeguards to reduce or eliminate the risks of toxic exposure are well understood and readily implemented as part of plant safety engineering.

Consequently, a consequence analysis of an incident involving toxic gas emissions from a fire on-site is not considered necessary.

4.6.4 Biophysical Environment Risk Criteria

The proposed development will store volumes of dangerous goods, in the form of LNG and ammonia. This may generate toxic releases in the event of a large spill or large scale fire.

Consequently, a further consequence analysis of an incident involving toxic releases into the biophysical environment is not considered necessary.

4.7 Concluding Remarks

It is considered that the operation of the proposed development with the safeguards as stipulated would not cause significant off-site risks.

The development is considered to be potentially hazardous based on the SEPP 33 screening thresholds, given the quantity of LNG and ammonia stored on site. However, the technical and management safeguards required in place for LNG systems and ammonia refrigerant systems are self-evident and readily implemented as part of plant safety engineering. In addition, it should be noted that the LNG storage and delivery system has been designed by BOC Limited (BOC) for Elgas following all of the relevant applicable Australian Standards. Furthermore, BOC Limited has installed similar facilities in many locations across four Australian states. Finally, the surrounding area is lightly populated with the closest potential residence approximately 3.8 km from the boundary.

A site specific risk assessment for the Baiada development, relating to fire hazards arising from the development and the adequacy of fire protection systems was undertaken by Lote Consulting. Therefore the risk assessment conclusions should be sourced from the Lote Consulting report, Risk Assessment 1154 Gunnedah Road, Westdale, NSW 2340, Report Number: 370593-LOteRA-Baiada Poultry Plant RevB, dated 17/09/2020.

In consideration of all these factors, the development does not pose a significant offsite risk.

5 CONCLUSION

This report has reviewed and applied the requirements of SEPP 33 in order to determine whether the policy applies to the Project.

The SEPP 33 screening has shown that:

- In relation to the transportation of dangerous goods, all quantities are below the relevant threshold levels.
- In relation to the storage of dangerous goods, the development may be classified as a potentially hazardous or offensive industry based on the amount of LNG and ammonia anhydrous stored on site.

A Preliminary Hazard Assessment was therefore indicated to determine risk, if any, to adjoining properties near the facility, or surrounding areas.

The Preliminary Hazard Analysis has found that the operation of the proposed development meets the criteria laid down in HIPAP 4 Risk Criteria for Land Use Safety Planning and would not cause any risk, significant or minor, to the community.

A risk assessment relating to fire hazards arising from the development and the adequacy of fire protection systems was undertaken by Lote Consulting. Therefore the risk assessment conclusions should be sourced from the Lote Consulting report, Risk Assessment 1154 Gunnedah Road, Westdale, NSW 2340, Report Number: 370593-LOteRA-Baiada Poultry Plant RevB, dated 17/09/2020.

Other spill, fire and incident events are not likely to extend significantly beyond the boundary of the site, with the exception of a major facility fire where, regardless of the type of operation there will always be a risk of potentially harmful smoke plumes downwind from a fire. In the majority of large fires, the buoyant nature of a smoke plume means any potentially harmful materials are rapidly dispersed.

LNG storage, whilst significant, is well within the storage and handling requirements of the relevant Australian standards (listed above).

It is the conclusion of this PHA that the proposed development meets all the requirements stipulated by the Department of Planning and Environment, and hence would not be considered, with suitable engineering and design controls in place, to be an offensive or hazardous development on site or would not be impacted by any hazardous incidents from adjoining facilities off site.

6 REFERENCES

AS/NZS 1596:2014 The storage and handling of LP Gas

BOC LNG Design Dossier v1, LNG Storage, Vaporiser and Pressure Control Installation

Commonwealth Government, 2020, Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Number 7.7).

Commonwealth Government, 2014, Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Number 7.3).

Department of Planning NSW, 2011, Applying SEPP 33 - Hazardous and Offensive Development Application Guidelines.

Lote Consulting report, Risk Assessment 1154 Gunnedah Road, Westdale, NSW 2340, Report Number: 370593-LOteRA-Baiada Poultry Plant RevB, dated 17/09/2020.

Planning NSW, 2011 Rick Criteria for Land Use Safety Planning – Hazardous Industry Planning Advisory Paper No 4, New South Wales Government

Planning NSW, 2011 Hazard Analysis – Hazardous Industry Planning Advisory Paper No 6, New South Wales Government

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Commercial in Confidence

Risk Assessment

1154 Gunnedah Road, Westdale, NSW 2340

Report Number: 370593-LoteRA-BaiadaPoultryPlant-RevB

Date: 17/09/2020

Client:

Baiada Poultry



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			Prepared	Reviewed	Authorised
A	11/09/20	Draft for Client review only	Renton Parker	Steve Sylvester	Dr S A Magrabi Principal Fire Engineer BPB No: 0240
B	17/09/20	Update of assessment based on LNG location	Renton Parker	Steve Sylvester	Dr S A Magrabi Principal Fire Engineer BPB No: 0240

Report Reading Guide

The scope of this Risk Assessment (RA) is to assess the potential hazards at the site to determine the adequacy of fire protections systems against the identified hazards. This RA is divided into the following sections

EXECUTIVE SUMMARY

- 1.0 INTRODUCTION
- 2.0 METHODOLOGY
- 3.0 GENERAL DESCRIPTION
- 4.0 HAZARD IDENTIFICATION
- 5.0 CONSEQUENCE ANALYSIS
- 6.0 FREQUENCY ANALYSIS AND RISK ASSESSMENT
- 7.0 CONCLUSION AND RECOMMENDATIONS

The project stakeholders will have varying degrees of involvement in the fire engineering process with an interest in different sections. It is recommended that each stakeholder read the entire document, paying particularly attention to the sections indicated in Table 0.

Table 0 – Recommended reading guide table for project stakeholders

Stakeholder	Executive Summary	1	2	3	4	5	6	7	Appendices
Client	✓	✓	✓	✓	✓			✓	✓
Architect	✓	✓	✓	✓	✓			✓	✓
Certifying Authority	✓	✓	✓	✓	✓	✓	✓	✓	✓
Project Manager	✓	✓	✓	✓	✓			✓	
Services Engineers	✓	✓	✓	✓	✓			✓	
Fire Brigades	✓	✓	✓	✓	✓	✓	✓	✓	✓
Managing Contractor	✓	✓	✓	✓	✓			✓	
Sub-Contractor	✓	✓	✓	✓	✓			✓	

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Executive Summary

Background

Baiada Poultry has proposed to construct a poultry processing facility on land located at 1154 Gunnedah Road, Westdale, NSW 2340. Part of the design has been to incorporate childcare facilities within the facility to assist employees with childcare needs while working. The site also includes Dangerous Goods (DGs) which exceeded the State Environmental Planning Policy No. 33 (SEPP 33) resulting in the preparation of a Preliminary Hazard Analysis (PHA) dated 3/08/20. In particular, large quantities of Liquefied Natural Gas (LNG).

The Hazardous Industry Planning Advisory Paper (HIPAP) No. 4¹ has a range of criteria for sensitive populations which must be complied with to demonstrate that a facility is not potentially hazardous. While the childcare is located within the confines of the site property, the Department of Planning, Industry and Environment (DPIE) has requested additional assessment to demonstrate that the risks posed by the LNG storage do not exceed the applicable criteria at the childcare. This document has been prepared as an addendum to the existing PHA dated 3/08/202 prepared by SLR Consultants to assess the risk at the childcare based upon the storage of LNG.

Conclusions

A hazard identification table was developed for the facility to identify potential hazards that may be present at the site as a result of operations or storage of materials. Based on the identified hazards, scenarios were postulated that may result in an incident with a potential for offsite impacts. Postulated scenarios were discussed qualitatively and any scenarios that would not impact offsite were eliminated from further assessment. Scenarios not eliminated were then carried forward for consequence analysis.

Incidents carried forward for consequence analysis were assessed in detail to estimate the impact distances. Impact distances were developed into scenario contours and overlaid onto the site layout diagram to determine if an offsite impact would occur. The consequence analysis showed that one of the scenarios (vapour cloud explosion) would impact over the site boundary and into the adjacent land use and the onsite childcare; hence, this incident was carried forward for frequency analysis and risk assessment.

The frequency analysis and risk assessment showed that the fatality rate at the childcare would be 0 while the fatality rate at the site boundary would be 0.5%. Given the location of the facility it would be unlikely for a person to be located at the boundary. Hence, it was concluded that it would be incredibly unlikely for a fatality to occur at the site boundary. Therefore, the probability of a fatality from an LNG explosion at the site boundary is within the acceptable risk criteria.

Based on the analysis conducted, it is concluded that the risks at the site boundary are not considered to exceed the acceptable risk criteria. Therefore, the facility would only be classified as potentially hazardous and would be permitted within the current land zoning for the site.

Recommendations

- a) The hoses for the transfer of LNG shall be inspected monthly and pressure tested annually in accordance with the Australian Dangerous Goods Code.
- b) All equipment shall be inspected and tested in accordance with the Australian Dangerous Goods Code.
- c) The over pressurisation shut off for the supply will be set at not more than 200 kPa.

¹ Department of Planning, "Hazardous Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use Safety Planning," Department of Planning, Sydney, 2011.

1.0 Introduction

1.1 Background

Baiada Poultry has proposed to construct a poultry processing facility on land located at 1154 Gunnedah Road, Westdale, NSW 2340. Part of the design has been to incorporate childcare facilities within the facility to assist employees with childcare needs while working. The site also includes Dangerous Goods (DGs) which exceeded the State Environmental Planning Policy No. 33 (SEPP 33) resulting in the preparation of a Preliminary Hazard Analysis (PHA) dated 3/08/20. In particular, large quantities of Liquefied Natural Gas (LNG).

The Hazardous Industry Planning Advisory Paper (HIPAP) No. 4² has a range of criteria for sensitive populations which must be complied with to demonstrate that a facility is not potentially hazardous. While the childcare is located within the confines of the site property, the Department of Planning, Industry and Environment (DPIE) has requested additional assessment to demonstrate that the risks posed by the LNG storage do not exceed the applicable criteria at the childcare. This document has been prepared as an addendum to the existing PHA dated 3/08/202 prepared by SLR Consultants to assess the risk at the childcare based upon the storage of LNG.

² Department of Planning, "Hazardous Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use Safety Planning," Department of Planning, Sydney, 2011.

2.0 Methodology

The following methodology has been adopted in this assessment:

- a) The LNG tanks were subject to a hazard identification to identify the potential scenarios which may occur from a failure of the LNG systems.
- b) Identified scenarios were subject to a consequence analysis to identify the extent of the impacts.
- c) The impact contours were overlaid on the site layout to determine whether impact at the childcare would occur.
- d) Where an impact was identified, a frequency and risk analysis was conducted to determine whether the risk criteria for childcare facilities within HIPAP No. 4 was exceeded.
- e) The review of the SLR Consulting PHA is outside the scope of this commission and has not been undertaken.

3.0 General Description

An overview of the LNG systems installed at the site is provided in the following subsections. Description of the process and system has been extracted from the BOC Technical Documents for the system dated 21/07/2013.

3.1 LNG Quantities

The LNG is stored in three (3) vertical tanks which are located on the northern eastern side of the facility as shown in Figure 3-1. The total quantity of LNG stored within the tanks is summarized in Table 3-1.

Table 3-1 – Summary of LNG Quantities at the Site

Storage Type	Number of Tanks	Volume of Each Storage (L)	Total Volume (L)
Vertical tank	3	80,000	240,000

3.2 Gas Controls

The primary gas control is the OPSO valve(s) which lets the pressure down from the operating pressure of the LNG storage vessel, normally 5 Barg, to 0.7 to 1.4 Barg for supply to the gas fired appliances. The over pressure shut off for the supply will be set at 200kPa, possibly lower if requested by a customer but no higher.

3.3 Safety Controls

The LNG storage vessel is fitted with ESOV's on all entry and exit lines with instrument impulse lines fitted with a 1.4 mm orifice. The gas supply line is over pressure protected by the OPSO valve panel with the over pressure set to 2 Barg. The OPSO valve panel is protected by a low temperature shutdown set at -20C. The overall facility is protected by two gas detection units (in a polling configuration) which shut the ESOV's in the event of a gas detection event.

The gas will be stench immediately downstream of the vaporisers, via injection of Spotleak 1009 odourant (see MSDS in section below). This removes the need for electronic gas detection downstream at the usage points. Spotleak 1009 is a mixture of tertiary-butyl mercaptan and isopropyl mercaptan. Odourant injection is achieved via pump injection, proportional to the mass flow rate of natural gas.

The LNG storage vessel is protected from over pressure through a pair of safety valves, the first valve is set at the maximum allowable operating pressure and the second valve is set to 120% of the maximum allowable operating pressure.

The pipework between isolation valves is fitted with thermal relief valves to protect the pipework from trapped cryogenic liquid, which will boil off to create an expanding vapour increasing in pressure until the thermal safety valve lifts at 31 Barg.

As additional safety measure, the LNG supply system has a dial in DCS that alerts the on-call engineer via sms in case of E-Stop trip or a fault condition. The engineer can then dial in and diagnose/rectify the issue with customer assistance where necessary. The dial in system also comes complete with a surveillance camera so that a visual check may be carried out before resetting the system remotely.

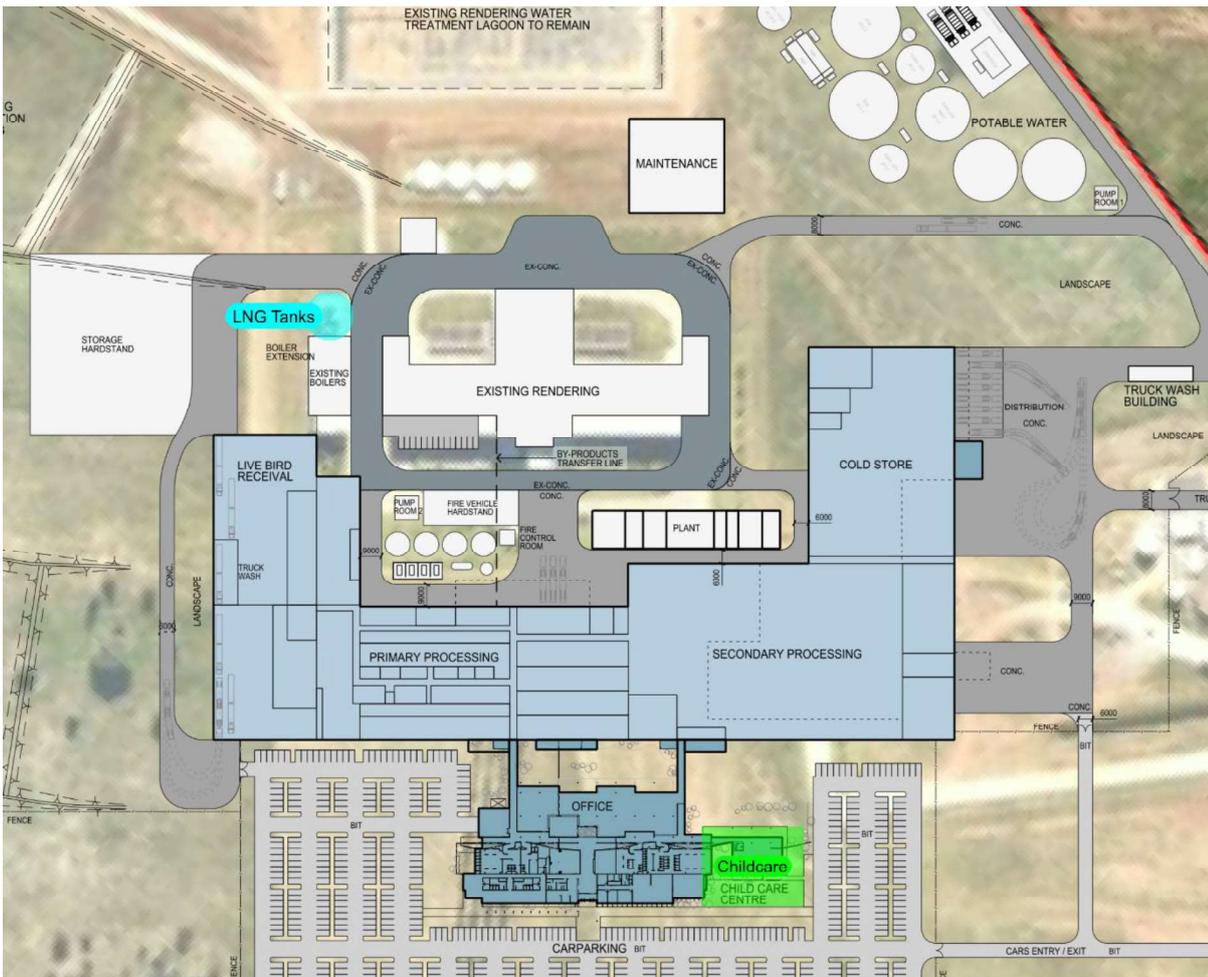


Figure 3-1 – Existing Site Layout

4.0 Hazard Identification

4.1 Introduction

A hazard identification table has been developed and is presented at Appendix A. This table has been developed following the recommended approach in Hazardous Industry Planning Advisory Paper No .6, Hazard Analysis Guidelines³. The Hazard Identification Table provides a summary of the potential hazards, consequences and safeguards at the site. The table has been used to identify the hazards for further assessment in this section of the study. Each hazard is identified in detail and no hazards have been eliminated from assessment by qualitative risk assessment prior to detailed hazard assessment in this section of the study.

4.2 Identified Hazards

The following hazardous scenarios were identified as part of the hazard identification:

- a) LNG Release, Ignition and Pool Fire
- b) LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire
- c) LNG Release and Ignition Causing Flash Fire or Explosion
- d) LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Delivery Tanker and BLEVE
- e) LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Tank and BLEVE

Each has been discussed further in the following sections.

4.3 LNG Release, Ignition and Pool Fire

In the event of a small leak from a vessel or pipework a pool of LNG may form when the rate of evaporation of LNG is less than the flow rate of LNG from the leak. If the pool were to ignite an LNG pool fire would occur.

A leak sufficient to cause a release that exceeds the evaporation rate to develop a pool large enough to ignite (noting the area is zoned per the requirements of AS/NZS 60079.10.1:2009⁴) and the subsequent fire is considered very low. This is substantiated by numerous similar sized LNG tanks installed throughout Australia with very low incidences of leaks and fires occurring from such installations.

Furthermore, based upon the location of the LNG tanks in relation to the site boundaries and the childcare, an impact offsite would not be expected from these scenarios. Given the potential for the incident to happen is low and the childcare would be unlikely to be impacted by such an incident due to its location at the site this incident has not been carried forward for further analysis.

4.4 LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire

As the site LNG is depleted, it will be refilled by a delivery tanker at the site. During loading of the tank there is the potential for the hose to rupture which may be the result of a puncture of the hosing or deterioration through general wear and tear. It is considered the hoses are inspected monthly and pressure tested annually in accordance with the Australian Dangerous Goods Code⁵ (ADG).

Notwithstanding this, there is the potential for a hose to become damaged between inspection and test periods which may lead to sufficient deterioration resulting in a hose rupture when transferring pressurised LNG. Excess flow and non-return valves will isolate the flow of LNG. However, if these fail in addition to a hose rupture, LNG will be released resulting in an LNG vapour cloud. The operator may be able to respond and isolate the LNG transfer by activating an emergency stop button located on the tanker.

If the operator is incapacitated or unable to stop the transfer, the LNG will continue to flow developing a substantial cloud which may contact an ignition source and ignite which would result in a flash fire or explosion which would

³ Department of Planning, "Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis," Department of Planning, Sydney, 2011.

⁴ Standards Australia, AS/NZS 60079.10.1:2009 - Explosive Atmospheres Part 10.1: Classification of Areas, Explosive Gas Atmospheres, Sydney: Standards Association of Australia, 2009.

⁵ Road Safety Council, The Australian Code for the Transport of Dangerous Goods by Road and Rail Edition 7.4, Canberra: Road Safety Council, 2016.

burn back to the release point and subsequent jet fire. It is noted the area is unconfined. Hence, an explosion is unlikely to occur and would likely result in a flash fire.

The impacts from a jet fire may be substantial although unlikely to impact the childcare due to the location of the tank on the site. Nonetheless, this incident has been carried forward for further analysis as to confirm an offsite impact will not occur.

4.5 LNG Release and Ignition Causing Flash Fire or Explosion

In the event of an LNG release, LNG will vapourise forming a flammable cloud which may ignite. A review of the area indicates the tank will not be stored in an area where confinement will occur. Hence, the cloud is unlikely to ignite as an explosion but is likely to result in a flash fire. Nonetheless, due to the large volumes of gas stored within each tank, in a full release scenario there is the potential for a dense cloud to form which if ignited may be sufficient to detonate as an explosion. Therefore, both a flash fire and explosion have been carried for further analysis as both an offsite impact or impact at the childcare may occur.

4.6 LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Delivery Tanker and BLEVE

Similarly, to the scenario described in Section 4.4 the hose may rupture resulting in a jet fire. If this jet fire were aimed at the delivery tanker, the tanker shell would begin to heat, transferring the heat into the LNG within the tank which would begin to vaporise and increase the pressure within the tanker. At the design pressure of the tank, the pressure relief valve will begin to lift to relieve pressure within the tanker.

As the liquid level within the tanker drops, the impact zone of the jet fire may impact the vapour space in the tanker. The vapour will absorb less energy than the liquid which will result in localised heating of the tanker shell at the point of the jet fire impact. This may compromise the structural integrity of the tanker shell which may rupture resulting in a blast overpressure as the vessel fails and formation of an LNG vapour cloud which may also ignite resulting in a vapour cloud explosion known as a Boiling Liquid Expanding Vapour Explosion (BLEVE). This incident has been carried forward to assess the potential impact zone.

4.7 LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Tank and BLEVE

Similarly, to the scenario described in Section 4.4 the hose may rupture resulting in a jet fire. If this jet fire were aimed at the tank, the tank shell would begin to heat, transferring the heat into the LNG within the tank which would begin to vaporise and increase the pressure within the tank which may result in a BLEVE as described in Section 4.5. Hence this incident has been carried forward for further analysis.

5.0 Consequence Analysis

Incidents carried forward for Consequence Analysis

- LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire
- LNG Release and Ignition Causing Flash Fire or Explosion
- LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Delivery Tanker and BLEVE
- LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Tank and BLEVE

Each has been discussed further in the following sections.

5.1 LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire

There is the potential for a hose to rupture and release high pressure LNG if the excess flow valve on the tanker fails and operator intervention does not occur. If this stream ignited, a jet fire could occur. A detailed analysis has been conducted in Appendix B6 for this scenario which indicates the jet fire would have an impact of distance of 31.8 m. The impact distances for this incident are shown in Figure 5-3.

There are several protection systems to prevent hose rupture including hose pressure testing and inspections, non-return valves on the tank and vehicle, excess flow valves on the tanker, earthing connections, ignition source controls. Therefore, it is unlikely that a release of LPG would occur and subsequent ignition.

A review of the impact distance indicates it would not impact over the site boundary which is 237 m away and nor would it impact the childcare which is 284 m away. Therefore, this incident has not been carried forward for further analysis.

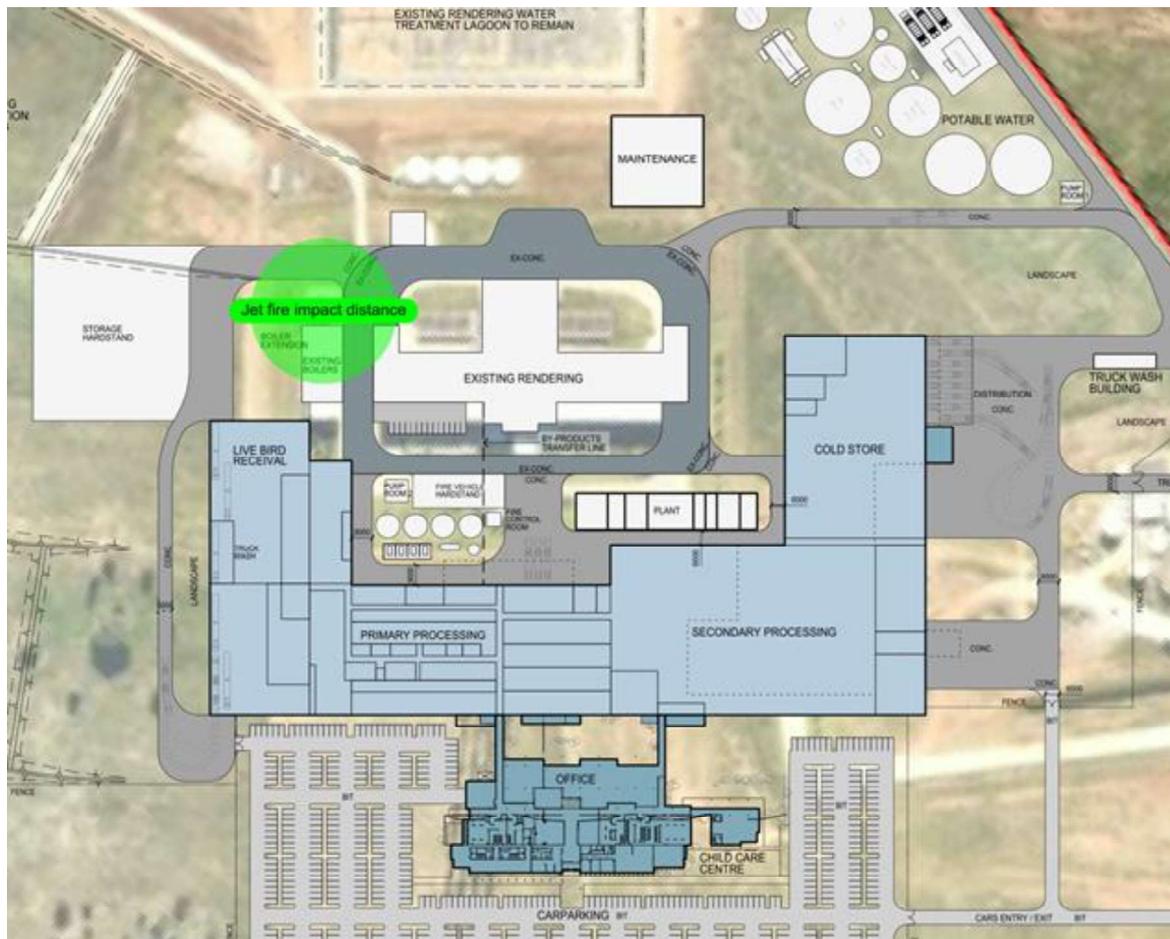


Figure 5-1: Impact from a Jet Fire

5.2 LNG Release and Ignition Causing Flash Fire or Explosion

In the event of an LNG release, a vapour cloud will form which may migrate away from the source of release and ignite. Depending upon the confinement and mass of the vapour within the cloud, it may explode or result in a flash fire. A detailed analysis has been conducted in Appendix B7 with the results summarised in Table 5-1.

A review of the impact distances shown in Figure 5-1 indicates the overpressure at 7 kPa would impact over the site boundary and would impact the childcare which may result in a fatality. Hence, this incident has been carried forward for further analysis.

The methodology developed by ICI⁶ for estimating flash fire impact distances (i.e. the 70 kPa contour) does not impact over the site boundary nor the childcare. Hence, the flash fire component has not been carried forward for further analysis.

Table 5-1 – Overpressure from a Vapour Cloud Explosion

Overpressure (kPa)	Distance (m)
70	65
35	134
21	179
14	224
7	359

6 ICI Australia Engineering Pty Ltd, "Hazard Analysis Course Notes," ICI Australia Engineering Pty Ltd, 1988.

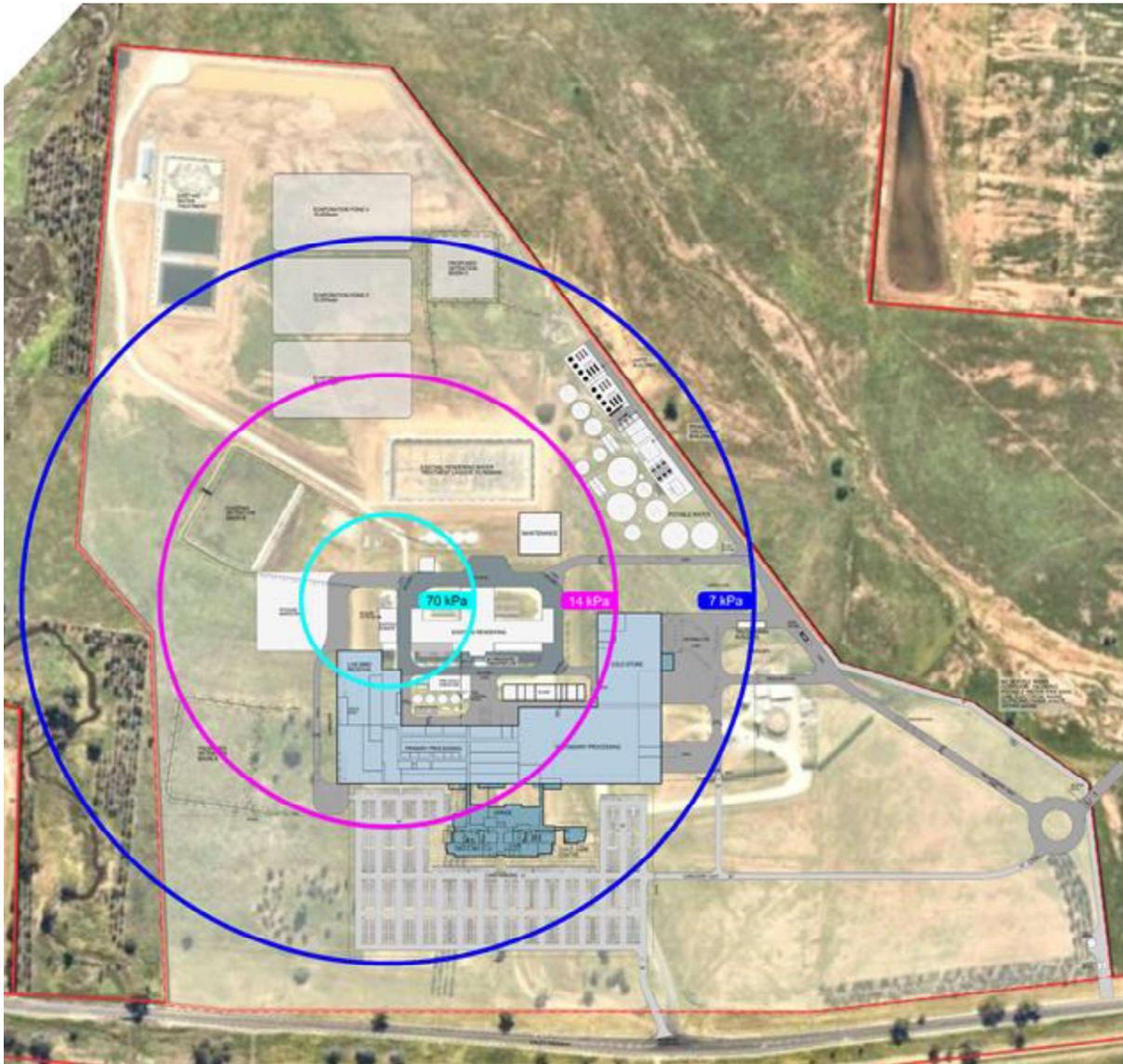


Figure 5-1 – Overpressure Contours from a Vapour Cloud Explosion

5.3 LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Delivery Tanker and BLEVE

In the event of a jet fire and impingement on the delivery tanker there is potential for the LNG in the tanker to boil escalating to a BLEVE if intervention measures fail. A detailed analysis has been conducted in Appendix B8 which indicates the diameter of the BLEVE would be 119 m and would last for 8.0 seconds. The impact distances for this incident are shown in Figure 5-2.

Similarly, to the jet fire scenario, several layers of protection are required to fail before the initiating event could occur. In addition, the jet fire would need to be impinged on the tanker before it could BLEVE which takes considerable time as the LPG must boil off such that the liquid level is below the impact point.

A review of the BLEVE impact distance indicates the fireball would not impact over the site boundary nor would it impact the childcare. Therefore, this incident has not been carried forward for further analysis.

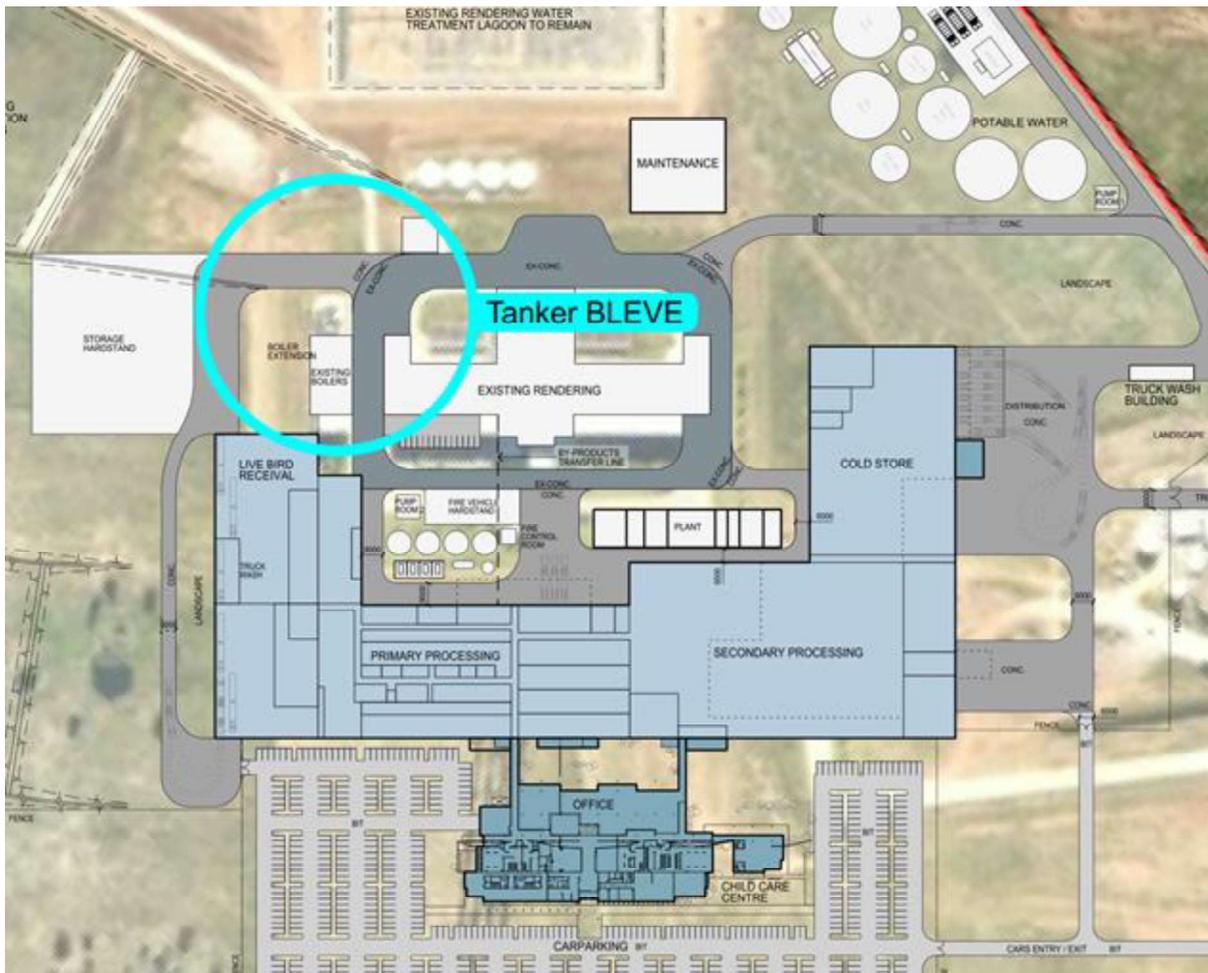


Figure 5-2 – BLEVE Impact from a Tanker

5.4 LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Delivery Tanker and BLEVE

In the event of a jet fire and impingement on the storage tank there is potential for the LNG in the tanker to boil escalating to a BLEVE if intervention measures fail. A detailed analysis has been conducted in Appendix B9 which indicates the diameter of the BLEVE would be 130.6 m and would last for 8.6 seconds. The impact distances for this incident are shown in Figure 5-3.

Similarly, to the jet fire scenario, several layers of protection are required to fail before the initiating event could occur. In addition, the jet fire would need to be impinged on the tanker before it could BLEVE which takes considerable time as the LPG must boil off such that the liquid level is below the impact point.

A review of the BLEVE impact distance indicates the fireball would not impact over the site boundary nor would it impact the childcare. Therefore, this incident has not been carried forward for further analysis.

6.0 Frequency Analysis and Risk Assessment

6.1 Incident(s) Carried Forward for Frequency Analysis and Risk Assessment

The following incident(s) have been carried forward for further analysis:

- d) LNG Release and Ignition Causing an Explosion

This incident has been assessed in the following section.

6.2 LNG Release and Ignition Causing an Explosion

Based upon the potential offsite impact and impact at the childcare, a probit analysis has been conducted on the overpressure experience at the receptors to determine whether a fatality would occur.

To estimate the probability of fatality it is necessary to review the susceptibility to personnel exposed to overpressure which may occur at the site boundary and the childcare. Tolerance to an exposure (i.e. overpressure) differs across a population which may be estimated using Probit analysis. For explosion overpressure, the Probit equation is shown in Eqn 6-1.

$$Y = K_1 + K_2 \ln P \quad \text{Eqn 6-1}$$

Where:

- $K_1 = 5.13$
- $K_2 = 1.37$
- $P = \text{overpressure (bar)}$

The value obtained from the Probit equation is then read from the graph shown in Figure 6-1. Which yields the percentage of fatality for personnel exposed to the input overpressure.

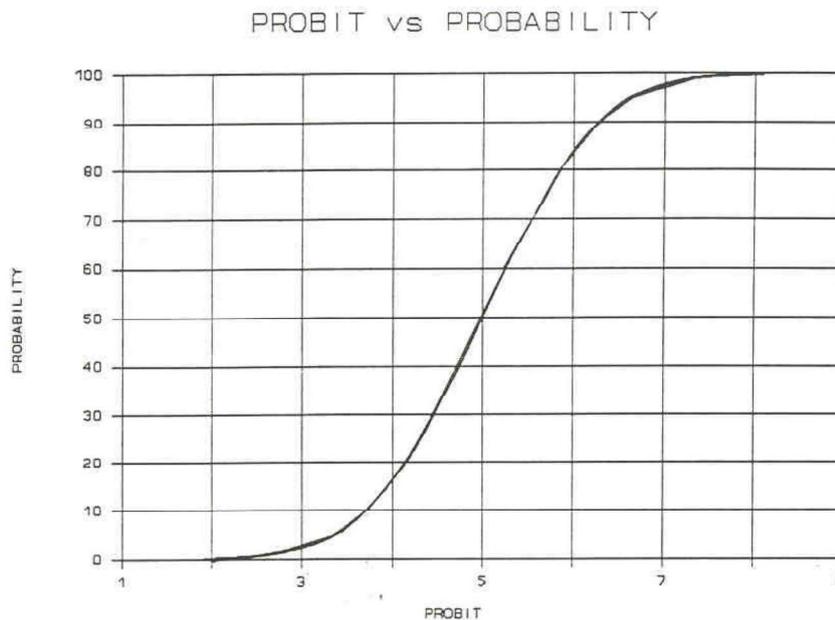


Figure 6-1 – Probit vs Probability

The distances from the childcare and the site boundary are 288 m and 237 respectively. Which when input into the model results in the overpressures displayed in Table 6-1 based upon Figure 6-2.

Table 6-1: Overpressure at Sensitive Receptors

Receptor	Distance (m)	Scaled Distance (Z)	Overpressure (kPa)
Site boundary	237	10.5	13
Childcare	284	12.8	9

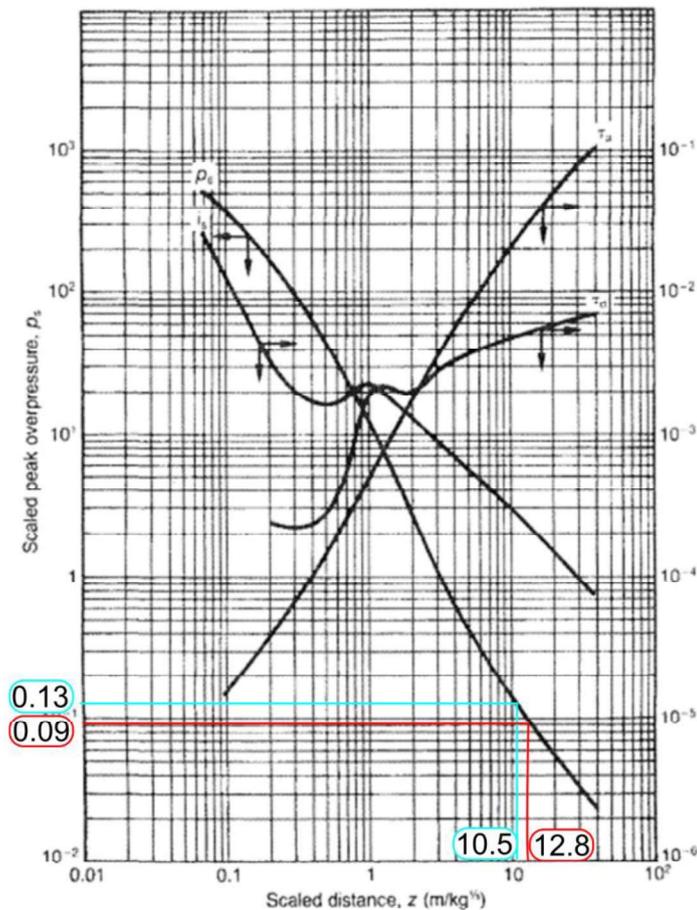


Figure 6-2: Scaled Distance vs Overpressure (bar)

Substituting the overpressures in Table 6-1 into the results in the probits and probability of fatalities as shown in Table 6-2.

Table 6-2: Probability of Fatality from VCE Overpressure

Receptor	Probit	Fatality (%)
Site boundary	2.62	0.5
Childcare	1.83	0

The probability of fatality observed at the childcare would be 0 chances pmpy based upon the probit calculation. However, the analysis is considered incredibly conservative as the calculations don't take into account the impact of the building being between the tanks and the childcare which would divert and dissipate the overpressure resulting in lower observed overpressures at the childcare than observed.

With respect to the site boundary, a 0.5% fatality risk was observed at the boundary. However, a review of the area indicates it is in a very rural location; hence, the potential for someone to be at the site boundary would be almost negligible and thus a fatality at the site boundary would not be expected to occur with lower fatality potential farther

afield. Furthermore, the protection systems incorporated into the gas design limit the potential for large and uncontrolled releases which would result in the required vapour cloud mass to form the explosive overpressures calculated.

Therefore, it is considered that the probability of fatality at the site boundary is 0 pmpy.

6.3 Comparison to Risk Criteria

The NSW Department of Planning and Environment has issued a guideline on the acceptable risk criteria⁷. The acceptable risk criteria published in the guideline relates to injury, fatality and property damage. The values in the guideline present the maximum levels of risk that are permissible at the land use under assessment.

The adjacent land use would be classified as a rural / industrial site as it is restricted access and only industrial operations are permitted to occur in this area. For industrial facilities, the maximum permissible fatality risk is 50 pmpy. While the childcare is within the same location, a separate criterion of 0.5 pmpy year has been adopted due to the sensitive nature of the occupants⁷.

The assessed highest fatality risk is 0 pmpy at both the site boundary and the childcare. Hence, the highest risk is within the permissible criteria and therefore all other risk points beyond the boundary would be within the acceptable criteria.

Based on the estimated injury risk, conducted in the analysis above, the risks associated with injury and nuisances at the closest sensitive receptors are not considered to be exceeded.

⁷ Department of Planning, "Hazardous Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use Safety Planning," Department of Planning, Sydney, 2011.

7.0 Conclusions and Recommendations

7.1 Conclusions

A hazard identification table was developed for the facility to identify potential hazards that may be present at the site as a result of operations or storage of materials. Based on the identified hazards, scenarios were postulated that may result in an incident with a potential for offsite impacts. Postulated scenarios were discussed qualitatively and any scenarios that would not impact offsite were eliminated from further assessment. Scenarios not eliminated were then carried forward for consequence analysis.

Incidents carried forward for consequence analysis were assessed in detail to estimate the impact distances. Impact distances were developed into scenario contours and overlaid onto the site layout diagram to determine if an offsite impact would occur. The consequence analysis showed that one of the scenarios (vapour cloud explosion) would impact over the site boundary and into the adjacent land use and the onsite childcare; hence, this incident was carried forward for frequency analysis and risk assessment.

The frequency analysis and risk assessment showed that the fatality rate at the subject childcare would be 0 while the fatality rate at the site boundary would be 0.5%. Given the location of the facility it would be unlikely for a person to be located at the boundary; hence, it was concluded that it would be incredibly unlikely for a fatality to occur at the site boundary. Therefore, the probability of a fatality from an LNG explosion at the site boundary is within the acceptable risk criteria.

Based on the analysis conducted, it is concluded that the risks at the site boundary are not considered to exceed the acceptable risk criteria. Hence, the facility would only be classified as potentially hazardous and would be permitted within the current land zoning for the site

7.2 Recommendations

- a) The hoses for the transfer of LNG shall be inspected monthly and pressure tested annually in accordance with the Australian Dangerous Goods Code.
- b) All equipment shall be inspected and tested in accordance with the Australian Dangerous Goods Code.
- c) The over pressurisation shut off for the supply will be set at not more than 200 kPa.

8.0 Documents Considered

This assessment is based on the following documentation:

- a) Preliminary Hazard Analysis (PHA) undertaken by SLR Consulting dated 3/08/2020
- b) BOC Technical Documents for the system dated 21/07/2013
- c) Annual Fire Safety Statement (AFSS) as shown in Appendix C.
- d) P&ID drawings as per Table 8-1.
- e) Architectural drawings by SBA Architects as per Table 8-2.

Table 8-1 – P&ID Drawings

Drawing No.	Title	Date/Issue
C505-74	LGN installations	28/12/14
C508-107	Bulk LGN Supply Systems	3/11/14
C508-108	3x VIE 80,000 LNG Tank Manifold System	3/11/14

Table 8-2 – Architectural Drawings

Drawing No.	Title	Date/Issue
SK10	Site Plan	22/06/2020

9.0 Validity & Limitations

The reader's attention is drawn to the following limitations with respect to the fire engineering assessment undertaken in this report:

- a) This report is provided in accordance with the Lote Consulting Pty Ltd (hereafter referred to as "Lote") Fee Proposal and Agreement for the provision of Consulting Engineer Services executed between Lote and the Client on the subject project. No obligation in contract exists between Lote and any other party.
- b) The report is limited to the assessment of BCA DtS variations identified in Section 4.2 of this report for compliance with relevant BCA Performance Requirements. With the exception of these Performance Solutions, all other fire safety aspects of the building are to comply with the BCA DtS Provisions.
- c) This assessment deals with the fire safety provisions of the BCA only and does not consider amenity or non-fire related matters in the building such as health, amenity, security, energy efficiency, occupational health & safety, compliance with Disability Discrimination Act (DDA) etc., which are to be addressed by others. Consequently, the outcomes of this assessment have not been checked or verified for their fitness for purpose of any non-fire safety related matters including the ones outlined above.
- d) This assessment is not a full compliance or conformance audit for any fire safety system. Therefore, operational checks of fire safety equipment, verification of construction techniques, fire resistance levels or the witnessing of fire drills or exercises are specifically excluded from the scope of this assessment. The operational status of systems, items of equipment and staff training should be addressed as part of the inspection, commissioning, enforcement, maintenance, testing, training and management procedures for the building.
- e) This assessment will be consistent with the objectives and limitations of the BCA and therefore specifically excludes arson (other than as a source of initial ignition), multiple ignition sources, acts of terrorism, protection of property (other than adjoining property), business interruption or losses, personal or moral obligations of the owner/occupier, reputation, environmental impacts, broader community issues etc.
- f) Arson has been shown statistically to contribute to fire. This report has addressed the incidence of minor forms of arson as a single ignition source. However major arson involving accelerants and/or multiple ignition sources are beyond the scope of this assessment and have been excluded.
- g) Egress and fire safety provisions for persons with disabilities have only been considered to the same degree as the BCA DtS Provisions.
- h) Reports marked 'Draft' are subject to change and Lote accepts no liability pending release of the final version of the report.
- i) The design concepts outlined in this report are for a complete and operational building and do not address protection of the building during construction, renovation or demolition.
- j) Any change in building, occupant or fuel conditions from those considered in this report, or any deviation from the implementation of the fire safety strategy outlined in this brief, may result in outcomes not anticipated by the proposed strategy and should be reviewed.
- k) Evaluation of the expected level of fire induced property damage with respect to the contents and building structure is specifically excluded.
- l) The recommendations in this assessment are based on information provided by others. Lote has not verified the accuracy and/or completeness of this information and accepts no responsibility or liability for any errors or omissions which may be incorporated into this assessment as a result.
- m) It is considered that the scope of works arising from this report and limitations of this report are read, understood and implemented. Lote shall be contacted in relation to any queries on the report content and takes no responsibility for misinterpretation of the report content by others.
- n) The recommendations, data and methodology documented in this assessment are based on the documentation in Section 8.0 and specifically apply to the subject building / project and must not be utilised for any other purpose. Any modifications or changes to the building, fire safety management system, or building usage from that described may invalidate the findings of this assessment necessitating a re-assessment. No warranty is intended or implied for use by any other third party and no responsibility is undertaken to any other third party for material contained herein.
- o) The scope of this report is limited to the assessment in this report. Lote has not approved or verified any base building Performance Solutions or assessments.
- p) The architectural and engineering drawings referenced or listed in this report have been utilised for purposes of formulating and assessing the Performance Solutions nominated in this Report. Lote have not reviewed the drawings for compliance with the BCA, Australian Standards or the Fire Engineering Report.

Appendix A – Hazard Identification

ID	Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
1	LNG Tanks	<ul style="list-style-type: none"> Releases from pipework due to corrosion, flange leaks, hose/pump leaks, weld failure, operator error, maintenance error, mechanical damage (e.g. tanker impact on fill point) etc. Overfilling of tank due to operator error (incorrect tank reading) Overfilling of tanker due to equipment fault or procedures not followed (e.g. leaving operation unattended). Hose failure or coupling failure or coupling not properly engaged during transfers due to mechanical damage or undetected wear and tear or operator error. Drive away with hoses attached. 	<ul style="list-style-type: none"> Minor leak (5 mm hole) Major leak (50 mm hole) If ignition then: <ul style="list-style-type: none"> Flash fire, jet fire, pool fire, VCE or BLEVE (tanker), possible explosion if enters drains, and potentially hazardous heat radiation, direct fire involvement, and/or overpressure/projectiles. Potential fire propagation to adjacent sites. 	<ul style="list-style-type: none"> Tanks designed per the following standards: <ul style="list-style-type: none"> AS3961 – The storage and handling of liquefied natural gas AS1210 – Unfired pressure vessels AS4041 – Pressure piping (on pad pipework, vapouriser) AS5601 – Gas installations (gas pipeline) AS1271 – Safety valves, other valves, liquid level gauges and other fittings for boilers and unfired pressure vessels AS1345 – Identification of the contents of pipes, conduits and ducts AS/NZS3000 – Electrical installations AS/NZS60079.10 – Classification of Areas – Explosive Gas Atmospheres AS/NZS60079.14 – Explosive atmospheres, electrical installations design, selection and erection AS1768 – Lightning Protection Tank and associated pipework/fitting will be pressure tested in accordance with the requirements of the pressure vessels code



ID	Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
				<ul style="list-style-type: none"> • Ignition source control including earthing to prevent static sparks. • Hoses tested annually as per AS/NZS 1596:2014 and the ADG⁸ • Excess flow valves installed in pipework. • Valves to fill point closed until air connected to truck. • Valves shut on breaking of air connection to truck. • All staff including contract drivers will be trained in the specific transfer operations at the site. • Tanker fitted with Emergency Shut Down • Excess flow valve on tanker • Manual shutdown valve • Non-return valve on delivery line • Emergency Shutdown on delivery line • Manual valve on delivery line • Overfill protection device • Fusible link on tanker and vessel

⁸ Road Safety Council, The Australian Code for the Transport of Dangerous Goods by Road and Rail Edition 7.4, Canberra: Road Safety Council, 2016.

Appendix B – Consequence Analysis

B1. Incident Carried Forward for Consequence Analysis

The following incidents have been carried forward for consequence analysis:

- a) LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire
- b) LNG Release and Ignition Causing Flash Fire or Explosion
- c) LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Delivery Tanker and BLEVE
- d) LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Tank and BLEVE

B2. Jet Fire Modelling

The flow rate of a liquid from a hole may be calculated from Equation 1⁹.

$$m = C_d A (2\rho\Delta P)^{0.5} \quad \text{Equation 1}$$

Where:

- m = Mass flow rate (kg/s)
- C_d = Discharge coefficient (0.6 for irregular holes)
- A = area of the orifice (m^2)
- ρ = Density of the material (kg/m^3)
- ΔP = Pressure difference across the orifice (Pa).

The flame length and width, as a result of a release, can be estimated from the empirical formula published by Lees¹⁰. The equations for the length and width are shown in Equation 2 and Equation 3.

$$L = 9.1G_L^{0.5} \quad \text{Equation 2}$$

Where:

- L = Length (m)
- G_L = Mass flow rate (kg/s)

$$W = 0.25L \quad \text{Equation 3}$$

Where:

- W = Width (m)
- L = Length (m)

B3. BLEVE Modelling

The diameter of the fireball and the duration of the BLEVE may be estimated using the following formulae⁹:

$$D = 6.48m^{0.325} \quad \text{Equation 4}$$

$$t = 0.852m^{0.25} \quad \text{Equation 5}$$

⁹ I. R. R. Cameron, Process Systems Risk Management, Sydney: Elsevier Academic Press, 2005.

¹⁰ F. P. Lees, Loss Prevention in the Process Industries, London: Butterworth-Heinemann, 2005.

Where:

- D = diameter of the fire ball (m)
- m = mass of LNG in the tank (kg)
- t = duration of the BLEVE (seconds)

B4. Overpressure Modelling

To estimate the explosion overpressure, the TNT equivalent method is used. This method equates the quantity of a material involved in the explosion to an equivalent quantity of TNT. The equivalent mass of TNT is estimated using Equation 6.

$$W_{TNT} = \alpha \left(\frac{WH_c}{H_{TNT}} \right) \quad \text{Equation 6}$$

The other parameters required in this equation are;

- W = mass of fuel in the vapour cloud (kg)
- H_c = heat of combustion of the fuel (kJ/kg)
- H_{TNT} = TNT blast energy (4,600 kJ/kg)¹¹)
- α = explosion efficiency (conservatively estimated to be 0.04 for hydrocarbons¹¹)

Overpressure is now calculated using a scaled distance curve, based on actual distance from the blast and the TNT equivalent, this is given Equation 7.

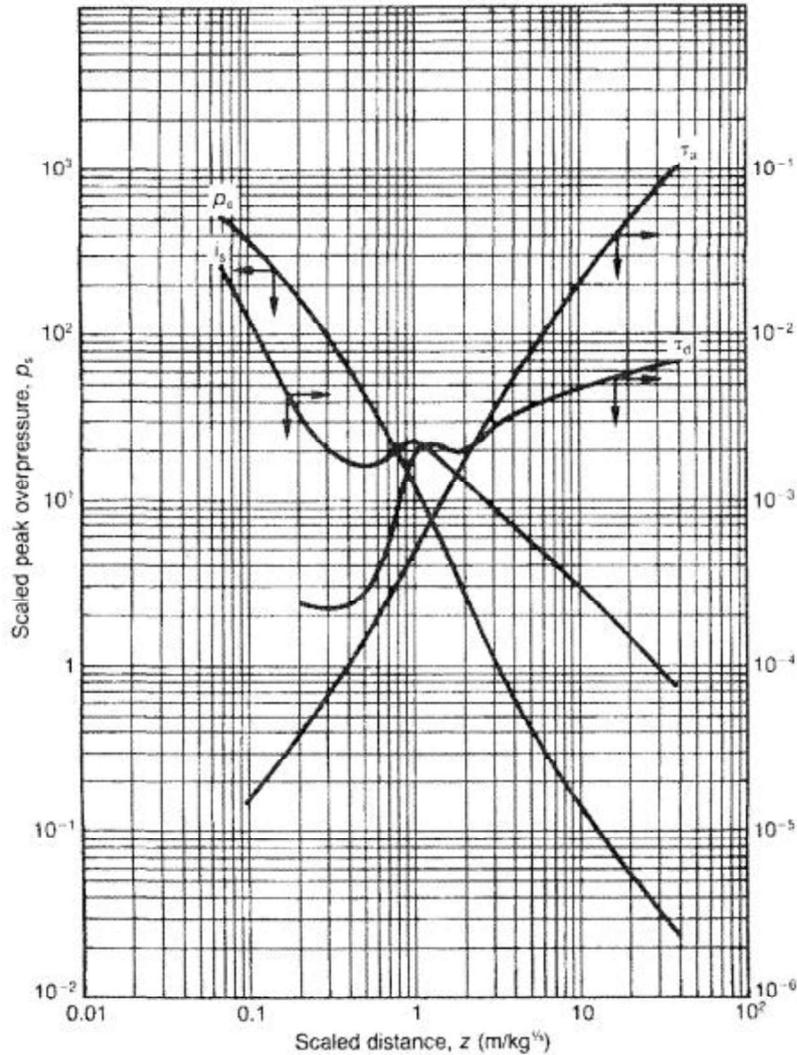
$$Z = \frac{R}{(W_{TNT})^{\frac{1}{3}}} \quad \text{Equation 7}$$

Where:

- Z Scaled distance (unit less)
- R Distance from the blast (m)
- W_{TNT} Equivalent weight of TNT (kg)

Appendix Figure 1 shows the scaled distances and pressures which is used to determine the impact distance at a specific overpressure.

11 ICI Australia Engineering Pty Ltd, "Hazard Analysis Course Notes," ICI Australia Engineering Pty Ltd, 1988.



Appendix Figure 1 – Scaled Parameter plots for TNT Explosions¹²

B5. Flash Fire Modelling

ICI Engineering developed a method for estimating the impact distance of a flash fire by linking the impact to the 70 kPa overpressure as if the vapour cloud exploded (noting that for a flash fire an explosion with overpressure does not occur)¹³. The methodology used to estimate overpressure as shown in Appendix B4 is used with the distance selected at 70 kPa to estimate the impact distance of the flash fire boundary.

B6. LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire

A hose rupture could occur and ignite which would result in a jet fire. To estimate the dimensions of a jet fire, the flow rate of the liquid from the hose must be estimated. The following data was input into Equation 1 to estimate the flow rate through the ruptured hose:

- C_d = Discharge coefficient (0.6 for irregular holes)
- $A = 50 \text{ mm hose} = \frac{\pi D^2}{4} = \frac{\pi \times 0.050^2}{4} = 0.002 \text{ m}^2$
- $\rho = 430 \text{ kg/m}^3$
- $\Delta P = 5 \text{ bar} = 500,000 \text{ Pa}$

¹² I. Cameron and R. Raman, Process Systems Risk Management, San Diego: Elsevier, 2005.

¹³ ICI Australia Engineering Pty Ltd, "Hazard Analysis Course Notes," ICI Australia Engineering Pty Ltd, 1988.

Substituting the information into Equation 1 gives a flow rate of 24.4 kg/s.

$$m = 0.6 \times 0.002 \times (2 \times 430 \times 500000)^{0.5} = 24.4 \frac{kg}{s}$$

Now, a liquid LNG release would be too fuel dense to ignite as it would be above the Upper Explosive Limit (UEL) so the only portion that could ignite would be the liquid that vapourises upon release. Assuming a flash fraction of 50%, the vapour flow rate from the release would be $0.5 \times 24.4 = 12.2$ kg/s.

Substituting the mass flow rate of vapour into Equation 3 gives a jet fire length of 31.8 m.

$$L = 9.1 \times 12.2^{0.5} = 31.8 \text{ m}$$

B7. LNG Release and Ignition Causing Flash Fire or Explosion

If an uncontrolled LNG release occurs it will result in a vapour cloud which may cause a flash fire or explosion if ignited. The tankers which fill the LNG tanks have a volume of 80,000 L or 34,400 kg using a density of 430 kg/m³. The LNG will be released with a portion flashing to the gaseous state with the unflashed fraction forming an LNG pool which will begin to evaporate further enhancing the cloud. The cold liquid LNG will evaporate relatively slowly due to the thermal mass of the liquid; hence, it has been assumed the vapour cloud will be composed of the 50% flashed fraction plus an additional 25% of the evaporated pool in the worst case once the cloud contacts an ignition source. Therefore, there is 75% of the released mass in the vapour cloud $0.75 \times 34,400 = 25,800$ kg.

The overpressure from the ignited vapour cloud has been estimated using Equation 6 and the following inputs:

- W = mass of fuel in the vapour cloud (25,800 kg)
- H_c = heat of combustion of the fuel (50,200 kJ/kg¹⁴)
- H_{TNT} = TNT blast energy (4,600 kJ/kg)¹⁵
- a = explosion efficiency (conservatively estimated to be 0.04 for hydrocarbons¹⁵)

$$W_{TNT} = 0.04 \left(\frac{25,800 \times 52,000}{4,600} \right) = 11,262 \text{ kg}$$

Using Equation 7 and the scaled parameters shown in Appendix Figure 1 the impact distances for the key overpressure values can be obtained (i.e. selecting the pressure and reading Z from the figure and using this in Equation 7 to obtain the impact distance).

Provided in Appendix Table 1 is a summary of the impact distance for each of the overpressures of interest.

Appendix Table 1 – Overpressure from an LNG Explosion

Overpressure (kPa)	Distance (m)
70	85
35	134
21	179
14	224
7	359

B8. LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Delivery Tanker and BLEVE

In the event of a jet fire and impingement on the delivery tanker there is potential for the LNG in the tanker to boil escalating to a BLEVE if intervention measures fail. It is assumed that impingement will occur at the 30% fill level

¹⁴ Engineering Toolbox, "Heat of Combustion," 2017. [Online]. Available: https://www.engineeringtoolbox.com/standard-heat-of-combustion-energy-content-d_1987.html . [Accessed 23 October 2019].

¹⁵ ICI Australia Engineering Pty Ltd, "Hazard Analysis Course Notes," ICI Australia Engineering Pty Ltd, 1988.

of the tanker and that the tanker holds a maximum 60,000 L. A BLEVE will only occur once the liquid level falls below the impingement level; hence, the maximum volume of LNG that could be involved in the BLEVE is 18,000 L. As noted, the density of LNG is 430 kg/m³; therefore, the mass of LNG involved in the BLEVE is 7,740 kg.

Inputting the mass into Equation 4 and Equation 5 yields an impact diameter of 119 m and a resonance time of 8 seconds.

$$D = 6.48 \times 9,144^{0.325} = 119 \text{ m}$$

$$t = 0.852 \times 9,144^{0.25} = 8 \text{ s}$$

B9. LNG Unloading Incident, Hose Rupture, LNG Release, Ignition and Jet Fire and Impact on LNG Tank and BLEVE

In the event of a jet fire and impingement on the delivery tanker there is potential for the LNG in the tanker to boil escalating to a BLEVE if intervention measures fail. It is assumed that impingement will occur at the 30% fill level of the tank which holds a maximum 80,000 L. A BLEVE will only occur once the liquid level falls below the impingement level; hence, the maximum volume of LNG that could be involved in the BLEVE is 24,000 L. As noted, the density of LNG is 430 kg/m³; therefore, the mass of LNG involved in the BLEVE is 10,320 kg.

Inputting the mass into Equation 4 and Equation 5 yields an impact diameter of 130.6 m and a resonance time of 8.6 seconds.

$$D = 6.48 \times 10,320^{0.325} = 130.6 \text{ m}$$

$$t = 0.852 \times 10,320^{0.25} = 8.6 \text{ s}$$

Appendix C – Annual Fire Safety Statement

Fire Safety Statement

Part 9 of the Environmental Planning and Assessment Regulation 2000



Please note:

Information to assist building owners to complete each section of the statement is provided on pages 3, 4 and 5.

Section 1: Type of statement

This is (mark applicable box): an annual fire safety statement (complete the declaration at Section 8 of this form)
 a supplementary fire safety statement (complete the declaration at Section 9 of this form)

Section 2: Description of the building or part of the building

This statement applies to: the whole building part of the building

Address

1154 GUNNEDAH ROAD, WESTDALE NSW 2340

Lot No. (if known)	DP/SP (if known)	Building name (if applicable)
100	1094741	BAIADA

Provide a brief description of the building or part (building use, number of storeys, construction type etc)

RENDERING PLANT WITH ASSOCIATED OFFICES AND BOILER HOUSE

Section 3: Name and address of the owner(s) of the building or part of the building

Name

BAIADA (TAMWORTH) PTY LTD

Address

1154 GUNNEDAH ROAD, TAMWORTH NSW 2340

Section 4: Fire safety measures

Fire safety measure	Minimum standard of performance	Date(s) assessed	CFSP *
AUOTMATIC FIRE DETECTION AND ALARM SYSTEMS	BCA 2013 CLAUSE E2.2, AS1670.1-2004, AS1670.4-2004	16/01/2020	RF
EMERGENCY LIGHTING	BCA 2013 CLAUSE E4.2 AND AS2293.1-2005	16/01/2020	RF
EXIT SIGNS	BCA 2013 CLAUSES E4.5, E4.6 & E4.8 & AS2293.1-2005	16/01/2020	RF
FIRE HOSE REEL SYSTEMS	BCA 2013 CLAUSE E1.4, AS2441-2005	16/01/2020	RF
FIRE HYDRANT SYSTEMS	BCA 2013 CLAUSE E1.3 AS2419.1-2005	16/01/2020	RF
PERIMETER VEHICLE ACCESS FOR EMERGENCY VEHICLES	BCA CLAUSE C2.3, C2.4	16/01/2020	RF
PORTABLE FIRE EXTINGUISHERS	BCA CLAUSE E1.6, AS2444-2001	16/01/2020	RF
GASEOUS FIRE EXTINGUISHING SYSTEMS	AS4214-2002	20/02/2020	RF

* See notes on page 4 about how to correctly identify a Competent Fire Safety Practitioner (CFSP).

Section 5: Inspection of fire exits and paths of travel to fire exits (Part 9 Division 7)

1154 GUNNEDAH ROAD, WESTDALE NSW 2340

Fire Safety Statement

Information to help building owners complete the Fire Safety Statement form



Section 8: Annual fire safety statement declaration

- The person completing this section is the person who is issuing the annual fire safety statement in accordance with clause 175 of the Regulation and is the same person as detailed in section 7. The person issuing the statement must identify if they are the owner or the owner's agent.
- In issuing the statement, the building owner or agent is not declaring that each fire safety measure meets the minimum standard of performance, but rather that each fire safety measure has been assessed, and was found by a CFSP to be capable of performing to that standard, as listed in section 4. In performing this function, the building owner or owner's agent could obtain documentation from each CFSP to verify that the standard of performance has been met, prior to completing the form and issuing the statement.
- The person who issues the statement by completing section 8 or section 9 of the form must not be a CFSP who was involved in the assessment of any of the fire safety measures, or inspection of the building for the purposes of the statement. This is to ensure that building owners, who are ultimately responsible, remain engaged in the fire safety statement process.

Section 9: Supplementary fire safety declaration

- The person completing this section is the person who is issuing the supplementary fire safety statement in accordance with clause 178 of the Regulation and is the same person as detailed in section 7. The person issuing the statement must identify if they are the owner or the owner's agent.
- The information provided above in relation to section 8 on what the owner is declaring also applies to a supplementary fire safety statement.

© State of New South Wales through Department of Planning, Industry and Environment 2019. The information contained in this publication is based on knowledge and understanding at the time of writing (November 2019). However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate officer of the Department of Planning, Industry and Environment or the user's independent adviser.

Fire Safety Statement



Information to help building owners complete the Fire Safety Statement form

- For supplementary fire safety statements, the table in section 4 must list each of the relevant critical fire safety measures that apply to the building or part and the relevant standard of performance. The date(s) on which these measures were assessed and inspected must be within 1 month prior to the date the supplementary fire safety statement is issued.
- The accreditation number of the CFSP who assessed a fire safety measure listed in section 4 must be nominated against the relevant measure(s) in the column titled 'CFSP'. If the CFSP is not required to be accredited, the name of the CFSP must be listed. Further information on the accreditation number is provided at section 6.

Section 5: Inspection of fire exits and paths of travel to fire exits (Part 9 Division 7)

- This section applies only to an annual fire safety statement.
- The purpose of this section is to identify that a CFSP has inspected the fire exits, fire safety notices, doors relating to fire exits and paths of travel to fire exits in the building or part of the building and found there has been no breach of Division 7 of Part 9 of the Regulation.
- The table in section 5 must detail the parts of the building that were inspected. The date(s) of the inspection(s) must be within the 3 months prior to the date the annual fire safety statement is issued.
- The accreditation number of the CFSP who inspected the whole or part of the building listed in section 5 must be nominated against the relevant part in the column titled 'CFSP'. If the CFSP is not required to be accredited, the name of the CFSP must be listed. Further information on the accreditation number is provided at section 6.

Section 6: Name and contact details of competent fire safety practitioners (CFSPs)

- A CFSP is a person engaged by the building owner(s) to undertake the assessment of fire safety measures in section 4 and the inspection of the buildings exit systems in section 5 (for an annual fire safety statement). Under clause 167A of the Regulation, the building owner(s) must form the opinion in writing that the person is a CFSP unless the person is required to be accredited (see below).
- The purpose of this section is to record the name and contact details of each CFSP who assessed a fire safety measure listed in section 4 or inspected the building or part of the building as specified in section 5.
- Each CFSP listed in the table must also sign the fire safety statement. Alternatively, a CFSP could provide the building owner or agent with a separate signed document to endorse the relevant part of the fire safety statement.
- An accreditation scheme for CFSPs is expected to start in January 2020.
- After the accreditation scheme begins, CFSPs will need to be selected from a register of recognised practitioners. The accreditation number of each relevant CFSP must be listed on the form. Until the accreditation scheme commences, or if a practitioner is of a class of persons that is not required to be accredited under clause 167A of the Regulation, there is no requirement to include an accreditation number on the form.
- Further information about the accreditation scheme can be found at www.fairtrading.nsw.gov.au.

Section 7: Name and contact details of the person issuing the statement

- The purpose of this section of the form is to detail the name and contact details of the person who is issuing the statement i.e. the person who completes and signs section 8 or section 9 of the form. This could be the owner(s) of the building or a nominated agent of the owner(s).
- Where a person issues the statement on behalf of an organisation (as the owner of the building), the name of the organisation and the title/position of the person must be provided. The person issuing the statement as a representative of the organisation must have the appropriate authority to do so.
- Where a person issues the statement on behalf of the owner(s) (as the owner's agent), this person must have the appropriate authority from the building owner(s) to undertake this function.
- In the case of a building with multiple owners, one owner may issue the statement, however each of the other owners must authorise the owner who issues the statement to act as their agent.
- The person issuing the statement must not be a CFSP who is listed in section 6. This recognises the different roles and responsibilities for building owner(s) and CFSPs in the fire safety statement process. This is important because the Regulation makes building owners responsible for declaring that fire safety measures have been assessed and the building inspected (for the purposes of section 5) by a CFSP. This ensures that building owners, who are ultimately responsible, remain engaged in the fire safety statement process.
- In addition, until an accreditation scheme commences and accredited practitioners are recognised as CFSPs under the Regulation, or if a practitioner is not required to be accredited, only the building owner(s) can determine that a person is competent to perform the fire safety assessment functions. The building owner(s) are also responsible for ensuring that essential fire safety measures are maintained in accordance with clause 182 of the Regulation. An agent cannot be made responsible for these requirements.

Fire Safety Statement

Information to help building owners complete the Fire Safety Statement form



Please note:

The following information has been provided to help building owners complete the fire safety statement template and does not comprise part of the form. The following pages do not have to be displayed in the building and need not be submitted to the local council and the Commissioner of Fire and Rescue NSW.

General

- Please print in CAPITAL LETTERS and complete all relevant sections in full.
- A reference to 'the Regulation' is a reference to the *Environmental Planning and Assessment Regulation 2000*.
- A 'CFSP' is a competent fire safety practitioner recognised under clause 167A of the Regulation.
- The completed fire safety statement form must be submitted to both the local council and Fire and Rescue NSW.
- Please contact your local council for further information about how to submit the completed statement.
- Completed statements can be emailed to Fire and Rescue NSW at afss@fire.nsw.gov.au. Alternately, statements can be posted to Fire and Rescue NSW, Locked Bag 12, Greenacre NSW 2190. For further information about this process, please visit the 'Lodge a fire safety statement' page at www.fire.nsw.gov.au.
- As soon as practicable after issuing the fire safety statement, the building owner must display a copy (together with a copy of the current fire safety schedule) in a prominent location within the building.
- Further information about building fire safety is available on the 'Fire safety' page of the Department's website at www.planning.nsw.gov.au.

Section 1: Type of statement

- Mark the applicable box to identify if the statement being issued is an annual fire safety statement or a supplementary fire safety statement.
- An annual fire safety statement is issued under clause 175 of the Regulation and relates to each essential fire safety measure that applies to the building.
- A supplementary fire safety statement is issued under clause 178 of the Regulation and relates to each critical fire safety measure that applies to the building.

Section 2: Description of the building or part of the building

- Mark the applicable box to identify whether the statement relates to the whole building or part of the building.
- In addition to the address and other property identifiers, a brief description of the building or part is to be provided. This could include the use(s) of the building (e.g. retail, offices, residential, assembly, carparking), number of storeys (above and/or below ground), construction type or other relevant information.
- If the description relates to part of a building, the location of the part should be included in the description.

Section 3: Name and address of the owner(s) of the building or part of the building

- Provide the name and address of each owner of the building or part of the building.
- The owner of the building or part of the building could include individuals, a company, or an owner's corporation.

Section 4: Fire safety measures

- The purpose of this section is to identify all of the fire safety measures that apply to a building or part of a building.
- Fire safety measures include both essential fire safety measures and critical fire safety measures. They include items such as portable fire extinguishers, fire hydrants, fire sprinklers, fire detection and alarm systems and lightweight construction.
- Essential fire safety measures are those fire safety measures which are assessed on an annual basis, while critical fire safety measures are those which are required to be assessed at more regular intervals (as detailed on the fire safety schedule). These terms are defined in clause 165 of the Regulation.
- For annual fire safety statements, the table in section 4 must list each of the essential fire safety measures that apply to the building or part of the building and the relevant standard of performance. The date(s) on which these measures were assessed and inspected must be within the 3 months prior to the date the annual fire safety statement is issued.

Fire Safety Statement

Information to help building owners complete the Fire Safety Statement form



Note:

A current fire safety schedule for the building must be attached to the statement in accordance with the Regulation.

Fire Safety Statement

Part 9 of the Environmental Planning and Assessment Regulation 2000



Part of the building inspected	Date(s) inspected	CFSP *

* See notes on page 4 about how to correctly identify a Competent Fire Safety Practitioner (CFSP).

Section 6: Name and contact details of competent fire safety practitioners (CFSPs)

Full name	Phone	Email	Accreditation No.*	Signature
RODNEY FENSBO	1300896499	rod@dynamicfire.com.au	IT44478	

* Where applicable – see notes on page 4 for further information.

Section 7: Name and contact details of the person issuing this statement *

Full name

Paul Grima

Organisation (if applicable)

Baiada Poultry Pty Ltd

Phone

0428 118 150

Title/Position (if applicable)

Site Manager - Oakburn

Email

Paul_Grima@baiada.com.au

* The person issuing the statement must not be a CFSP listed in section 6.

Section 8: Annual fire safety statement declaration

I, Click here

(insert full name) being the: owner owner's agent

declare that:

- a) each essential fire safety measure specified in this statement has been assessed by a competent fire safety practitioner and was found, when it was assessed, to be capable of performing:
 - i. in the case of an essential fire safety measure applicable by virtue of a fire safety schedule, to a standard no less than that specified in the schedule, or
 - ii. in the case of an essential fire safety measure applicable otherwise than by virtue of a fire safety schedule, to a standard no less than that to which the measure was originally designed and implemented, and
- b) the building has been inspected by a competent fire safety practitioner and was found, when it was inspected, to be in a condition that did not disclose any grounds for a prosecution under Division 7 of Part 9 of the Regulation.

Owner/Agent Signature

Paul Grima
Simon Camilleri

Date issued

30-03-2020

Section 9: Supplementary fire safety statement declaration

I, Click here

(insert full name) being the: owner owner's agent

declare that each critical fire safety measure specified in the statement has been assessed by a competent fire safety practitioner and was found, when it was assessed, to be capable of performing to at least the standard required by the current fire safety schedule for the building for which this statement is issued.

Owner/Agent Signature

Date issued

15 October 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) – HAZARDS REQUEST FOR ADVICE

I refer to correspondence from Department of Planning, Industry and Environment (DPIE) dated 7 October 2020 and email from NSW Fire and Rescue dated 7 October 2020 regarding matters identified by those agencies relating to the hazards. A response is provided below to each of the matters raised.

Please note that, in response to this submissions and in the interest of finalising the assessment in a timely manner, the Applicant has decided to remove proposed Child Care Facility from the project. Further, to our discussions with Mr Nicholas Hon from the DPIE on 13 October 2020, we understand that the removal of the Child Care Centre removes the requirement for further quantitative assessment against the Department’s HIPAP 4 land use safety risk criteria.

MATTERS RAISED	APPLICANT’S RESPONSE
<i>Department of Planning, Industry and Environment</i>	
<p>1. PHA – A</p> <p>Table 3 indicates storage of 10,000 Litres (L) of “oxygen gas”. Although oxygen is generally understood to be dangerous goods (DG) Class 2.2, it is also understood to be classified with subsidiary risk 5.1. As such, the preliminary risk screening must also compare the storage quantity of oxygen against the 5 tonne threshold quantity for DG Class 5.1, specified in Table 3 of the Department’s Applying SEPP 33. Notwithstanding, the development has already determined to be potentially hazardous under SEPP on the basis of other DG exceeding the relevant thresholds in Applying SEPP 33.</p> <p>However, in noting the 10,000 L oxygen storage in context of overall site operations, it is likely that the on-site storage and handling of oxygen may involve the use of a bulk storage tank capable of storing at least 11 tonnes of liquid oxygen (LOX). The PHA did not specify the reason for using oxygen on-site nor identify the hazards and relevant safeguards associated with the oxygen gas or LOX system. Moreover, PHA – B Figure 5.1 indicates that 14 kPa overpressure overlaps the 10,000 L oxygen storage area indicated in PHA – A Figure 4. An overpressure</p>	<p>The LOX is necessary the Controlled Atmosphere Stunning (CAS) process during which birds are exposed to combinations of Oxygen and Carbon Dioxide so that a state of unconscious is achieved prior to slaughter.</p> <p>The CAS process aligns with the best practice animal welfare considerations.</p> <p>Liquid Oxygen (LOX) is stored in a 10,000L Tank which will be installed, operated and managed in accordance with the relevant Australian Standards.</p> <p>As noted above, the proponent has decided to remove the Child Care Centre from the proposal and such, further quantitative assessment against the Department’s HIPAP 4 land use safety risk criteria is no longer required.</p>



MATTERS RAISED	APPLICANT'S RESPONSE
<p>of 14 kPa may cause sufficient impact to plant and may result in accident propagation.</p> <p>Please provide:</p> <ol style="list-style-type: none"> clarification on whether the development will involve the use of LOX and if so, clarify the storage arrangements and maximum storage quantity of LOX reasons for using oxygen gas or LOX on-site, given that this material is generally not associated with poultry related facilities. If oxygen gas is utilised for boilers, please provide the flame temperatures for these boilers and reasons why such flame temperatures are necessary for the development in view of item 1b above and in considering Section 2.2a of the Department's HIPAP 4 (i.e. all 'avoidable' risk should be avoided), verify whether the use of oxygen gas or LOX on-site is necessary when alternatives are considered. if item 1c above is verified, identify the hazards and relevant safeguards associated with the oxygen gas or LOX system, including and not limited to verification that the storage and handling of these materials would be able to comply with all relevant Australian Standards in view of item 1d above, analyse the consequences and risks associated with oxygen gas or LOX, including and not limited to incidents leading to and from accident propagation in view of item 1e above, assess that the cumulative risk from the development, inclusive of the oxygen gas or LOX system, can comply with the Department's HIPAP 4 land use safety risk criteria, including the childcare facility (HIPAP 4 sensitive land use) as part of the development. 	
<p>2. PHA – A</p> <p>Section 4.5.3 and Table 6 identified the hazards and relevant safeguards associated with the storage and use of ~7 tonnes of anhydrous ammonia as part of refrigeration systems for this development, along with specifying that the refrigeration system will be designed and operated in accordance with AS 5149. The risk assessment in PHA – A Table 6 adopted a qualitative approach, generally aligning with a Level 1 Qualitative Analysis as per the Department's Multi-level Risk Assessment (MLRA). This approach would generally be appropriate for this storage quantity if applied in certain settings such as an industrial</p>	<p>Further, to our discussions with Mr Nicholas Hon from the DPIE on 13 October 2020, we understand that the removal of the Child Care Centre removes the requirement for further quantitative assessment against the Department's HIPAP 4 land use safety risk criteria.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p>facility in remote locations, away from residential, sensitive and populated land uses.</p> <p>However, in noting that the development includes a childcare facility, the Department considers at least a Level 2 Semi-quantitative Analysis as per MLRA to be the appropriate approach to assess the risk exposure to the childcare facility (HIPAP 4 sensitive land use) against the Department's HIPAP 4 land use safety criteria. This semi-quantitative approach was applied in PHA – B to analyse and assess the risks involving the storage and use of LNG on-site.</p> <p>As such, please revise the PHA to include a Level 2 Semi-quantitative Analysis to analyse the risks involving the storage and use of anhydrous ammonia on-site to align with the similar approach already adopted to analyse LNG risks. In revising the PHA, please ensure the cumulative risk exposure (i.e. sum of LNG, anhydrous ammonia and oxygen gas, LOX, accident propagation-related risks) are carefully assessed against all relevant quantitative risk criteria specified in the Department's HIPAP 4 (i.e. fatality, injury, accident propagation) especially at the childcare facility.</p>	
<p>3. PHA – B</p> <p>PHA – B as a whole focuses only on the risks associated with the storage and use of LNG as part of the development. Having reviewed PHA – B, PHA – B appropriately identified the LNG hazards, identified suitable LNG scenarios and estimated the extent of the consequences from these scenarios. In estimating the consequences, PHA – B verified that radiative heat impacts from LNG scenarios will not reach off-site nor the childcare facility, but verified that explosion overpressure impacts from LNG vapour cloud explosion (VCE) extends beyond the development boundary, inclusive of the childcare facility (PHA – B Table 6-1 indicating explosion overpressures of 13 kPa at the site boundary and 9 kPa at the childcare centre). From these results, it is understood that the impacts from LNG VCE will largely be contained within the development boundary and significant impacts beyond the development boundary is considered not likely.</p> <p>However, the Department does not agree with the use of probit relations to reduce the mortality of 9 kPa explosion overpressure impacts at the childcare centre to 0% when Section 2.4.2.2 of the Department's HIPAP 4 clearly states "7 kPa be the appropriate level above which significant effects to people and property damage may occur". Although the Department acknowledges that the 7 kPa injury criteria is generally conservative, the Department confirms that this injury criteria remains appropriately conservative for PHAs, especially when</p>	<p>Further, to our discussions with Mr Nicholas Hon from the DPIE on 13 October 2020, we understand that the removal of the Child Care Centre removes the requirement for further quantitative assessment against the Department's HIPAP 4 land use safety risk criteria.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p>blast fragmentations are generally not included in PHAs due to a high degree of uncertainties associated with blast fragmentation analysis.</p> <p>Please revise:</p> <ol style="list-style-type: none"> the location of the LNG tanks or childcare facility in an appropriate manner to reduce the potential exposure at the childcare facility to be below 7 kPa explosion overpressure with due consideration of off-site risks; or revise the LNG VCE risk analysis to show that the cumulative injury risk (refer to item 2 above) at the childcare centre do not exceed 50 pmpy risk criteria specified in HIPAP 4. In performing this revision, the UK HSE's <i>Failure Rate and Event Data for use within Risk Assessments (06/11/17)</i> [https://www.hse.gov.uk/landuseplanning/failure-rates.pdf] should be compared. 	
<p>4. PHA – B</p> <p>Noting from PHA – B Figure 5-1 that the 14 kPa covers a significant portion of the development, please verify:</p> <ol style="list-style-type: none"> that accident propagation risks which may involve anhydrous ammonia, oxygen gas or LOX have been appropriately addressed as part of the PHA a cumulative risk assessment has been performed as the sum of the risks associated with anhydrous ammonia, LNG, oxygen gas and LOX. 	<p>Further, to our discussions with Mr Nicholas Hon from the DPIE on 13 October 2020, we understand that the removal of the Child Care Centre removes the requirement for further quantitative assessment against the Department's HIPAP 4 land use safety risk criteria.</p>
<p>Waste Management</p>	
<p>FRNSW have reviewed the documentation that was provided in support of the development and provide the following comments and recommendations for consideration:</p>	
<ul style="list-style-type: none"> It is noted that the quantity of LNG in storage at the site is 240,000 Lt. Given the expansion ratio of LNG (600:1) a loss of containment of would result in approx. 144,000,000 Lt of natural gas. Has the gas leak and subsequent fire modelling been conducted on this volume of gas? If so, please provide evidence of this assessment. 	<p>Lote Consulting and the gas supplier (Elgas) have provided the following response to this item.</p> <p>A leak resulting in all LNG vessels releasing, or even the full volume of one LNG vessel releasing are considered incredibly unlikely. Minor leaks may occur around valves, fitting, gaskets, seals, etc. which would be incredibly small and would disperse while larger failures (i.e. pipe rupture, vessel rupture) would be unlikely to occur. The typical extent of these minor leaks is identified through the hazardous area drawings, and the vessel compound encompasses the identified hazardous areas.</p> <p>Typical protection systems for such installations involve gas detection, gas odourisation and isolation of valves to prevent sustained releases from occurring which may result in large vapour clouds. Other typical protection systems are poly-flow tubing</p>

MATTERS RAISED	APPLICANT'S RESPONSE
	<p>which is designed to melt should a fire occur which also isolates safety valves. Isolation valves will not prevent against vessel rupture.</p> <p>The BOC LNG vessels also have 24/7 remote monitoring by the Elgas Port Botany control room and regular safety walk arounds by LNG delivery drivers and Baiada personnel to identify any abnormalities.</p> <p>Furthermore, pressure vessels undergo regular and rigorous pressure testing per AS 1210. Hence, the failure of the vessel shell is considered incredibly unlikely. Subsequently, the full release of a 144,000,000 L of natural gas is not considered a credible scenario and has not been analysed further.</p>
<ul style="list-style-type: none"> The development notes a childcare centre catering for up to 85 children. This would place a sensitive receiver in close proximity to potential hazards. This could require significant emergency services resource commitment in the event of a loss of containment or fire event at the facility. 	<p>The childcare facility is no longer proposed as part of the development.</p>
<ul style="list-style-type: none"> Has the potential for an onsite incident to impact Tamworth Airport (180m to the south of proposed facility) been considered? Emergency response guidelines specify an initial evacuation distance of 800m for a large spill, and if a rail car or tanker truck is involved in fire it requires isolation for up to 1600m in all directions. Please provide evidence of this assessment. 	<p>Whilst the southern end of the Tamworth Airport runway is located 180m from the site boundary, the terminal building (i.e. where people may be congregating) is located approximately 2.25km away from the LNG Tanks. As such, there is minimal risk of an on-site incident impacting on the airport operations.</p> <p>It is noted that Tamworth Regional Council (as the Airport operator) and CASA were consulted during the preparation of the EIS and have undertaken detailed assessment of the project. It is understood that responses from these agencies have been provided to DPIE.</p>
<ul style="list-style-type: none"> The document states that a waste water treatment facility is planned to be included in the development. The dangerous goods to be utilised as part of the waste water facility, are they included in the proposed dangerous goods manifest? 	<p>Yes. The Advanced Waste Water Treatment facility is part of the project and is covered by the PHA. As noted in the PHA, the only dangerous good stored in the Advanced Water Treatment facility is 15,000L of ferric sulphate (Hazardous Class 8 III).</p>
<ul style="list-style-type: none"> The Lote Consulting risk analysis states LNG tanker BLEVE over pressures would not impact the childcare centre or off site locations. Has consideration been given as to whether the overpressure would potentially compromise the onsite LNG storage vessels? Can the LNG transfer location be remote from the bulk vessels? 	<p>Lote Consulting and the gas supplier (Elgas) have provided the following response to this item.</p> <p>A BLEVE typically doesn't have overpressure potential from combustion of the vapours. However, there is an overpressure from the rupture of the vessel. This is typically <10 kPa which would be insufficient to result in damage to the LNG vessels.</p> <p>Furthermore, the designs associated with gas storage are very rigorous and reliable as per the requirements of AS/NZE 1596:2014. Therefore, such incidents are not expected with any considerable frequency (i.e. fault tree analysis on similar systems</p>

MATTERS RAISED	APPLICANT'S RESPONSE
	<p>results in failure frequencies in the order of 10^{-8} to 10^{-10} p.a. which are several orders of magnitude lower than the criteria contained within HIPAP No. 4).</p> <p>The LNG installation has been designed in accordance with <i>AS3961 The storage and handling of liquified natural gas</i> which states a minimum separation distance of 4.5m between a road tanker and an LNG vessel. A larger separation distance is not recommended due to the loss of LNG through vaporisation during transfer.</p>
<ul style="list-style-type: none"> • It is recommended that the emergency response plan (ERP) be updated for the site in accordance with AS 3745–2010 Planning for emergencies in facilities. An external consultant should be engaged to provide specialist advice and services in relation fire safety planning and developing an emergency plan. <ul style="list-style-type: none"> ○ That the ERP specifically addresses foreseeable on-site and off-site fire events and other emergency incidents (such as fires involving dangerous goods or bushfires in the immediate vicinity) or potential hazmat incidents. ○ That the ERP details the appropriate risk control measures that would need to be implemented to safely mitigate potential risks to the health and safety of firefighters and other first responders (including electrical hazards). ○ Such measures will include the level of personal protective clothing required to be worn, the minimum level of respiratory protection required, decontamination procedures to be instigated and minimum evacuation zone distances. ○ Other risk control measures that may need to be implemented in a fire emergency (due to any unique hazards specific to the site) should also be included in the ERP. ○ That two copies of the ERP (detailed in recommendation above) be stored in a prominent 'Emergency Information Cabinet' located in a position directly adjacent to the site's main entry point/s. ○ Once constructed and prior to operation, that the operator of the facility contacts the relevant local 	<p>An Emergency Response Plan (ERP) will be prepared for the project and can be conditioned accordingly.</p>

MATTERS RAISED	APPLICANT'S RESPONSE
<p>emergency management committee (LEMC). The LEMC is a committee established by Section 28 of the State Emergency and Rescue Management Act 1989. LEMCs are required to be established so that emergency services organisations and other government and non-government agencies can proactively develop comprehensive inter agency local emergency procedures for significant hazardous sites within their local government area. The contact details of members of the LEMC can be obtained from the relevant local council. It is recommended that an emergency services information package (ESIP) be developed for the site and access to this document be provided to emergency service organisations.</p> <p>https://www.fire.nsw.gov.au/gallery/files/pdf/guidelines/guidelines_ESIP_and_TFP.pdf</p>	

I trust this information provides a full response to the matters raised by DPI and FRNSW. 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	15 October 2020	FINAL	Nicole Boulton	 David Ireland