HAZKEM

DANGEROUS GOODS CONSULTING

SEPP 33

RISK SCREENING DOCUMENTATION AND PRELIMINARY HAZARD ANALYSIS

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WOODLANDS RIDGE POULTRY PTY LTD
52 Sinclair Street
GOULBURN NSW

PURPOSE AND SCOPE OF THIS DOCUMENT

For dangerous goods installation designs where there is proposed storages above minor quantities, an investigation process must be followed in order to assess whether or not a proposal is suitable for a particular site or not. Such sites should be deemed "potentially hazardous" until a detailed risk assessment determines otherwise. The process flow chart is detailed in appendix 1.

NSW State Environmental Planning Policy 33[1], (SEPP 33) is a document published by the NSW Department of Planning which provides guidelines for local government and developers for ensuring that the safety and pollution impacts of an industrial proposal are addressed at an early stage of the development application process. Through this document an assessment procedure is followed which links the permissibility of a proposal to its safety performance. SEPP 33 ensures that only those industrial proposals which are suitably located, and able to demonstrate that they can be built and operated with an adequate level of safety, can proceed[2].

As detailed in SEPP 33 a "*hazardous industry*" is one which poses a significant risk when all locational, technical, operational and organizational safeguards are included.

A "*potentially hazardous industry*" is one which, when all safeguards are operating, imposes a risk level which is significantly lower.

SEPP 33 also incorporates a screening process which will determine whether or not a site is potentially hazardous. If deemed potentially hazardous, a preliminary hazard analysis is required.

Certain activities may involve handling, storing or processing a range of substances which in the absence of locational, technical or operational controls may create an off-site risk or offence to people, property or the environment. Such activities would be defined as potentially hazardous or potentially offensive. SEPP 33 also provides guidelines to assist councils and proponents to establish whether a development proposal would fit into such definitions and hence, come under the provisions of the policy.

The purpose of a PHA is to gain a better understanding of the risks and hazards associated with the site and to provide a reasonable basis for an informed judgment to be made on the acceptability of the site for the proposed development[3]. The PHA will outline in detail possible risks and hazards associated with this site. This will assist council in reaching an informed decision for the proposal.

It is important to note also that this investigation has been carried out by a suitably qualified person who understands the properties of the dangerous goods stored on site and the possible impact they may have on equipment and structures located on and off site. Under state legislation a system must be designed by a suitably qualified person who is experienced in this type of work[4].

REFERENCE AND ASSISTANCE DOCUMENTS

This document has been compiled with guidance from:

- Hazardous Industry Planning Advisory Paper No 4 'Risk Criteria for Land Use Safety Planning'
- Hazardous Industry Planning Advisory Paper No 6. 'Guidelines for Hazard Analysis"
- Hazardous and Offensive Development Application Guideline 'Applying SEPP 33'
- NSW Dept of Planning assessment guidelines "Multi Level Risk Assessment".

SITE DESCRIPTION

LOCATION

The site is a proposed processing facility for Woodland Ridge Poultry Pty Ltd located at 52 Sinclair Street, Goulburn and formally known as Lot 22 DP 750050. The site is located within the Local Government Area of Goulburn Mulwaree and allocated with a zoning of B6 Enterprise Corridor, RU6 Transition and E3 Environmental Management under the LEP 2009.

The site itself is located to the south west of the Sinclair and Common Street intersection. The surrounding properties consist of commercial, industrial and low density residential properties.

PROPOSAL

The site incorporates multiple facilities, with the predominant purpose being an abattoir for poultry. The proposed development of this site incorporates a corporate office, Cold Storage Warehouse, Processing Facility Warehouse, By-Product Processing Warehouse, Live Bird Shed, Truck Maintenance Facility and a child care facility as well as extensive car parking. The overall site is approx. 82,600 square meters in size which can be divided into two predominant areas being the processing area and non processing area. The processing area at the back of the site totals approx 43,750m^2 which requires authorised access whilst the non processing area and buildings located at the front of site total approx 38,850m^2.

To enable the effective running of the abattoir facility there are several storages of Hazardous Chemicals required. The site proposes the need for LP Gas, Chlorine, Anhydrous Ammonia and Carbon Dioxide all of which are to be stored in bulk tanks located at the back of the main processing facility building.

HAZARDOUS MATERIALS

As defined within the Department of Plannings Applying SEPP 33 documentation the Risk Screening process is based on the notion of Hazardous Materials being present on site. As outlined within this document Hazardous Materials that are covered and to be assessed under the SEPP 33 documentation must be classified as a Dangerous Good

with by the Australian Code for Transportation of Dangerous Goods by Road and Rail (Dangerous Goods Code)" (otherwise known as the ADG Code).

The proposed hazardous material storages for this site, based on their classification under the ADG Code are as follows:

Product	UN	Class and PG	Quantity
LP Gas	1075	Class 2.1	24,000 litres
Chlorine	1017	Class 2.3 Sub Risk 5.1, Sub Risk 8	5,000 litres
Anhydrous Ammonia	1005	Class 2.3 Sub Risk 8	10,000 litres
Carbon Dioxide	1013	Class 2.2	25,000 litres

DIsclaimer: This assessment covers the bulk storages listed above based on the information provided. This assessment does not incorporate any additional storages that have not been listed.

The above storages that are incorporated in this proposal have been chosen to enable the effective and efficient operations of the abattoir and associated processing facility. The dangerous goods chosen are done so to be in line with industry standards to enable the processes to occur whilst using dangerous goods of the lowest risk possible via substitution from an OH & S perspective.

ASSESSING POTENTIALLY OFFENSIVE INDUSTRY

DESCRIPTION

The site as a proposed poultry abattoir for Woodland Ridge Poultry Pty Ltd is deemed to be a potentially offensive industry. The nature of the site with the live poultry, the slaughter/processing of poultry and the waste handling required is assessed as being a potentially offensive industry.

CONCLUSION

A site can be deemed not an offensive industry if it falls within a licensable activity of the Department of Environment Climate Change and Water (DECCW). This proposal falls within a Schedule 1 activity classification of the POEO Act under "Livestock processing activity". This site, due to its nature will be subject to stringent Licences under the Protection of the Environment Operations Act 1997 (POEO Act). As such this site will be required to maintain all licences relevant to this activity and obtain all approvals applicable under the POEO Act.

Based on the ability to comply with the DECCW under the POEO Act and its licence requirements, it is determined that the proposed activity will not be deemed offensive.

ASSESSING POTENTIALLY HAZARDOUS INDUSTRY - SEPP 33 RISK SCREENING

PROPOSAL SUMMARY

The below is a summary of the storages to be assessed under this Risk Screening process

Product	Storage Type	UN	Class and PG	Quantity
LP Gas	Aboveground Tank	1075	Class 2.1	24,000 litres
Chlorine	Aboveground Tank	1017	Class 2.3 Sub Risk 5.1, Sub Risk 8	5,000 litres
Anhydrous Ammonia	Aboveground Tank	1005	Class 2.3 Sub Risk 8	10,000 litres
Carbon Dioxide	Aboveground Tank	1013	Class 2.2	25,000 litres

CALCULATIONS

The screening method set out in Applying SEPP 33 (Department of Planning, 2011) provides the first step in the analysis. The screening method is based on broad estimates of the possible off-site effects or consequences from hazardous materials present on site, taking into account locational characteristics.

If the quantity/distance is less than the screening threshold, then no further analysis is necessary. The safety management regime in this case, relies on observance of the requirements of engineering codes and standards. If the quantities/distances exceed the screening threshold, further analysis is necessary.

Table 1 outlines the Screening Methods to be used for the relevant classes stored and the minimum applicable quantities. It should be noted that Class 2.2 is excluded from the risk screening process and not covered by this assessment. In this instance based on the proposed storages, the following classes and sub risks are applicable:

Summary of Table 1 in part:

Class	Method to Use/Minimum Quantity
LPG (aboveground)	table 3
2.3	table 3
5	table 3
8	table 3

Summary of Table 3 in part:

Class	Screening Threshold	Description
LPG (aboveground)	10 tonne or 16m3	If stored aboveground
2.3	5 tonne	Anhydrous Ammonia, kept in same manner as for liquified flammable gases and not kept for sale
	1 tonne	Chlorine and sulfur dioxide stored as liquified gas in containers <100kg
	2.5 tonne	Chlorine and sulfur dioxide stored as liquified gas in containers >100kg
	100 kg	Liquified gas kept in or on premises
	100 kg	other poisonous gases
5.1	5 tonne	any other class 5.1
8	PG II	25 tonne
	PG III	50 tonne

Application of Table 3:

Product	Class	Screening Threshold (Description)		Outcome
LP Gas	Class 2.1	10 tonne or 16m3 (If stored aboveground)	24,000 litres	Threshold Exceeded
Chlorine	Class 2.3	2.5 tonne (Chlorine and sulfur dioxide stored as liquified gas in containers >100kg)	5,000 litres	Threshold Exceeded
	Sub Risk 5.1	5 tonne	5,000 litres	Threshold not exceeded
	Sub Risk 8	50 tonne (Packaging Group III)	5,000 litres	Threshold not exceeded
Anhydrous Ammonia	Class 2.3	5 tonne (Anhydrous Ammonia, kept in same manner as for liquified flammable gases and not kept for sale)	10,000 litres	Threshold Exceeded
	Sub Risk 8	50 tonne (Packaging Group III)	10,000 litres	Threshold not exceeded

As can be seen by utilising Table 3, some of the threshold quantities relevant to the proposed storages have been exceeded. As such further analysis with regards to LP Gas storage, the Chlorine storage and the Anhydrous Ammonia storage associated with the development is required due to being potentially hazardous.

TRANSPORT SCREENING THRESHOLD

SEPP 33 screening also requires a study of the transporting/delivery frequencies, for the site as outlined in table 2 (below). It is envisaged that deliveries to site, for the varying classes of dangerous goods will be well within the allowable thresholds as itemised below.

Reference from Table 2: Transport Screening Thresholds (in part)

Product	Class	Screening Threshold (Annual)	Screening Threshold (Peak Weekly)
LP Gas	Class 2.1	>500	>30
Chlorine	Class 2.3	>100	>6
	Sub Risk 5.1	>500	>30
	Sub Risk 8	>500	>30
Anhydrous Ammonia	Class 2.3	>100	>6
	Sub Risk 8	>500	>30

It is not anticipated that any of the above transport thresholds will be exceeded for any class of storage. It is envisaged that there may be approximately 1 or 2 total transport movements a month (12 to 24 movements a year) for each of the LP Gas and Chlorine installations. A system such as Ammonia is not envisaged to require any regular/consistent product delivers once it is commissioned with generally the need for product deliveries required during significant system maintenance.

In this case, as the numbers of expected deliveries for the varying classes of storage being well below the thresholds, there are no requirement to do further analysis in the form of a PHA based on the transport screening thresholds.

CONCLUSION

It has been determined via assessment of this proposal under the NSW State Environmental Planning Policy 33 (SEPP 33) that the site has been deemed "potentially hazardous". The screening process has determined that all transport screening thresholds are complied with and in relation to the transport of dangerous goods there is no further assessment required. The storage thresholds associated with the LP Gas, Chlorine and Ammonia storages exceed the allowable thresholds and as such require further analysis in the form of a Preliminary Hazard Analysis

PRELIMINARY HAZARD ANALYSIS

INTRODUCTION

As previously detailed, SEPP 33 screening has deemed this proposal to be "Potentially Hazardous or Offensive" and hence a Preliminary Hazard Analysis (PHA) will be required to determine if this proposal is acceptable for this site.

This preliminary hazard analysis (PHA) covers the following subsections in accordance with established procedures and HIPAP No. 6:

Hazard Identification
Possible outcomes
Estimation of likelihood of hazardous events/consequences*
Control measures

* with respect to risk ranking method detailed in Appendix 2

The following types and quantities of materials are proposed to be stored on site requiring further assessment under the Preliminary Hazard Analysis.

Product	Storage Type	UN	Class and PG	Quantity
LP Gas	Aboveground Tank	1075	Class 2.1	24,000 litres
Chlorine	Aboveground Tank	1017	Class 2.3 Sub Risk 5.1, Sub Risk 8	5,000 litres
Anhydrous Ammonia	Aboveground Tank	1005	Class 2.3 Sub Risk 8	10,000 litres
Carbon Dioxide	Aboveground Tank	1013	Class 2.2	25,000 litres

Note: The storage of Carbon Dioxide was determined under the SEPP 33 Risk Screening as being exempt from this assessment as Class 2.2's as a whole are not deemed Potentially Hazardous.

This identification process has been examined and each possible event versus possible consequences and proposed safeguards to prevent or minimise these events.

A risk assessment has also been prepared as per NSW Department of Planning "Multi Level Risk Assessment" doc May 2011 and detailed elsewhere in this report.

HAZARD IDENTIFICATION

Note. The risk ranking referred to here is as per risk ranking method detailed in appendix 2.

LP Gas

The LP Gas system at this site has been designed with the intention of minimising all unnecessary risks associated with the storage and handling for this type of dangerous goods, being a flammable gas. It has been designed in full compliance with AS/NZS 1596-2014 'The storage and handling of LP Gas.

Risks and control measures associated with the LP Gas system:

Specific risks and control measures associated with the LP Gas system:

- Overfill of tank
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: The tank installation will be located outdoors in a well ventilated area. The tank will be remote filled with the fixed liquid level gauge readily accessible at the fill point. The contents gauge will be visible by inspection through two access covers over the tanks. Fire fighting equipment will be within close proximity to the delivery driver whilst filling the tanks.

- Hose Trip Hazard
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D5
  Control Measure: As a remote filled tank, the tanker will park adjacent to the fill point in a nominated tanker parking area. The hose used will be a small diameter pressure hose and is generally able to lie flat on the ground. The tanker driver is to use warning signage during deliveries.

- Fire at fillpoint
  Risk: Yes
  Possible Outcome: Fire
  Ranking: D4
  Control Measure: At least a single powder type extinguisher is to be available near the fill points during product delivery (normally carried by the tanker) and at least one hose reel in the vicinity of the tank storage area. The fill points will be fitted with a manual shutoff valve and a back check fill valve to stop any outward flow. The tanker will be fitted with an emergency stop system in order to cease pumping quickly. The driver is to be in attendance at all times.

- Fire on site

  Risk: Yes
  Possible Outcome: Fire
  Ranking: D3
  Control Measure: As a site storing flammable gas, fire protection in the form of a hose reel and fire extinguishers are to be located on site in strategic places in full compliance with AS/NZS 1596. An emergency shut down system is to be installed on site to enable the LP Gas installations to be shut down in an emergency.

- Leak/rupture in pipework

  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: As an aboveground installation some pipework will be required to be located aboveground however it will be designed to be the shortest length possible and located behind Armco guardrail to be protected from accidental impact. Regular pressure tests are to be performed to ensure tightness. Stock reconciliation is to be carried out regularly and would highlight any leaks. The pipework run through the site is to be a continuous copper or polypropylene line.

- Ruptured Fill hose

  Risk: Yes
  Possible Outcome: Leak
  Ranking: E4
  Control Measure: Extremely unlikely event. The tank hoses are to be pressure tested and/or replaced regularly. The tanker will be fitted with an emergency stop system.

- Equipment wear and tear

  Risk: Yes
  Possible Outcome: Leak
  Ranking: D3
  Control Measure: Regular maintenance checks are to be carried out on the tank and its equipment to maintain that everything is in a safe and working condition. This is to occur at least annually. Delivery drivers are to report anything that requires rectification.

- Vandalism of equipment

  Risk: Yes
  Possible Outcome: Leak
  Ranking: E3
  Control Measure: As an aboveground installation, all fitting and valves will be secured against tampering. The aboveground tank will be located on a private property in an area for authorised personnel only.

- Fire on adjoining property
  Risk: Yes
  Possible Outcome: Fire
  Ranking: D3
  Control Measure: Should a fire on an adjoining property impact the site the LPG system will be shut down ensuring the all product remain in the tank.

- Use of non rated electrics in hazardous zone
  Risk: Yes
  Possible Outcome: Fire
  Ranking: D3
  Control Measure: Only rated electrics are to be permitted within the hazardous zones associated with the installation. Staff are to be trained in the safe storage and handling procedures associated with LP Gas.

- Use of mobile phone/transmitting devices
  Risk: Yes
  Possible Outcome: Fire
  Ranking: D3
  Control Measure: The site is to be fitted with warning signs advising staff of the risk of mobile phone and transmitting devices. Staff are to be trained in the safe storage and handling procedures associated with LP Gas.

- Spill of product onto staff
  Risk: Yes
  Possible Outcome: Injury
  Ranking: D3
  Control Measure: Staff will be aware of the minimum PPE and safe handling procedures associated with the LP Gas. The staff will be trained in how to administer first aid should an injury by coming into contact with any flammable gas occur on this site.

- Staff misuse of equipment
  Risk: Yes
  Possible Outcome: Injury/Leak/Fire
  Ranking: D3
  Control Measure: Staff will undergo training in the storage and handling of LP Gas if they are involved with the system. The site will be fitted with instructions indicating procedures for safe use of the equipment.

- Leaking valve
  Risk: Yes
  Possible Outcome: Minor Leak
  Ranking: D4
  Control Measure: Experience shows that this is a rare occurrence. Any leaking valve will be capable of being shut down manually.

- Collision between vehicle and tank
  Risk: Yes
  Possible Outcome: Leak/Fire
  Ranking: D4
  Control Measure: The tank system will be designed so it is protected behind Armco and bollards from vehicle impact. The position of the tank will be determined to be in an area away from significant traffic movements to minimise the risk.

Chlorine

The chlorine system at this site will be designed with the intention of minimising all unnecessary risks associated with the storage and handling of this type of dangerous goods. It will be designed in full compliance with the relevant Australian Standards being AS/NZS 2022-2003 and AS/NZS 1677.2-1998

Summary of Risks and control measures associated with the Chlorine system:

- Overfill of tank
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: The tank installation will be located outdoors in a well ventilated area. The tank will be designed with a remote fill and a fixed liquid level gauge readily accessible at the fill point. A contents gauge will be visible by inspection through access covers over the tank.

- Hose trip hazard
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: As a remote filled tank, the tanker is to be parked adjacent to the fill point in a nominated tanker parking area. The hose used will be a small diameter pressure hose and generally able to lie flat on the ground. The tanker driver is to use warning signage during deliveries.

- Leak/rupture in pipework
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: All pipework will be located in such a way and are protected from vehicular impact. Regular pressure tests will be performed to ensure tightness. Leak detectors are to be installed as required with this system.

- Leak in tank
  Risk: Yes
  Possible Outcome: Leak
  Ranking: E3
  Control Measure: Extremely unlikely event. The tank will be maintained by the supplier and tested regularly. The tank will be located outdoors in an area allowing natural ventilation.

- Equipment wear and tear
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: Regular maintenance checks will be carried out on the chlorine equipment to ensure that everything is in a safe and working condition. This will occur at least monthly.

- Vandalism of equipment
  Risk: Yes
  Possible Outcome: Leak
  Ranking: E3
  Control Measure: As aboveground installation all fitting and valves will be secured against tampering. The aboveground tank will be located on a private property in an area for authorised personnel only.

- Fire on adjoining property
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D3
  Control Measure: Should a fire on an adjoining property impact the site the chlorine system will be designed so it can be shut down ensuring the safety of all personnel and others.

- Fire on site
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D3
  Control Measure: Should a fire on the property impact the chlorine system, it will be designed so it can be shut down ensuring the safety of all personnel and others. The chlorine storage will be located outdoors and provided with fire protection in accordance with the relevant standards. Staff will be trained in the use of the on site fire protection.

- Tampering of equipment
  Risk: Yes
  Possible Outcome: Leak
  Ranking: E4
  Control Measure: The site will be fitted with warning signs advising persons of the risk of chlorine.

- Spill of product onto staff
  Risk: Yes
  Possible Outcome: Injury/Leak
  Ranking: D4
  Control Measure: Staff will be aware of the minimum PPE and safe handling procedures associated with the Chlorine system. The staff will be trained in how to administer first aid should an injury by coming into contact with any product on this site.

- Staff misuse of equipment
  Risk: Yes
  Possible Outcome: Injury/Leak
  Ranking: D4
  Control Measure: Staff are to undergo training in the storage and handling of Chlorine if they are involved with the system. The site will be further fitted with instructions indicating procedures for safe use of the equipment.

- Collision between vehicle and tank
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D3
  Control Measure: The tank system will be designed so it is protected behind Armco and bollards from vehicle impact. The position of the tank will also been determined to be in an area away from significant traffic movements to minimise the risk.

Anhydrous Ammonia

The Anhydrous Ammonia system at this site will be designed with the intention of minimising all unnecessary risks associated with the storage and handling of this type of dangerous goods. It will be designed in full compliance with the relevant Australian Standards being AS/NZS 2022-2003 and AS/NZS 1677.2-1998

Summary of Risks and control measures associated with the Anhydrous Ammonia system:

- Leak in primary refrigeration system
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: Toxic gas under pressure. All equipment within building is to be designed to be protected by leak alarm system. All equipment will be located on the roof and in the open air. The refrigeration system will be designed and installed to the correct standards and current best practice.

- Leak in secondary refrigeration system
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: The secondary refrigeration system is reticulated throughout the site and is a non toxic and non hazardous liquid.

- Overpressure of primary refrigeration system
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: Toxic gas under pressure. All equipment within building is to be designed to be protected by leak alarm system. All equipment will be located on the roof and in the open air. The refrigeration system will be designed and installed to the correct standards and current best practice.

- Over pressure of secondary refrigeration system
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D4
  Control Measure: The secondary refrigeration system is reticulated throughout the site and is a non toxic and non hazardous liquid.

- Fire in buildings
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D3
  Control Measure: An emergency shut down system is to be incorporated in the design as required by AS/NZS 2022 and AS/NZS 1677.2. Fire protection in accordance with AS/NZS 2022 and AS/NZS 1677.2 is to be provided as applicable.

- Fire adjacent to buildings
  Risk: Yes
  Possible Outcome: Leak
  Ranking: D3
  Control Measure: An emergency shut down system is to be incorporated in the design as required by AS/NZS 2022 and AS/NZS 1677.2. Fire protection in accordance with AS/NZS 2022 and AS/NZS 1677.2 is to be provided as applicable.

CONCLUSIONS

As with any Preliminary Hazard Analysis, the main aims are:

1. Identify all potential hazards and accidental events that may lead to an accident
2. Rank the identified accidental events according to their severity
3. Identify required hazard controls and follow-up actions

In this case, there is nothing that leads to any conclusion other than the fact that the proposal is acceptable for this site.

MULTI-LEVEL RISK ASSESSMENT APPROACH

This section highlights the key features of the multi-level risk assessment framework. There are three levels of assessment, depending on the outcome of preliminary analysis, which in this case are:

level 1 - qualitative analysis, primarily based on the hazard identification techniques

level 2 - partially quantitative analysis, using hazard identification and the focused quantification of key potential off-site risk contributors

level 3 - quantitative risk analysis (QRA), based on the full and detailed quantification of risks, consistent with *HIPAP No. 6 - Hazard Analysis*.

The method nominated below is based on the *Manual for the classification and prioritisation of risks due to major accidents in the process and related industries* (IAEA, rev. ed. 1996). This method is risk-based and relies on broad estimations of consequences and likelihood of accidents. The outputs may be expressed in terms of individual and societal fatality risk which can be compared against criteria for determining the appropriate level of further assessment.

MULTI LEVEL RISK ASSESSMENT FRAMEWORK

The calculations following here are a direct reference to this proposal using the working process detailed in this document.

The technique used is a modified version of the *Manual for the classification of risks due to major accidents in process and related industries* (IAEA, Rev. 1. 1996). It should be noted that the full IAEA method covers fixed installations and transport (including by waterways and pipeline).

For simplicity, only the part of the method dealing with fixed installations is covered here. The IAEA method was developed to produce a broad estimate of the risks due to major accidents from the manufacture, storage, handling and transport of hazardous materials. As published, the method covers only off-site risks arising from explosion, fire or release of toxic substances. The results are expressed in terms of societal risk, rather than individual risk. Societal risk of death is defined in the IAEA method as the relationship between the number of people killed in a single accident and the chance or likelihood that this number will be exceeded.

The method uses a number of simplifying assumptions, the most important being:

- Only the most important variables are used in assessing risk (such as population density, frequency of loading/unloading operations)

- Estimates of probability and consequences are rounded to the nearest order of magnitude.

- The entire inventory is initially assumed to be involved in any incident.

- For physical and toxic effects, 100 percent fatality is assumed within an area where 50-100 percent lethality would be expected; outside this range, no fatalities are assumed.

- No explosion overpressure or heat radiation calculations are carried out - the lethal radius is assumed to be the distance to the lower flammable limit (LFL) in the case of explosion and the actual fire area in the case of flammables.

- Only one weather pattern is used.

- Basic probabilities are generic but are modified later.

The boundaries of the site have been defined and maps and drawings prepared showing the site's location in relation to its locality, and the site layout itself. The area chosen is of sufficient size to encompass the consequence distance of the worst credible accident. The site layout is in sufficient detail to allow the locations of all storage and processing areas to be identified to a precision that will allow consequence distances to be clearly represented.

A plan of the area has been produced and estimates of the population in the area have been made. It should be noted that the surrounding area from the storages do not include any sensitive uses.

LP GAS

Calculations

Firstly, IAEA Table II (page 39) provides us with reference number 9 for this type of storage being LP Gas in an aboveground tank.

For the LP Gas storage of 24,000L with a relative vapour density of 0.53 we can calculate the storage as 43.5 tonne. From IAEA Table IV(a), (page 42), we can then apply for classification of substance by effect category based on the 43.5 tonnes for reference 9 we then obtain CIII.

Using these classifications, in IAEA table V, (page 43) we obtain ***A*** for CIII being a maximum area of effect distance of 50-100 m's radius and an effect area of 0.3ha. (A=0.3)

Although the site is of a significant size overall, as the storages are located within the proximity of the north west corner of site it is located within the vicinity of boundaries. As the maximum effect areas can not be fully contained within the sites boundaries, the population distribution around the site needs to be assessed.

The site itself takes up the majority of the Effect Area however some area also encroaches on neighbouring properties. The Population Density guidance of Table IV (page 44) will be utilised, with the ability to correct where deemed necessary. As a conservative figure, utilising the guidance provided by Table IV and knowledge of the area we estimate 10 persons per hectare (d = 10).

Possible number of fatalities

Considering the population correction factor f_A of Table VII (page 44) this can be utilised if only part of the Effect Area is populated. The effect area for CIII is up to a 100m radius and therefore $\pi \times r^2 = \pi \times 100^2 = 31{,}416\ m^2$. The site itself has a total area of $82{,}600m^2$ with the processing at the back half of site calculated as having an area of approximately $43{,}750m^2$. Taking these figures as well as the location of the installation into account in relation to the site boundaries, it has been determined that the site can be calculated as to take up approximately 70% of the Effect Area. Based on Table V a population fraction of 50, as the nearest percentage, needs to be applied and therefore a figure of 1 is determined. ($f_A = 1$)

Following on to the mitigation correction factors f_m, in this case as the substance is flammable and reference number 9, Table VIII (page 45) gives a value of 1.

So an estimate of external consequences for reference 9, given by the formula:

$$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$$

or, in this case:

$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$
$C_{a,s} = 0.3x10x1x1$
$C_{a,s} =$ ***3 fatalities***

Estimation of Probability of major accident

The method used for estimating probability is based on probability numbers related to the type of installation and substance involved, together with correction factors for:

- average probability of incident based on type of installation/storage
- the frequency of loading/unloading operations (*nl*) (based on 52 per year)
- safety systems associated with flammable substances (*nf*)
- organisational and management safety (*no*))
- wind direction towards the populated area (*np*)

The probability number is given by the formula:

$$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$$

Where $N_{i,s}$ is the average probability number for the installation and the substance.

Table IX states for reference 9 as storage and not a plant $N^*_{i,s} = 7$

Table X(a) states for the deliver frequency of approximately 12-24 deliveries per year $n_l = 0$

Table XI is applicable to flammable gas storages of reference numbers 7, 10 and 13. As this storage is assigned as reference 9, n_f = Not applicable = 0

Table XII applies Correction Parameters for Organisational safety. This organisation maintains Average Industry practices therefore $n_o = 0$

Table XIII applies correction Parameters for Wind direction towards populated areas in the affected Zone and specifically looks at where people are living within this zone. In this instance there are some minimal Residential properties within the Affected Area and therefore a conservative level of 10% coverage is applied for this effect category III, $n_p = 1$ so,

where
$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$
$N_{i,s} = 7 + 0 + 0 + 0 + 1 = 8$

Converting probability into frequency, in table XIV, we get 1×10^{-8}

CHLORINE

Calculations

Firstly, IAEA Table II (page 39) provides us with reference number 32 for this type of storage being Chlorine in an aboveground tank.

For the Chlorine storage of 5,000L with a relative vapour density of 2.4 we can calculate the storage as 2.1 tonne. From IAEA Table IV(a), (page 42), we can then apply for classification of substance by effect category based on 2.1 tonnes for reference 32 we obtain DIII.

Using these classifications, in IAEA table V, (page 43) we obtain ***A*** for DIII being a maximum area of effect distance of 100-200 m's radius and an effect area of 1ha. (A=1)

Although the site is of a significant size overall, as the storages are located within the proximity of the north west corner of site, it is located within the vicinity of boundaries. As the maximum effect areas can not be fully contained within the sites boundaries, the population distribution around the site needs to be assessed.

The site itself takes up the majority of the Effect Area however some area also encroaches on neighbouring properties. The Population Density guidance of Table IV (page 44) will be utilised, with the ability to correct where deemed necessary. As a conservative figure, utilising the guidance provided by Table IV and knowledge of the area we estimate 10 persons per hectare (d = 10).

Possible number of fatalities

Considering the population correction factor f_A of Table VII (page 44) this can be utilised if only part of the Effect Area is populated. The effect area for DIII is up to a 200m radius and therefore $\pi \times r^2 = \pi \times 200^2 = 125{,}664\ m^2$. The site itself has a total area of $82{,}600m^2$ with the processing at the back half of site calculated as having an area of approximately $43{,}750m^2$. Taking these figures as well as the location of the installation into account in relation to the site boundaries, it has been determined that the site can be calculated as to take up approximately 45% of the Effect Area. Based on Table V a population fraction of 20, as the nearest percentage without going over, needs to be applied for the Effect Area Category III and therefore a figure of 1 is determined. ($f_A = 1$)

Following on to the mitigation correction factors f_m, in this case as the substance is called up under reference number 32 toxic gas, Table VIII (page 45) gives a value of 0.1.

So an estimate of external consequences for Reference 32, given by the formula:
$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$

or, in this case:

$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$
$C_{a,s} = 1x10x1x0.1$
$C_{a,s} =$ ***0.1 fatalities***

Rounded to a minimum full figure of 1
$C_{a,s} =$ ***1 fatality***

Estimation of Probability of major accident

The method used for estimating probability is based on probability numbers related to the type of installation and substance involved, together with correction factors for:

- average probability of incident based on type of installation/storage
- the frequency of loading/unloading operations (*nl*) (based on 52 per year)
- safety systems associated with flammable substances (*nf*)
- organisational and management safety (*no*))
- wind direction towards the populated area (*np*)

The probability number is given by the formula:

$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$

Where $N_{i,s}$ is the average probability number for the installation and the substance.

Table IX states for reference 32 as storage and not a plant $N^*_{i,s} = 6$

Table X(a) states for the deliver frequency of approximately 12-24 deliveries per year $n_l = 0$

Table XI is applicable to flammable gas storages of reference numbers 7, 10 and 13. As this storage is assigned as reference 32, n_f = Not applicable = 0

Table XII applies Correction Parameters for Organisational safety. This organisation maintains Average Industry practices therefore $n_o = 0$

Table XIII applies correction Parameters for Wind direction towards populated areas in the affected Zone and specifically looks at where people are living within this zone. In this instance there are some minimal Residential properties within the Affected Area and therefore a conservative level of 10% coverage is applied for this effect category III, $n_p = 1$ so,

where
$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$
$N_{i,s} = 6 + 0 + 0 + 0 + 1 = 7$

Converting probability into frequency, in table XIV, we get 1×10^{-7}

ANHYDROUS AMMONIA

Calculations

Firstly, IAEA Table 1 (page 39) provides us with reference number 31 for this type of storage being Anhydrous Ammonia utilised at an abattoir for an extensive Cooling installation.

From IAEA Table II(a), (page 42) for the Ammonia storage of 10,000L having a vapour density of 0.6 we can calculate the storage as 16,666 tonnes (10-50 tonnes). From IAEA Table IV(a), (page 42), we can then apply for classification of substance by effect category based on 2.1 tonnes for reference 31 we obtain DIII.

Using these classifications, in IAEA table V, (page 43) we obtain ***A*** for DIII being a maximum area of effect distance of 100-200 m's radius and an effect area of 1ha. (A=1)

Although the site is of a significant size overall, as the storages are located within the proximity of the north west corner of site, it is located within the vicinity of boundaries. As the maximum effect areas can not be fully contained within the sites boundaries, the population distribution around the site needs to be assessed.

The site itself takes up the majority of the Effect Area however some area also encroaches on neighbouring properties. The Population Density guidance of Table IV (page 44) will be utilised, with the ability to correct where deemed necessary. As a conservative figure, utilising the guidance provided by Table IV and knowledge of the area we estimate 10 persons per hectare (d = 10).

Possible number of fatalities

Considering the population correction factor f_A of Table VII (page 44) this can be utilised if only part of the Effect Area is populated. The effect area for DIII is up to a 200m radius and therefore $\pi \times r^2 = \pi \times 200^2 = 125{,}664\ m^2$. The site itself has a total area of $82{,}600m^2$ with the processing at the back half of site calculated as having an area of approximately $43{,}750m^2$. Taking these figures as well as the location of the installation into account in relation to the site boundaries, it has been determined that the site can be calculated as to take up approximately 45% of the Effect Area. Based on Table V a population fraction of 20, as the nearest percentage without going over, needs to be applied for the Effect Area Category III and therefore a figure of 1 is determined. ($f_A = 1$)

Following on to the mitigation correction factors f_m, in this case as the substance is called up under reference number 31 toxic gas, Table VIII (page 45) gives a value of 0.1.

So an estimate of external consequences for Reference 32, given by the formula:
$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$

or, in this case:

$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$
$C_{a,s} = 1x10x1x0.1$
$C_{a,s} =$ ***0.1 fatalities***

Rounded to a minimum full figure of 1
$C_{a,s} =$ ***1 fatality***

Estimation of Probability of major accident

The method used for estimating probability is based on probability numbers related to the type of installation and substance involved, together with correction factors for:

- average probability of incident based on type of installation/storage
- the frequency of loading/unloading operations (*nl*) (based on 52 per year)
- safety systems associated with flammable substances (*nf*)
- organisational and management safety (*no*))
- wind direction towards the populated area (*np*)

The probability number is given by the formula:

$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$

Where $N_{i,s}$ is the average probability number for the installation and the substance.

Table IX states for reference 32 as storage and not a plant $N^*_{i,s} = 6$

Table X(a) states for the deliver frequency of approximately 1-10 deliveries per year $n_l = +0.5$

Table XI is applicable to flammable gas storages of reference numbers 7, 10 and 13. As this storage is assigned as reference 31, n_f = Not applicable = 0

Table XII applies Correction Parameters for Organisational safety. This organisation maintains Average Industry practices therefore $n_o = 0$

Table XIII applies correction Parameters for Wind direction towards populated areas in the affected Zone and specifically looks at where people are living within this zone. In this instance there are some minimal Residential properties within the Affected Area and therefore a conservative level of 10% coverage is applied for this effect category III, $n_p = 1$ so,

where
$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$
$N_{i,s} = 6 + 0.5 + 0 + 0 + 1 = 7.5$

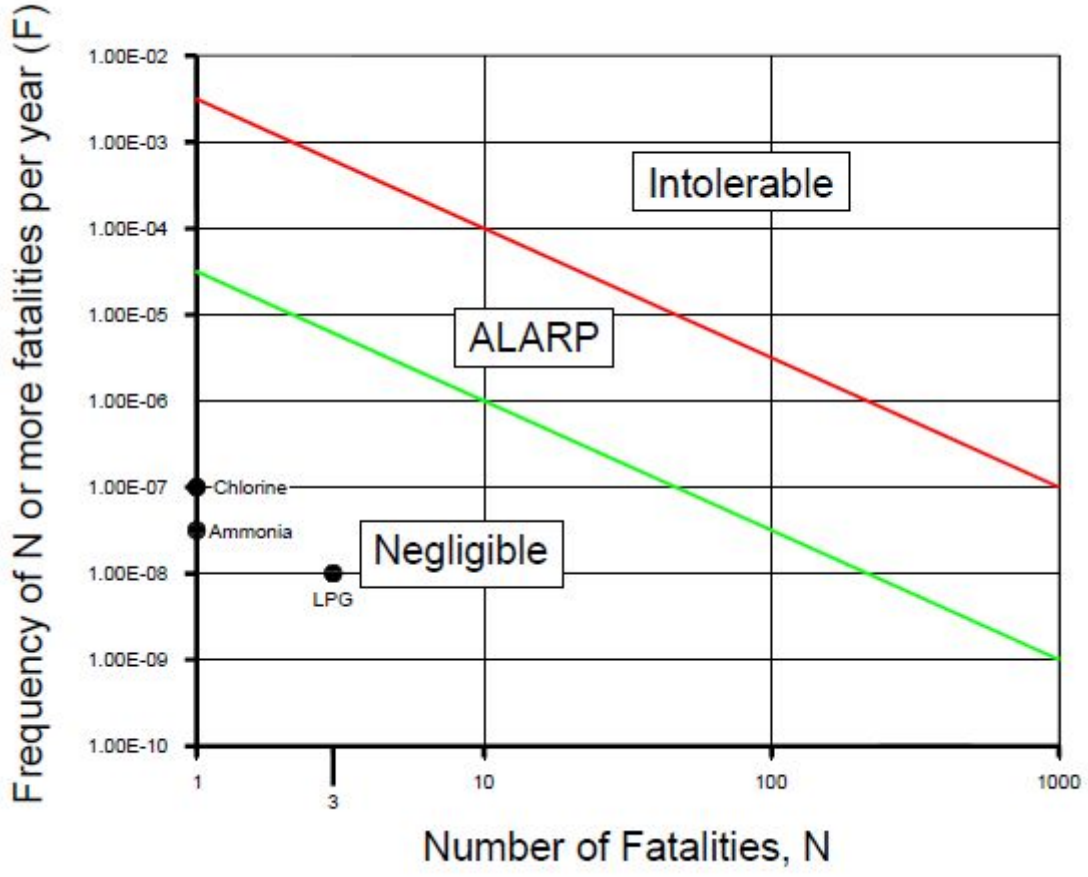
Converting probability into frequency, in table XIV, we get 3×10^{-8}

PLOTTING

Summary of calculations :

	Possible fatalities	**Estimation of Probability of major accident**
LP Gas	3	$1x10^{-8}$
Chlorine	1	$1x10^{-7}$
LP Gas	1	$3x10^{-8}$

This result can be plotted on the following graph:



By intersecting the frequency with the consequences in the graph above, for each of the storages, we can see that the risk to society from the proposed development falls within the negligible area below the green line. All possible measures should still be taken to ensure that the level of risk is kept as low as possible going forward.

CONCLUSION

As can be seen through the application of SEPP 33 and the subsequent Preliminary Hazard Analysis (PHA) with the assistance of plotting the frequency against consequence, that the societal risk of the proposal is negligible. The level one qualitative Risk Analysis, referred to in Applying SEPP 33 as a Preliminary Hazard Analysis (PHA) is deemed sufficient for this proposal. All equipment must be installed to manufacturer's recommendations and must comply with all the relevant standards listed within. Specific safety features of the site are to be maintained and reviewed on a regular basis to ensure that they maintain, if not exceed industry standards.

DOCUMENT REFERENCES

[1] State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines. – Department of Planning NSW, January 2011.
[2] State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines. – Department of Planning NSW. Page 1, 1.2 the policy, last para
[3] State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines. – Department of Planning NSW. Page 9, 4.2
[4] Protection of the Environment Operations (Underground Petroleum Storage Systems) regulation 2014 division 1, clause 5 and 6

OTHER REFERENCES

Australian Standards:

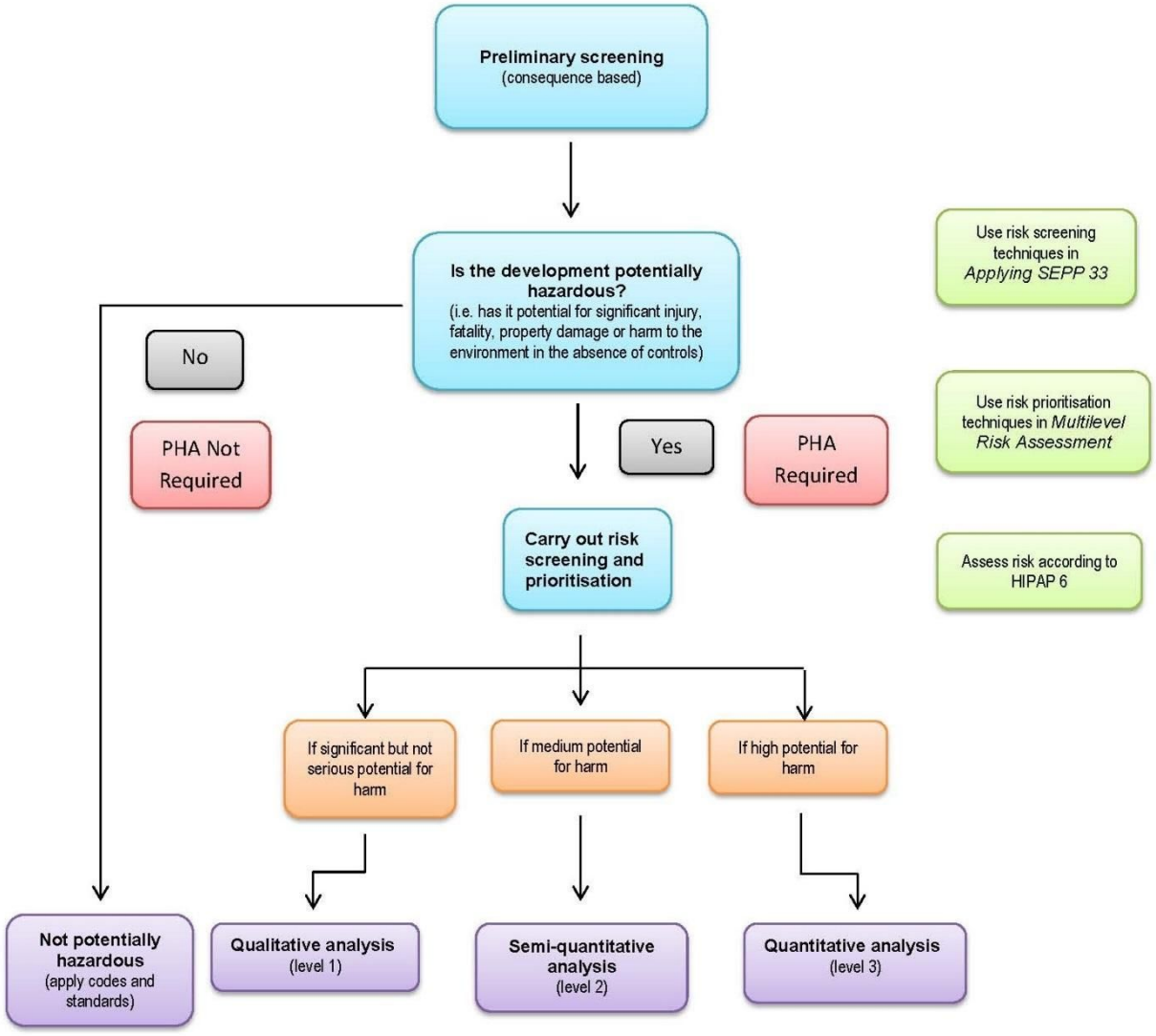
AS/NZS 1596-2014	"Storage and Handling of LP Gas"
AS/NZS 2022-2003	"Anhydrous Ammonia - Storage and Handling"
AS/NZS 1677.2-1998	"Refrigerating systems - Safety Requirements for fixed applications" Storage Tanks"
AS 4326-2008	"The Storage and handling of oxidising agents"
AS 3000-2007	"Electrical Wiring Rules".
AS/NZS 60079.10.1-2009	"Classification of Areas. Explosive gas atmospheres". Annex ZA "Examples of Hazardous Area Classification".
AS 2832.2-2003	"Cathodic Protection of Metals – Compact buried structures".
AS 2239-2003	"Galvanic (sacrificial) Anodes for Cathodic Protection".
AS/NZS 3788-2006	"Pressure Equipment – In-service inspection".
AS 4037-1999	"Pressure Equipment – Examination & testing".
AS/NZS 1841.5-2007	"Portable Fire Extinguishers".
AS 2444-2001	"Portable Fire Extinguishers and Fire Blankets". Select. & location.
AS 1692-2006	"Tanks for Flammable and Combustible liquids".

Codes of Practices:
Australian Code for the Transportation of Dangerous Goods by Road and Rail, Seventh edition.
NSW Code of Practice 2005 for Storage & Handling of Dangerous Goods.
NSW Work Health and Safety Act and Regs 2011.

Planning NSW Guidelines:
Hazardous and Offensive Development Application Guidelines - Applying SEPP 33
Hazardous and Offensive Development Application Guidelines - Multi-Level Risk Assessment
Hazardous Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use Safety Planning
Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis
Hazardous Industry Planning Advisory Paper No. 8 - Hazard and Operability Studies

Other Documentation:
Local Authorities requirements, NSW WorkCover and EPA Acts and Regulations.
Equipment Suppliers Specifications, Requirements and Instructions.
Fuel System Specifications and Drawings.
Site Specific drawings and suppliers specifications.

APPENDIX 1
MULTI LEVEL RISK ASSESSMENT FLOW CHART


Preliminary screening
(consequence based)
Is the development potentially hazardous?
(i.e. has it potential for significant injury, fatality, property damage or harm to the environment in the absence of controls)
Use risk screening techniques in Applying SEPP 33
No
PHA Not Required
Yes
PHA Required
Use risk prioritisation techniques in Multilevel Risk Assessment
Carry out risk screening and prioritisation
Assess risk according to HIPAP 6
If significant but not serious potential for harm
If medium potential for harm
If high potential for harm
Not potentially hazardous
(apply codes and standards)
Qualitative analysis
(level 1)
Semi-quantitative analysis
(level 2)
Quantitative analysis
(level 3)

APPENDIX 2
RISK RANK METHOD

RISK RANKING METHOD

Risk is the combination of the likelihood of a specific unwanted event and the potential consequences if it should occur.

Probabilities

A - common or repeating occurrence
B - known to occur, or "it has happened"
C - could occur, or "I've heard of it happening"
D - not likely to occur
E - practically impossible

Consequences

People
1 - fatality or permanent disability
2 - serious lost time injury or illness
3 - moderate lost time injury or illness
4 - minor lost time injury or illness
5 - no lost time

Equipment, assets or environment
1 - more than $500K damage
2 - $100K to $500K damage
3 - $50K to $100K damage
4 - $5k to $50K damage
5 - less than $5K damage

Production
1 - more than $500K production delay
2 - $100K to $500K delay
3 - $50K to $100K delay
4 - $5k to $ 50K delay
5 - less than $5K delay

Risk Ranking Method (above)
For each event, the appropriate probability (a letter A to E) and consequence (a number 1 to 5) is selected. If an event affects more than one area of consequence (eg. Affects people and production), the highest rank number, i.e.1, is always selected.

Risk Ranking Table (below)
The consequences (loss outcomes) are combined with the probability (of those outcomes) in the risk ranking table to identify the risk rank of each loss event (eg a consequence 3 with a probability B yields a risk rank 9).
The table yields a risk rank from 1 to 25 for each set of probabilities and consequences.
A rank of 1 is the highest magnitude of risk, i.e. a highly likely, very serious event.
A rank of 25 represents the lowest magnitude of risk, an almost impossible, very low consequence event.
Events represented on the risk ranking table by ranks between 16 and 25 inclusive are considered acceptable risks.

RISK RANKING TABLE

PROBABILITY / CONSEQUENCE	A	B	C	D	E
1	1	2	4	7	11
2	3	5	8	12	16
3	6	9	13	17	20
4	10	14	18	21	23
5	15	19	22	24	25

APPENDIX 3
HAZARD ANALYSIS

Hazard Analysis

Project: Woodlands Ridge Poultry Pty Ltd at 52 Sinclair Street Goulburn NSW **Assessment Ref No:**
Description/Activity: Design Phase - Dangerous Goods Storage at Poultry Abattoir **Date:** 14.03.2019

RISK RANKING METHOD SUMMARY (Refer Appendix 2 for full detail)

Probability	Consequences		
	People	*Equipment, assets or environment*	*Production*
A - Common or Repeating Occurrence	1 - fatality or permanent disability	1- more than $500K damage	1 - more than $500k production delay
B - Known to occur , or "it has happened"	2 - serious lost time injury or illness	2 - $100k to $500k damage	2 - $100k to $500k delay
C - Could occur, o "I've heard of it happening"	3 - moderate lost time injury or illness	3 - $50k to $100k damage	3 - $50k to $100k delay
D - not likely to occur	4 - minor lost time injury or illness	4 - $5k to $50k damage	4 - $5k to $50k delay
E - practically impossible	5 - no lost time	5 - less than $5k damage	5 - less than $5k delay

	LP Gas - Certification against AS/NZS1596 for Flammable Gas Storage		Probability	Consequences	
No.	Hazard		A-E	1-5	Action Required (Y/N)
1	Overfill of tank	The tank installation will be located outdoors in a well ventilated area. The tank will be remote filled with the fixed liquid level gauge readily accessible at the fill point. The contents gauge will be visible by inspection through two access covers over the tanks. Fire fighting equipment will be within close proximity to the delivery driver whilst filling the tanks.	D	4	N
2	Hose trip hazard	As a remote filled tank, the tanker will park adjacent to the fill point in a nominated tanker parking area. The hose used will be a small diameter pressure hose and is generally able to lie flat on the ground. The tanker driver is to use warning signage during deliveries.	D	5	N
3	Fire at fill point	At least a single powder type extinguisher is to be available near the fill points during product delivery (normally carried by the tanker) and at least one hose reel in the vicinity of the tank storage area. The fill points will be fitted with a manual shutoff valve and a back check fill valve to stop any outward flow. The tanker will be fitted with an emergency stop system in order to cease pumping quickly. The driver is to be in attendance at all times.	D	4	N
4	Fire on site	As a site storing flammable gas, fire protection in the form of a hose reel and fire extinguishers are to be located on site in strategic places in full compliance with AS/NZS 1596. An emergency shut down system is to be installed on site to enable the LP Gas installations to be shut down in an emergency.	D	3	N
5	Leak/rupture in pipework	As an aboveground installation some pipework will be required to be located aboveground however it will be designed to be the shortest length possible and located behind Armco guardrail to be protected from accidental impact. Regular pressure tests are to be performed to ensure tightness. Stock reconciliation is to be carried out regularly and would highlight any leaks. The pipework run through the site is to be a continuous copper or polypropylene line.	D	4	N

6	Ruptured fill hose	Extremely unlikely event. The tank hoses are to be pressure tested and/or replaced regularly. The tanker will be fitted with an emergency stop system.	E	4	N
7	Equipment wear and tear	Regular maintenance checks are to be carried out on the tank and its equipment to maintain that everything is in a safe and working condition. This is to occur at least annually. Delivery drivers are to report anything that requires rectification.	D	3	N
8	Vandalism of equipment	As an aboveground installation, all fitting and valves will be secured against tampering. The aboveground tank will be located on a private property in an area for authorised personnel only.	E	3	N
9	Fire on adjoining property	Should a fire on an adjoining property impact the site the LPG system will be shut down ensuring the all product remain in the tank.	D	3	N
10	Use of non rated electrics in hazardous zone	Only rated electrics are to be permitted within the hazardous zones associated with the installation. Staff are to be trained in the safe storage and handling procedures associated with LP Gas.	D	3	
11	Use of mobile phone/transmitting devices	The site is to be fitted with warning signs advising staff of the risk of mobile phone and transmitting devices. Staff are to be trained in the safe storage and handling procedures associated with LP Gas.	D	3	N
12	Spill of product onto staff	Staff will be aware of the minimum PPE and safe handling procedures associated with the LP Gas. The staff will be trained in how to administer first aid should an injury by coming into contact with any flammable gas occur on this site.	D	3	N
13	Staff misuse of equipment	Staff will undergo training in the storage and handling of LP Gas if they are involved with the system. The site will be fitted with instructions indicating procedures for safe use of the equipment.	D	4	N
14	Leaking valve	Experience shows that this is a rare occurrence. Any leaking valve will be capable of being shut down manually.	D	4	N
15	Collision between vehicle and tank	The tank system will be designed so it is protected behind Armco and bollards from vehicle impact. The position of the tank will be determined to be in an area away from significant traffic movements to minimise the risk.	D	4	N
	Anhydrous Ammonia - Certification against AS/NZS 2022-2003 and AS/NZS 1677.2-1998				
16	Leak in primary refrigeration system	Toxic gas under pressure. All equipment within building is to be designed to be protected by leak alarm system. All equipment will be located on the roof and in the open air. The refrigeration system will be designed and installed to the correct standards and current best practice.	D	4	N
17	Leak in secondary refrigeration system	The secondary refrigeration system is reticulated throughout the site and is a non toxic and non hazardous liquid.	D	4	N
18	Overpressure of primary refrigeration system	Toxic gas under pressure. All equipment within building is to be designed to be protected by leak alarm system. All equipment will be located on the roof and in the open air. The refrigeration system will be designed and installed to the correct standards and current best practice.	D	4	N
19	Over pressure of secondary refrigeration system	The secondary refrigeration system is reticulated throughout the site and is a non toxic and non hazardous liquid.	D	4	N
20	Fire in buildings	An emergency shut down system is to be incorporated in the design as required by AS/NZS 2022 and AS/NZS 1677.2. Fire protection in accordance with AS/NZS 2022 and AS/NZS 1677.2 is to be provided as applicable.	D	3	N

21	Fire adjacent to buildings	An emergency shut down system is to be incorporated in the design as required by AS/NZS 2022 and AS/NZS 1677.2. Fire protection in accordance with AS/NZS 2022 and AS/NZS 1677.2 is to be provided as applicable.	D	3	N
	Chlorine - Certification against AS/NZS 2022-2003 and AS/NZS 1677.2-1998				
22	Overfill of tank	The tank installation will be located outdoors in a well ventilated area. The tank will be designed with a remote fill and a fixed liquid level gauge readily accessible at the fill point. A contents gauge will be visible by inspection through access covers over the tank.	D	4	N
23	Hose trip hazard	As a remote filled tank, the tanker is to be parked adjacent to the fill point in a nominated tanker parking area. The hose used will be a small diameter pressure hose and generally able to lie flat on the ground. The tanker driver is to use warning signage during deliveries.	D	4	N
24	Leak/rupture in pipework	All pipework will be located in such a way and are protected from vehicular impact. Regular pressure tests will be performed to ensure tightness. Leak detectors are to be installed as required with this system.	D	4	N
25	Leak in tank	Extremely unlikely event. The tank will be maintained by the supplier and tested regularly. The tank will be located outdoors in an area allowing natural ventilation.	E	3	N
26	Equipment wear and tear	Regular maintenance checks will be carried out on the chlorine equipment to ensure that everything is in a safe and working condition. This will occur at least monthly.	D	4	N
27	Vandalism of equipment	As aboveground installation all fitting and valves will be secured against tampering. The aboveground tank will be located on a private property in an area for authorised personnel only.	E	3	N
28	Fire on adjoining property	Should a fire on an adjoining property impact the site the chlorine system will be designed so it can be shut down ensuring the safety of all personnel and others.	D	3	N
29	Fire on site	Should a fire on the property impact the chlorine system, it will be designed so it can be shut down ensuring the safety of all personnel and others. The chlorine storage will be located outdoors and provided with fire protection in accordance with the relevant standards. Staff will be trained in the use of the on site fire protection.	D	3	N
30	Tampering of equipment	The site will be fitted with warning signs advising persons of the risk of chlorine.	E	4	N
31	Spill of product onto staff	Staff will be aware of the minimum PPE and safe handling procedures associated with the Chlorine system. The staff will be trained in how to administer first aid should an injury by coming into contact with any product on this site.	D	4	
32	Staff misuse of equipment	Staff are to undergo training in the storage and handling of Chlorine if they are involved with the system. The site will be further fitted with instructions indicating procedures for safe use of the equipment.	D	4	
33	Collision between vehicle and tank	The tank system will be designed so it is protected behind Armco and bollards from vehicle impact. The position of the tank will also been determined to be in an area away from significant traffic movements to minimise the risk.	D	3	N

Hazard Analysis Summary

Project/Site: Woodlands Ridge Poultry Pty Ltd at 52 Sinclair Street Goulburn NSW
Description/Activity: Design Phase - Dangerous Goods Storage at Poultry Abattoir

Assessment Ref No:
Date: 14.03.2019
Last Updated:

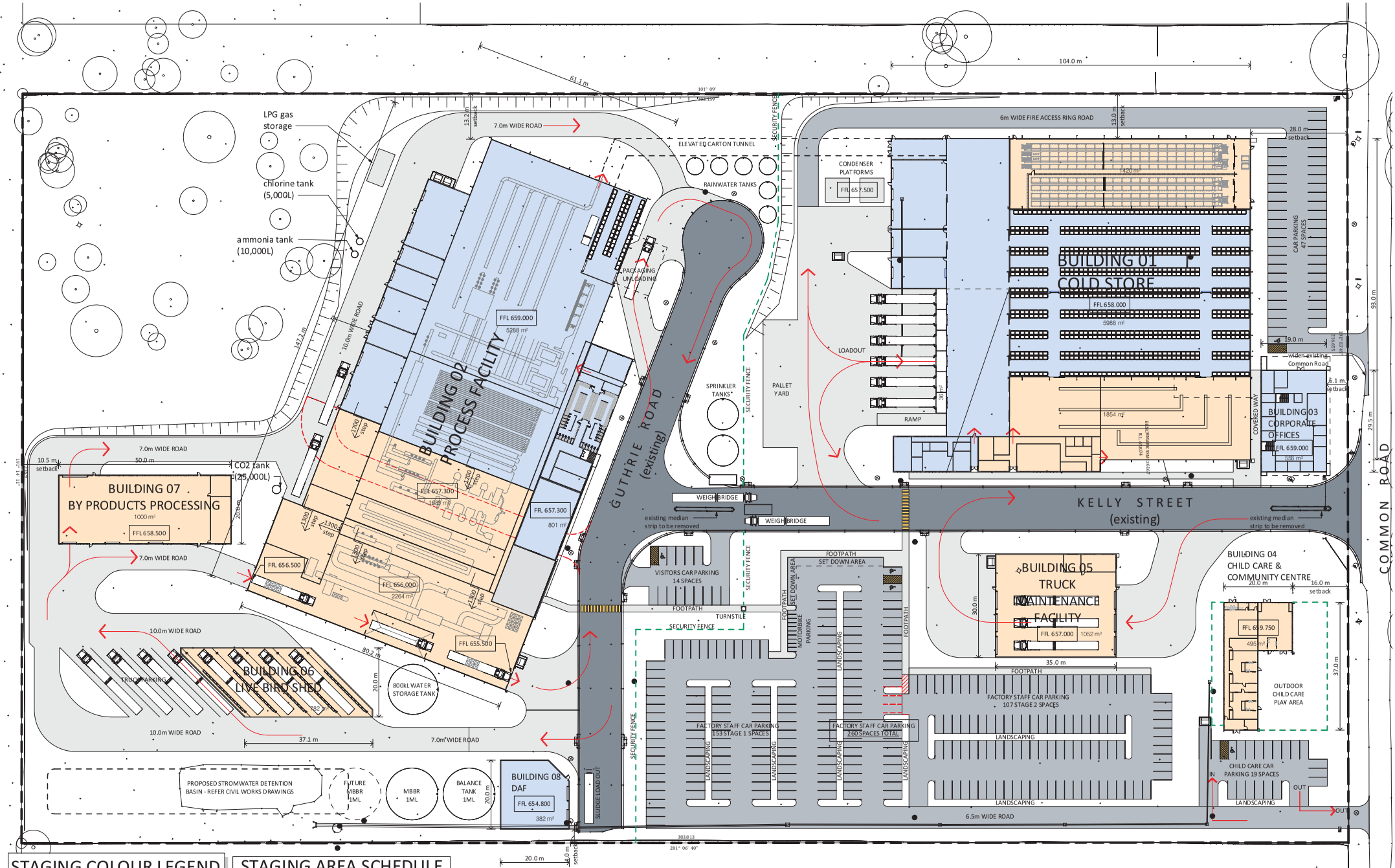
Note: This section of the hazard analysis is for the design of site only and does not take into account any site issues which must be looked at regarding alternate storage locations

CONTROL MEASURES		IMPLEMENTATION		MONITOR & REVIEW	
Item Ref	**Possible Control Measures**	**Responsibility and Action Required**	**Control Implemented Sign-off & Date**	**Planned Review Date**	**Review** Sign-off & Date
	NA	NA			

CONCLUSION/COMMENTS:

POST IMPLEMENTATION CHECKLIST REVIEW:

APPENDIX 4
PROPOSED SITE PLAN



STAGING COLOUR LEGEND

- STAGE 1
- STAGE 2

STAGING AREA SCHEDULE

STAGING	BUILDING AREA
	599 m²
STAGE 1	13228 m²
STAGE 2	10842 m²
	24669 m²

EXTERNAL PAVEMENT LEGEND

- EXISTING PAVEMENT
- NEW HEAVY DUTY PAVEMENT
- NEW LIGHT DUTY PAVEMENT

PROPERTY DESCRIPTION

LOT: 22 AREA: 8.3Ha
DP: 750050

A1= 1: 500 (A3= 1: 1000) 0 5 10 m

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PROPOSED PROCESSING FACILITY
OVERALL SITE PLAN - FINAL STAGE - NO CONTOURS

Project No - W21314
Dwg No - 00K008 - 3
Date - 03/04/19