PSA Consulting Pty Ltd ABN 83 109 836 197
T +61 7 3220 0288 F +61 7 3220 0388 W psaconsult.com.au
O Brisbane (Head Office) L11 / 270 Adelaide Street, Brisbane Qld 4000
P PO Box 10824, Adelaide Street, Brisbane Qld 4000

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
Department of Planning, Industry and Environment	
1. PHA – A 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. 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	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. The CAS process aligns with the best practice animal welfare considerations. Liquid Oxygen (LOX) is stored in a 10,000L Tank which will be installed, operated and managed in accordance with the relevant Australian Standards. 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.

MATTERS RAISED	APPLICANT'S RESPONSE
of 14 kPa may cause sufficient impact to plant and may result in accident propagation. Please provide: a. clarification on whether the development will involve the use of LOX and if so, clarify the storage arrangements and maximum storage quantity of LOX b. 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 c. 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. d. 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 e. 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 f. 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.	
2. PHA – A 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	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
facility in remote locations, away from residential, sensitive and populated land uses. 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. 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.	
3. PHA – B 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. 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	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
blast fragmentations are generally not included in PHAs due to a high degree of uncertainties associated with blast fragmentation analysis. Please revise: a. 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 b. 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 *Failure Rate and Event Data for use within Risk Assessments (06/11/17)* [https://www.hse.gov.uk/landuseplanning/failure-rates.pdf] should be compared.	
4. PHA – B Noting from PHA – B Figure 5-1 that the 14 kPa covers a significant portion of the development, please verify: a. that accident propagation risks which may involve anhydrous ammonia, oxygen gas or LOX have been appropriately addressed as part of the PHA b. a cumulative risk assessment has been performed as the sum of the risks associated with anhydrous ammonia, LNG, oxygen gas and LOX.	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.
Waste Management	
FRNSW have reviewed the documentation that was provided in support of the development and provide the following comments and recommendations for consideration:	
• 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.	Lote Consulting and the gas supplier (Elgas) have provided the following response to this item. 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. 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

MATTERS RAISED	APPLICANT'S RESPONSE
	which is designed to melt should a fire occur which also isolates safety valves. Isolation valves will not prevent against vessel rupture. 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. 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.
• 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.	The childcare facility is no longer proposed as part of the development.
• 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.	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. 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.
• 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?	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).
• 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?	Lote Consulting and the gas supplier (Elgas) have provided the following response to this item. 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. 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

MATTERS RAISED	APPLICANT'S RESPONSE
	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). The LNG installation has been designed in accordance with *AS3961 The storage and handling of liquified natural gas* 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.
• 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. o 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. o 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). o 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. o 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. o 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. o Once constructed and prior to operation, that the operator of the facility contacts the relevant local	An Emergency Response Plan (ERP) will be prepared for the project and can be conditioned accordingly.

MATTERS RAISED	APPLICANT'S RESPONSE
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. https://www.fire.nsw.gov.au/gallery/files/pdf/guidelines/guidelines_ESIP_and_TFP.pdf	

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