HAZKEM
DANGEROUS GOODS CONSULTING

# SEPP (Resilience and Hazards)

## RISK SCREENING DOCUMENTATION

BROWN COMMERCIAL BUILDING

**Brown Commercial**
**c/o**
**Kooragang Industrial Units**
**Lot 1 295 Cormorant Road**
**Kooragang, NSW**

**Hazkem (Aust) Pty Ltd**
**March 2025**


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## PURPOSE AND SCOPE OF THIS DOCUMENT

For dangerous goods installation designs where there are 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 as called up NSW State Environmental Planning Policy (Resilience and Hazards) 2021[1], (incorporating the formally named State Environmental Planning Policy 33 also known as SEPP 33). Such sites should be deemed "potentially hazardous" until a detailed risk assessment determines otherwise. The process flow chart is detailed in Appendix 1.

The NSW Department of Planning provides guidelines for local government and developers to ensure that the safety and pollutant impacts of an industrial proposal are addressed at an early stage of the development application process. The published NSW "Applying SEPP 33" is a way in which to assess and comply with the NSW State Environmental Planning Policy (Resilience and Hazards) 2021(incorporating the formally named State Environmental Planning Policy 33 also known as SEPP 33). Through this document, an assessment procedure is followed which links the permissibility of a proposal to its safety performance. State Environmental Planning Policy (Resilience and Hazards) 2021 and therefore "Applying 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 State Environmental Planning Policy (Resilience and Hazards) 2021 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.

The "Applying SEPP 33" Guideline 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. The established State Environmental Planning Policies also provide 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 the possible risks and hazards associated with this site. This will assist the 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

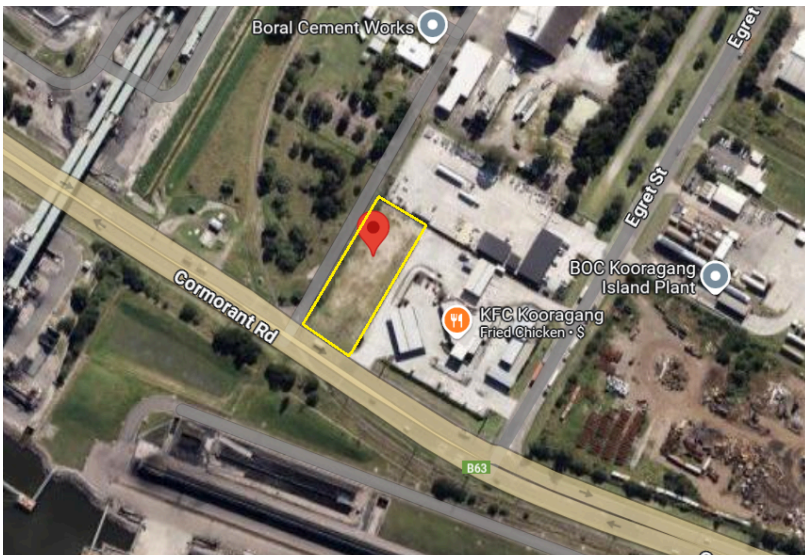
This document has been compiled with guidance from:

- 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 proposed site is an industrial site with a proposed multi-unit building situated at Lot 1, 295 Cormorant Road, Kooragang, NSW. The site is on the northern side of the Cormorant road. The subject site, whilst independent, shares the same block with the Shell service station located to the east. There is an Elgas LPG Depot that adjoins the northeastern boundary of the subject site.




### PROPOSAL

This development is purely a multi-unit industrial building. The site is approximately 2623 square meters in size and proposed to have the entrance and exit via the adjoining service station. Although the proposed site will not engage in the storage of dangerous goods or hazardous materials, the necessity for a State Environmental Planning Policy (SEPP)assessment arises primarily due to the proximity of adjacent sites that may pose potential environmental risks or concerns.

# SEPP 33 RISK SCREENING

As mentioned above, the proposed development does not include any storage of dangerous goods. Consequently, there is no requirement for preliminary risk screening under relevant safety regulations. However, assessment was undertaken with the adjoining properties storing dangerous goods to ensure safe operations of the site.

**FUEL STORAGE at adjoining Kooragang Island Service Station**

| Product | Quantity | Tank No. | Class and PG |
|---|---|---|---|
| Petrol | 30,000 litres | 1 | 3 PG II |
| Petrol | 80,000 litres | 2 | 3 PG II |
| Petrol | 30,000 litres | 3 | 3 PG II |
| Diesel | 30,000 litres | 4 | C1* |
| Diesel | 50,000 litres | 5 | C1* |
| Diesel | 110,000 litres | 6 | C1* |

Notes: * As the diesel (combustible C1) in Tanks 2 and 3 is stored together with the petrol (flammable liquid class 3), it will be considered flammable for the purposes of this report[6].
As the diesel (combustible C1) in Tank 6 is stored on-site separate from petrol (flammable liquid class 3), it is not considered to be potentially hazardous and can be omitted from this report moving forward[6].

**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.

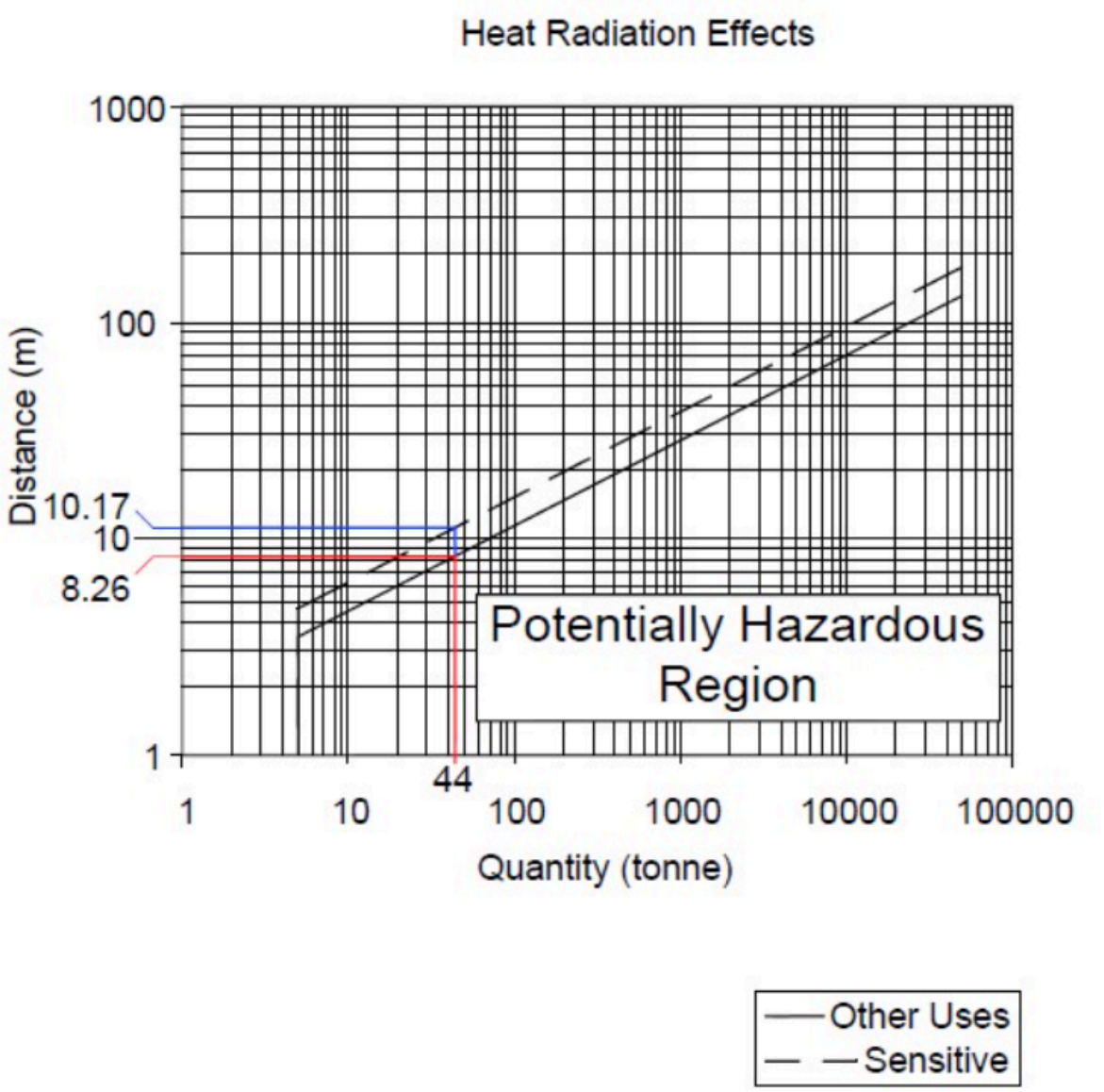
By utilising Figure 9 of "Applying SEPP 33" and measuring separation distances, it can be determined whether further analysis is required. The separation distances are measured from both the underground tank fill points and the fuel dispensers to the subject site's southern boundary.

| Min Distance – Fill Points | Min Distance - Dispensers |
|---|---|
| 45.1 | 15.6 |

Total storage capacity is 220,000 litres.

So for this quantity, as it is stored underground, we can divide by a factor of five, as it is considered less invasive. So allowance is for 44,000 litre storage.

**FIGURE 9, SEPP 33**




**From Figure 9 we can see that for 44,000 litres, the minimum setback distance from the remote fill and dispensing points is 8.26 metres to site property boundaries for other uses or 10.17 metres for sensitive uses (residential uses).**

Since the setback distance is in excess of 8.26m from the subject site's southern boundary to the fill points and dispensers being other uses, the site is deemed to be non-hazardous and there is no requirement to do a PHA for further analysis under this section.

## LPG Storage

***LPG storage at the adjoining Kooragang Island Service Station***

| Storage | Storage Quantity |
|---|---|
| Underground tank | 17,000 litres |

For LP Gas storage at a Service Station "Applying SEPP 33" directs the screening process to the "LPG Automotive Retail Outlets - Locational Guidelines" document, however, this Guideline document has been withdrawn by the NSW Department of Planning. In lieu of this withdrawal and after discussions directly with the Department the most relevant option available is to follow the relevant Australian Standard, AS/NZS 1596-2014 "The Storage and Handling of LP Gas", and in particular, section 10 covering Automotive filling installations at Service Stations and their land use locational guidelines. Table 10.1 of AS/NZS 1596 details land use controls and separation distances.

Section 10 of AS/NZS 1596-2014 permits a maximum aggregate capacity of either 16kl in a single or dual aboveground tank installation or 65kl in an underground single or dual installation on a Service Station site. This proposal incorporates a 17,000L underground vessel which is well below the permitted maximum of 65,000L for an underground installation at a Service Station.

It should also be further noted that in lieu of the "LPG Automotive Retail Outlets - Locational Guidelines" being able to be applied we acknowledge that this site is designed in full accordance with AS/NZS 1596-2014 "The Storage and Handling of LP Gas". AS/NZS 1596 utilises a similar framework to the withdrawn "LPG Automotive Retail Outlets - Locational Guidelines" document by detailing provisions for the use of control zones surrounding the LPG equipment and the service station. Two types of zones are used – exclusion zones and population limit zones.

Population limit zones are circular areas around the service station. An upper limit is placed on the number of people within these zones.

The current print of AS/NZS 1596-2014 includes land use separations requirements which is documented in Table 10.1 of the standard. The following zones are applicable to this site: -

- A commercial and recreational exclusion zone of 15 metres from the centre of the dispenser
- A commercial and recreational exclusion zone of 10 metres from the centre of the fill point and tanker standing area.

Plotting the exclusion zone areas, the 15 metres from the centre of the dispenser and the 10 metres from the centre of the fill point do not encroach on the subject site, confirming compliance with safety regulations and zoning restrictions

***Note. As the LPG vessel is located underground and contains an "in-tank" pump with no exposed pipework, separation distances from the tank itself do not apply.***

***LPG storage at the adjoining Elgas LPG Facility***

**Bulk Storage**

| Adjoining site | Storage | Storage Quantity |
|---|---|---|
| Elgas LPG Facility | Aboveground tank | 100,000 litres |

**Cylinder Storages**

| Product | Storage Type | UN | Class and PG | Quantity* |
|---|---|---|---|---|
| LP Gas | Overnight Tanker Parking | 1075 | Class 2.1 | 40,000 litres |
| LP Gas | Cylinder storage | 1075 | Class 2.1 | 64,000 litres |
| LP Gas | Cylinder storage | 1075 | Class 2.1 | 24,000 litres |
| LP Gas | Cylinder storage | 1075 | Class 2.1 | 40,000 litres |
| LP Gas | Cylinder storage | 1075 | Class 2.1 | 84,000 litres |
| LP Gas | Cylinder storage | 1075 | Class 2.1 | 1,600 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.

Table 1 outlines the Screening Methods to be used for the relevant class stored and the minimum applicable quantities. In this instance based on the proposed storages, the following storages are applicable:
Summary of Table 1 in part:

| Class | Method to Use/Minimum Quantity |
|---|---|
| LPG (aboveground) | table 3 |
| LPG (cylinders) | table 3 |

Summary of Table 3 in part:

| Class | Screening Threshold | Description |
|---|---|---|
| LPG (aboveground) | 10 tonne or 16m3 | If stored aboveground |

Application of Table 3:

| Product | Class | Screening Threshold (Description) | Proposed Storage | Outcome |
|---|---|---|---|---|
| LP Gas (bulk and cylinders) | 2.1 | 10 tonne or 16m3 (If stored aboveground) | 353,600 litres | Threshold Exceeded |

As can be seen by utilising Table 3 of Applying SEPP 33, the LPG storages exceed the threshold quantity. As such further analysis with regards to the storages of LPG in bulk and cylinder storages is required as they are deemed to be potentially hazardous.

## TRANSPORT SCREENING THRESHOLD

"Applying 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 of LP gas to the Elgas LPG facility will be about 6 a week or 312 times a year which is well below the allowable 30 movements per week or 500 movements per year.

In this case, as the number of expected deliveries for LPG is well below the thresholds, there is no requirement to do further analysis in the form of a PHA based on the transport screening thresholds.

Table 2: Transportation Screen Threshold "Applying SEPP 33" (page 18)

| | | Vehicle Movements | | Minimum quantity per load (tonne)* | |
|---|---|---|---|---|---|
| **Product** | **Class** | **Screening Threshold (Annual)** | **Screening Threshold (Peak Weekly)** | **Bulk** | **Packages** |
| LP Gas | Class 2.1 | >500 | >30 | 2 | 5 |

As the proposed industrial units do not propose any storage of dangerous goods, a transport screening threshold for the subject site does not apply to this assessment.

### CONCLUSION

It has been determined via assessment of this proposal under the NSW State Environmental Planning Policy (Resilience and Hazards) and the NSW "Applying SEPP 33" Guideline Document that the development is deemed "not potentially hazardous". The development does not involve the storage of dangerous goods; therefore, it does not pose an unacceptable risk to the surrounding area. Accordingly, no further assessment related to the transport of dangerous goods is required.

Additionally, it has been determined via the assessment of the adjoining properties under the NSW State Environmental Planning Policy (Resilience and Hazards) and the NSW "Applying SEPP 33" Guideline Document that the proposed site is located within the vicinity of a potentially hazardous development. The storage threshold associated with the adjoining Elgas LPG facility exceeds the allowable thresholds and as such requires 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 located in the vicinity of a "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 the risk ranking method detailed in Appendix 2*

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

| Product | Storage Type | UN | Class and PG | Quantity |
|---|---|---|---|---|
| LP Gas | Aboveground Tank | 1075 | Class 2.1 | 100,000 litres |
| LP Gas | Cylinder Storage | 1075 | Class 2.1 | 253,600 litres |

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 the 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 the risk ranking method detailed in Appendix 2.

The LP Gas system at the adjoining gas depot 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. Firefighting 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 fill point
  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 shutdown 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 will 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 fittings and valves will be secured against tampering. The aboveground tank will be located on 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 that all products 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 phones 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 the 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.

**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 pipelines).

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 to show 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 storage does not include any sensitive uses.

**Calculations**

Firstly, IAEA Table II (page 17) provides us with reference number 9 for this type of storage being LP Gas in an aboveground tank. Also, IAEA Table II (page 17) provides us with reference number 13 for the LPG cylinder storage.

For the LP Gas storage of 353,600L, with an average relative vapour density of 0.539 referencing the gas supplier's Safety Data Sheet being Elgas, we can calculate the storage as 190.6 tonnes. From IAEA Table IV(a), (page 42), we can then apply for classification of substance by effect category based on the 190.6 tonnes for references 9 and 13 we then obtain CI. So the worst-case scenario is DIII.

Using these classifications, in IAEA table V, (page 43) we obtain ***A*** for DIII being a maximum area of effect distance of 50-200 m's radius and an effect area of 1ha. (A=1)

As the maximum effect areas can not be fully contained within the site's boundaries, the population distribution around the site needs to be assessed.

The adjoining site itself takes up the majority of the Effect Area however some area also encroaches on the proposed development. The Population Density guidance of Table VI (page 44) will be utilised, with the ability to correct where deemed necessary. As a conservative figure, utilising the guidance provided by Table VI and knowledge of the area we estimate 20 persons per hectare (d = 20).

**Possible Number of Fatalities**

Considering the population correction factor fA 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 $\pi \times r^2 = \pi \times 200^2 = 125{,}663.70$ m2. The gas depot has an approximate area of 8,646m2 with the processing scattered across the site. 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 to take up approximately 6.9% of the Effect Area. Based on Table VII a population fraction of 10%, as the nearest percentage, needs to be applied and therefore a figure of 1 is determined. (fA = 1)

Following on to the mitigation correction factors $f_m$, in this case, as the substance is flammable and reference numbers 9 and 13, Table VIII (page 45) gives a maximum 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:

$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$
$C_{a,s} = 1x20x1x1$
$C_{a,s} =$ ***20 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 delivery frequency of approximately 260 deliveries per year $n_l = -1.5$

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, the Affect Area does not encroach on residential properties with road ways and industrial properties taking up the affect area. As there are no residential properties located within the Affected Area and therefore 5% coverage, being the lowest percentage, is applied and $n_p = 1.5$ so

where
$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$
$N_{i,s} = 7 + -1.5 + 0 + 0 + 1.5 = 7$

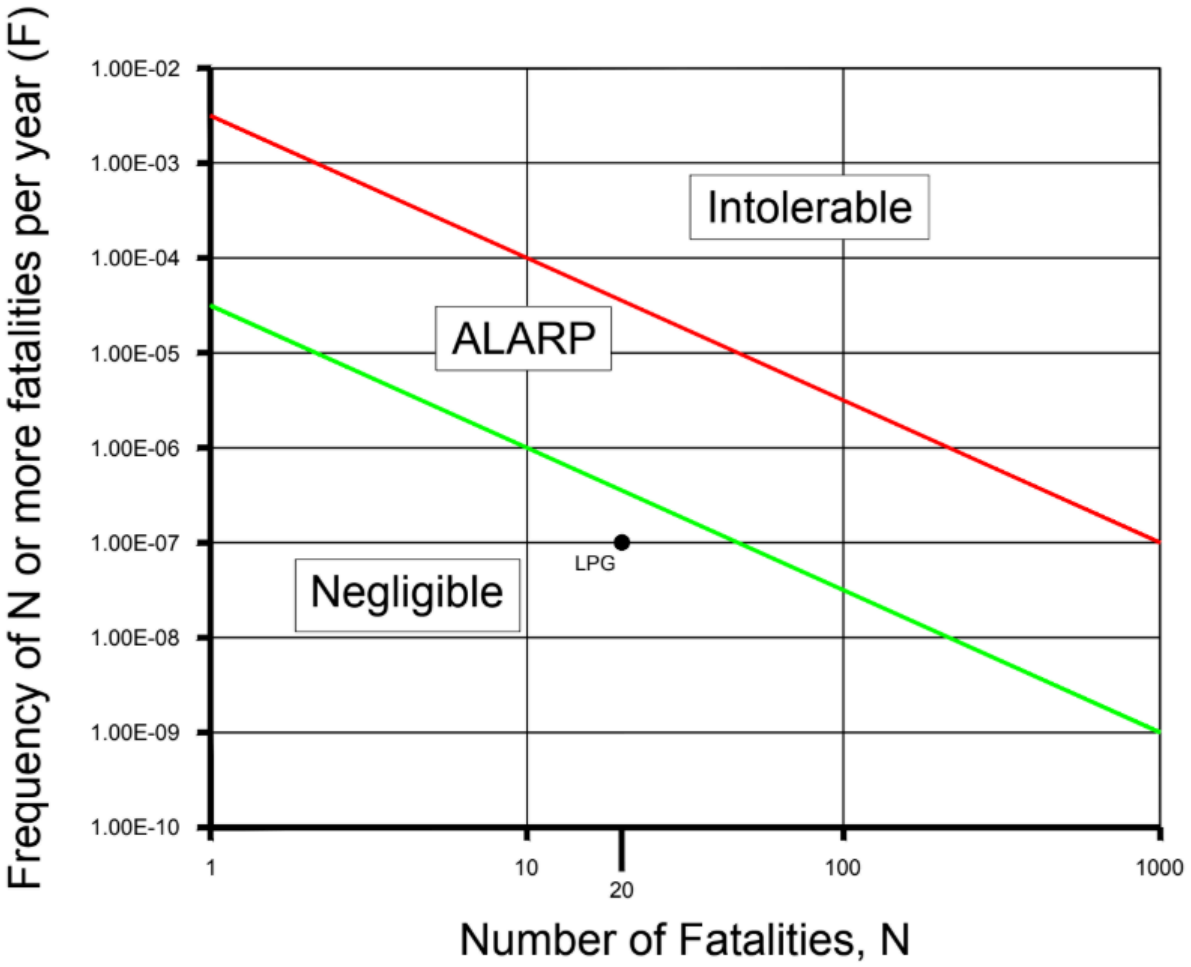
Converting probability into frequency, in table XIV, we get $1 \times 10^{-7}$

**PLOTTING**

Summary of calculations :

| | **Possible fatalities** | **Estimation of Probability of major accident** |
|---|---|---|
| LP Gas | 20 | $1 \times 10^{-7}$ |

This result can be plotted on the following graph:




By intersecting the frequency ($P = 1 \times 10^{-7}$) with the consequences (**20** fatalities per accident) in the graph above, we can see that the risk to society from the existing gas depot 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**

Plotting the frequency against consequence, it can be clearly seen that the societal risk is negligible. Therefore, only a level one qualitative Risk Analysis is required. This analysis is referred to in Applying SEPP 33 as a Preliminary Hazard Analysis (PHA), which has been included as detailed elsewhere in this document.

# HIPAP 10 ASSESSMENT

Sites storing or handling dangerous goods (DGs) can pose risks to surrounding land uses. If quantities are below SEPP-RH thresholds, the offsite risk is negligible. However, if thresholds are exceeded, it's essential to show that risks remain within acceptable limits. When a new development is proposed near an existing facility that exceeds these thresholds, a land use conflict may arise, potentially exposing the new development to unacceptable risks. In such cases, the proponent must demonstrate that their development won't introduce unacceptable risks from surrounding operations. HIPAP No. 10 outlines the methodology and criteria for assessing the risks to new developments.

Based on the State Environmental Planning Policy (Resilience and Hazards) prepared by Riskcon Engineering Pty Ltd, the assessment indicates that the risk factors affecting the industrial storage unit are within acceptable limits. Therefore, approving the industrial storage development will not pose an unacceptable risk to the site, considering the current Elgas operations.[8]

**CONCLUSION**

The review against the acceptable risk criteria in HIPAP No. 10 concluded that the risks associated with the Elgas facility would not pose an unacceptable risk to the industrial storage facility if it is approved. The assessments indicate that the proposed industrial-storage development is deemed suitable for the intended land use.

# CONCLUSION

As can be seen through the application of NSW State Environmental Planning Policy (Resilience and Hazards), the NSW "Applying SEPP 33" Guideline Document "Applying SEPP 33" and the subsequent Preliminary Hazard Analysis (PHA) with the assistance of plotting the frequency against consequence, the societal risk 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/maintained to the 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.

Moreover, the review against the acceptable risk criteria in HIPAP No. 10 concluded that the risks associated with the Elgas facility would not pose an unacceptable risk to the industrial storage facility if it is approved. This assessment reinforces that the proposed industrial storage development is deemed suitable for the intended land use, further confirming that all necessary measures have been considered to mitigate risks effectively. Therefore, the development meets the overall goals of keeping safety in mind and following environmental planning rules.

# DOCUMENT REFERENCES


[1] State Environmental Planning Policy (Resilience and Hazards) 2021 – Department of Planning NSW, March 2022.
[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
[5] Protection of the Environment Operations (Clean Air) Regulation 2022
[6] State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines – Department of Planning NSW. Page 16
[7] State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines – Department of Planning NSW. Page 18, table 2
[8] State Environmental Planning Policy (Resilience and Hazards) prepared by Riskcon Engineering Pty Ltd (Document No. RCE-25086_BCB_SEPP-RH_Final_6Mar25_Rev(0))


## OTHER REFERENCES

**Australian Standards:**

| | |
|---|---|
| AS 1940-2017 | "The Storage & Handling of Flammable & Combustible Liquids" |
| AS/NZS 1596-2014 | "Storage and Handling of LPG Gas" |
| AS 4897-2008 | "The Design, Installation and Operation of Underground Petroleum Storage Tanks" |
| AS 3000-2007 | "Electrical Wiring Rules". |
| AS/NZS IEC 60079.10.1-2022 | "Explosive atmospheres - Part 10.1: Classification of areas - Explosive gas atmospheres" |
| AS/NZS IEC 60079.10.1-2022 Sup 1-2022 | "Explosive atmospheres- Classification of areas - Explosive gas atmospheres - Commentary (Supplement 1 to AS/NZS IEC 60079.10.1-2022)" |
| 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 2011
NSW Work Health and Safety Regulation 2017

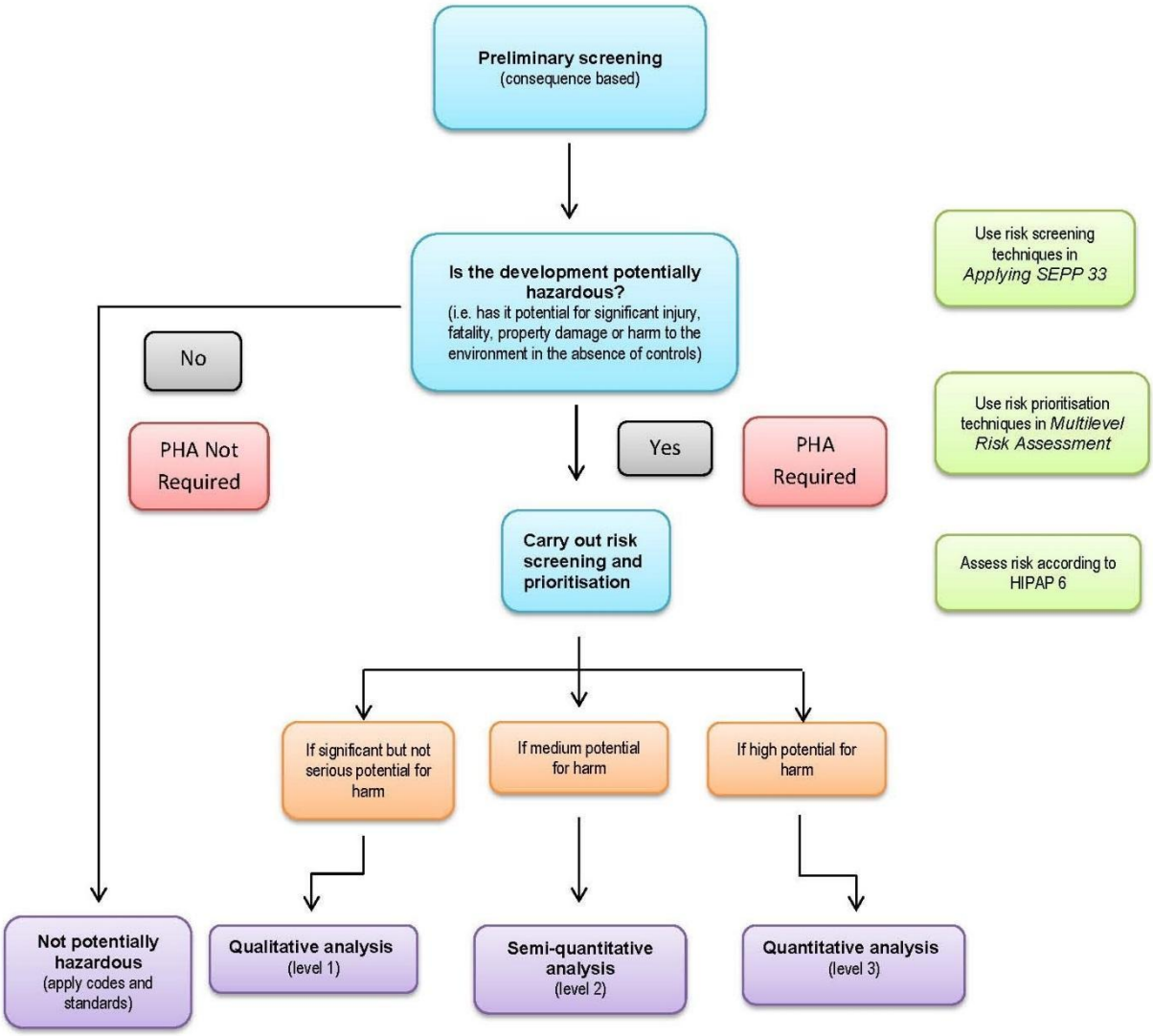
**Planning NSW Guidelines:**

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

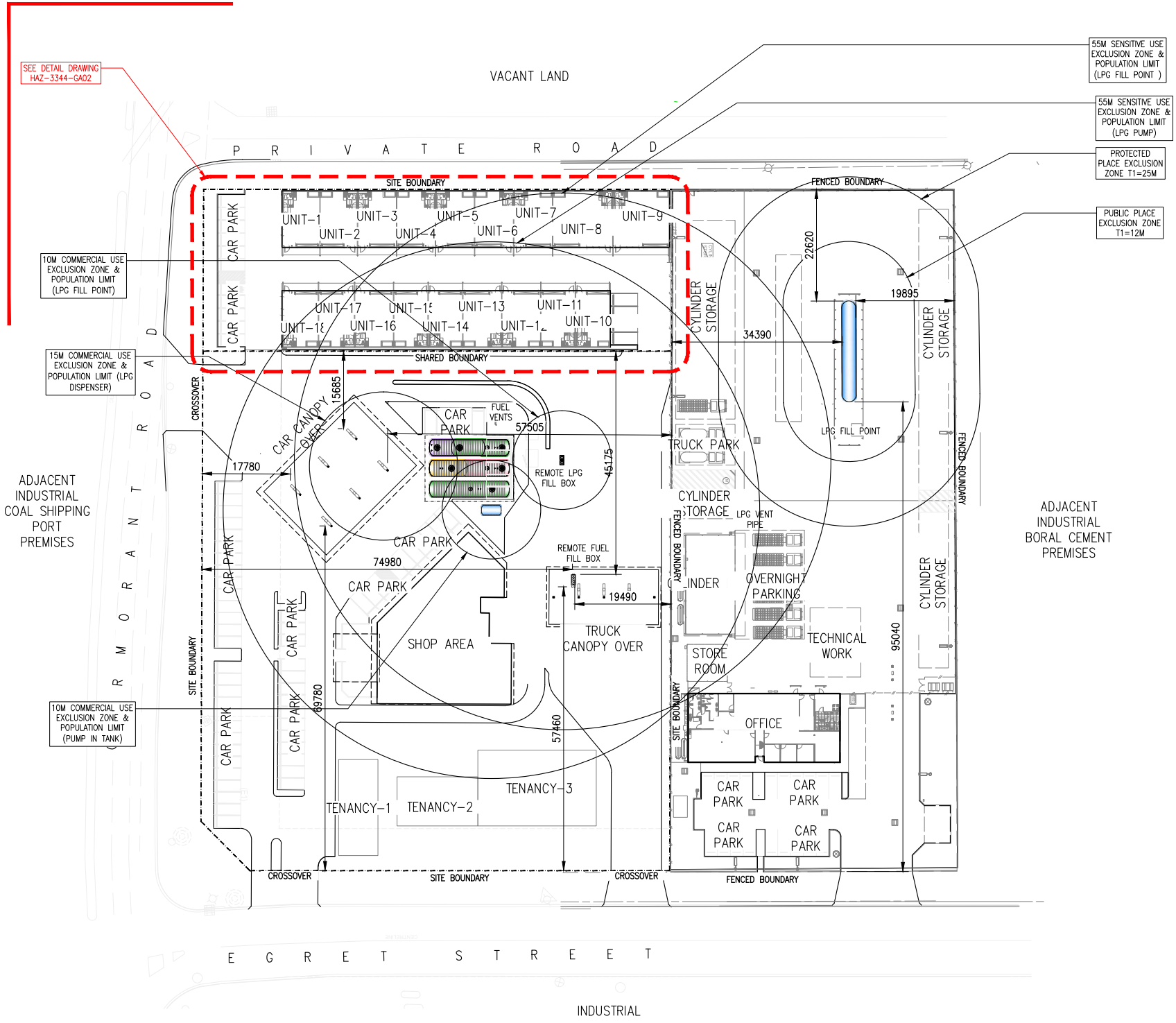
***Risk Ranking Method (above)***
*For each event, the appropriate probability (a letter A to E) and consequence (a number 1 to 5) is selected. If an event affects more than one area of consequence (eg. Affects people and production), The highest rank number, i.e.1, is always selected.*

***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 | A | B | C | D | E |
|---|---|---|---|---|---|
| **CONSEQUENCE** | | | | | |
| **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
# PROPOSED SITE PLAN




| ADJOINING SITES STORAGE DETAILS | | | |
|---|---|---|---|
| TANK-ID | TANK-SIZE | COMPARTMENT-SIZE | PRODUCT |
| T1 | 110, 000LT | 30, 000LT | ULP |
| T4 | | 30, 000LT | DSL |
| T5 | | 50, 000LT | DSL |
| T2 | 110, 000LT | 80, 000LT | E10 |
| T3 | | 30, 000LT | 95ULP |
| T6 | 110, 000LT | 110, 000LT | DSL |
| T7 | 17, 000LT | 17, 000LT | LPG |
| T8 | 119 000LT | 119 000LT | LPG |

BROWN COMMERCIAL BUILDING

PRELIMINARY ISSUE

| ISS/AMT | DESCRIPTION | BY | DATE |
|---|---|---|---|
| - | - | - | - |
| - | - | - | - |
| - | - | - | - |
| - | - | - | - |
| 0 | INITIAL HAZKEM ISSUE | GN | 14.10.24 |

HAZKEM

ABN 63 616 105 483
DANGEROUS GOODS CONSULTING
FUEL SYSTEM DESIGN & ENGINEERING SERVICES
UNIT 9/11 FRIAS ROAD, MOORABBIN VIC 3189
PHONE (03) 9842 7300
www.hazkem.com.au

PROJECT

KOORAGANG
LOT 1 295
CORMORANT ROAD
KOORAGANG, NSW

CLIENT

BROWN COMMERCIAL

TITLE

LOCALITY SITE PLAN

75m 0 75m 150m 225m 300m 375m

SCALE 1 : 750

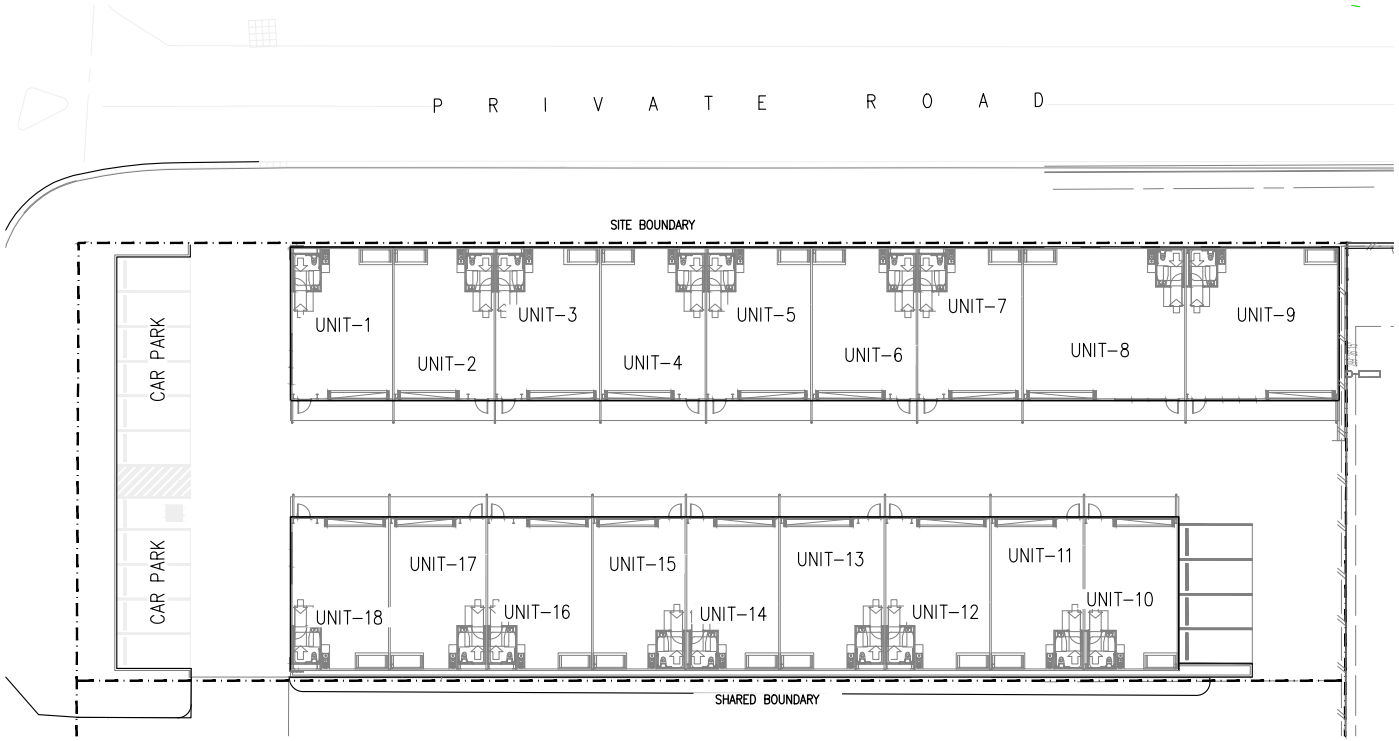
| PROJECT No | DESIGNED | DRAWN | SCALE |
|---|---|---|---|
| HAZ-3344 | | GN | 1:750 @A3 |

NORTH

APPROVED

DRAWING No: HAZ-3344- GA01

ISSUE/AMT: 0




BROWN COMMERCIAL BUILDING

PRELIMINARY ISSUE

| ISS/AMT | DESCRIPTION | BY | DATE |
|---|---|---|---|
| - | - | - | - |
| - | - | - | - |
| - | - | - | - |
| - | - | - | - |
| 0 | INITIAL HAZKEM ISSUE | GN | 14.10.24 |

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PROJECT

KOORAGANG
LOT 1 295
CORMORANT ROAD
KOORAGANG, NSW

CLIENT

BROWN COMMERCIAL

TITLE

GENERAL ARRANGEMENT SITE PLAN

4m 2m 0 4m 8m 12m 16m 20m
SCALE 1 : 400

| PROJECT No | DESIGNED | DRAWN | SCALE |
|---|---|---|---|
| HAZ-3344 | | GN | 1:400 @A3 |

NORTH

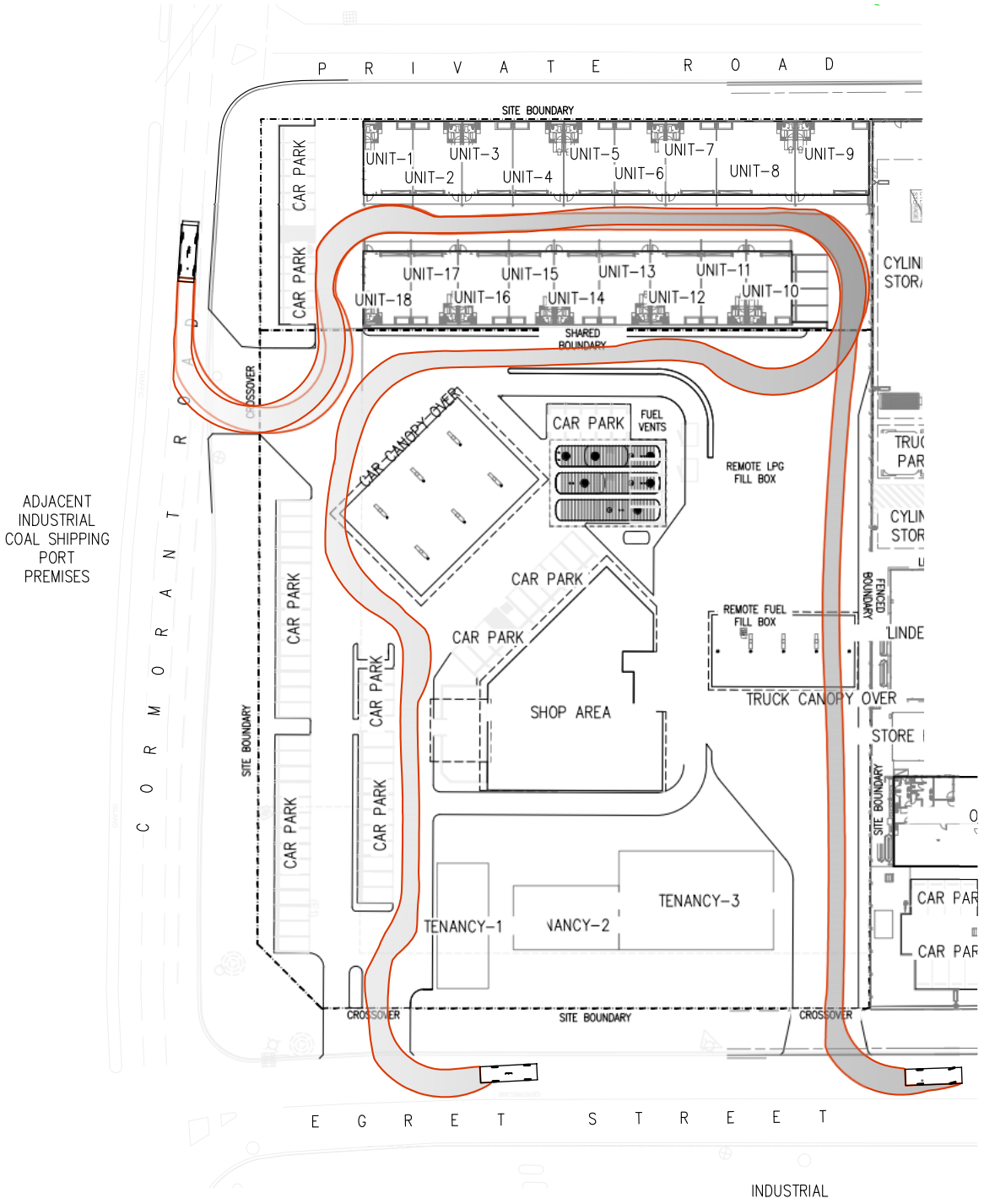
APPROVED

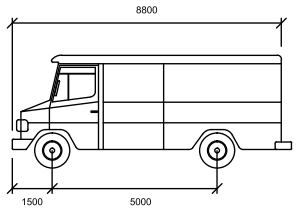
DRAWING No

HAZ-3344- GA02

ISSUE/AMT

0




| SVEH | mm |
|---|---|
| Width | 2500 |
| Track | 2500 |
| Lock to Lock Time | 6.0 |
| Steering Angle | 26.2 |

BROWN COMMERCIAL BUILDING

PRELIMINARY ISSUE

| ISS/AMT | DESCRIPTION | BY | DATE |
|---|---|---|---|
| – | – | – | – |
| – | – | – | – |
| – | – | – | – |
| – | – | – | – |
| 0 | INITIAL HAZKEM ISSUE | GN | 17.10.24 |

**HAZKEM**

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PROJECT

KOORAGANG
LOT 1 295
KOORAGANG, NSW

CLIENT

BROWN COMMERCIAL

TITLE

GENERAL ARRANGEMENT SERVICE VEHICLE PATH LAYOUT

3.5m 0 7m 14m 21m 28m 35m

SCALE 1 : 700

| PROJECT No | DESIGNED | DRAWN | SCALE |
|---|---|---|---|
| HAZ-3344 | | GN | 1:700 @A3 |

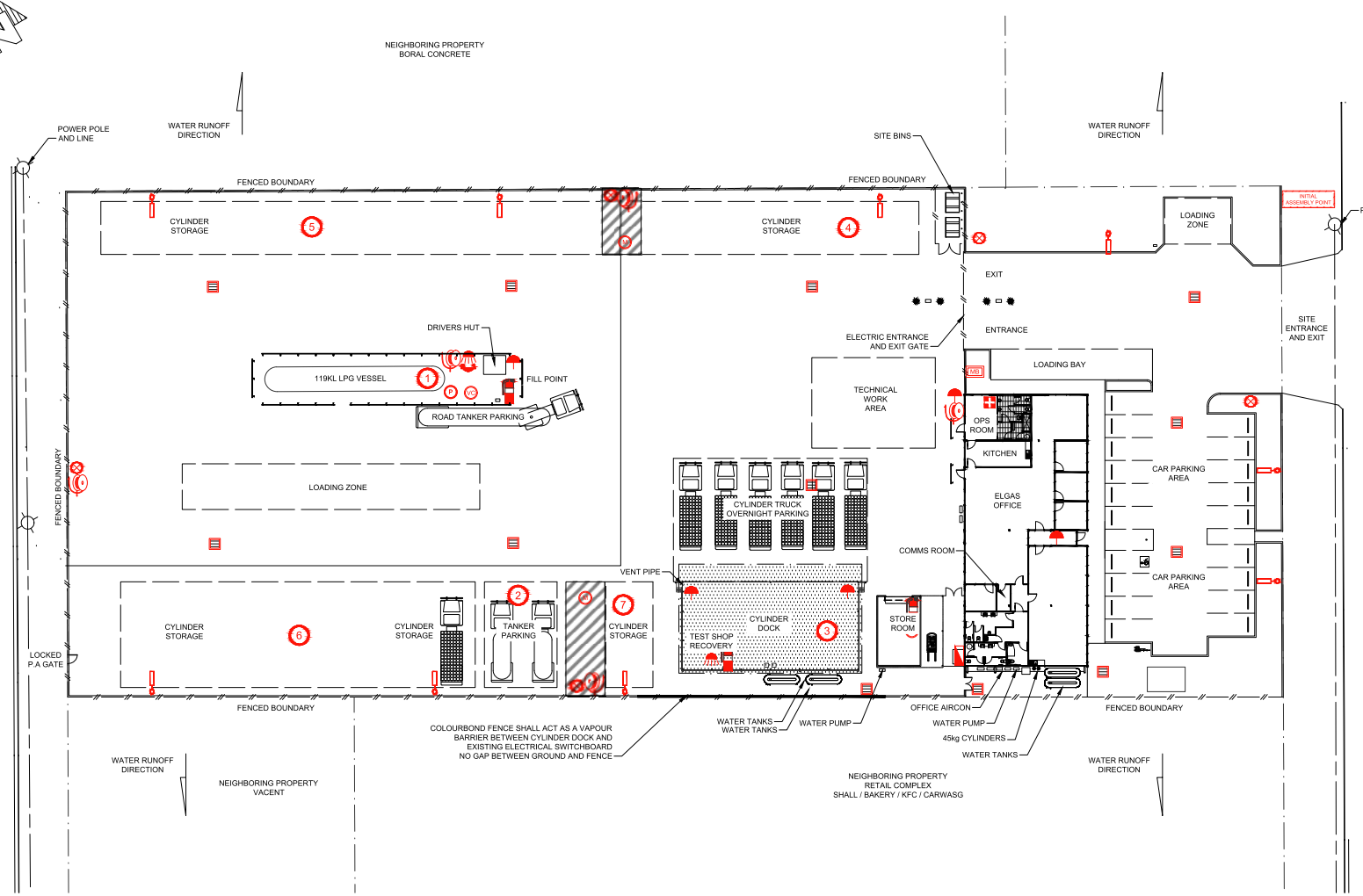
NORTH

APPROVED

DRAWING No: HAZ-3344- GA03

ISSUE/AMT: 0

| DEPOT DETAILS | | | | |
|---|---|---|---|---|
| Storage No | Description | CLASS | CONTENTS | QUANTITY |
| 1 | Above Ground Tank (AGT) | 2.1 | PETROLEUM GASES, LIQUIFIED | 100000L |
| 2 | Overnight Tanker Parking | 2.1 | PETROLEUM GASES, LIQUIFIED | 40000L |
| 3 | Cylinder Store | 2.1 | PETROLEUM GASES, LIQUIFIED | 64000L |
| 4 | Cylinder Store | 2.1 | PETROLEUM GASES, LIQUIFIED | 24000L |
| 5 | Cylinder Store | 2.1 | PETROLEUM GASES, LIQUIFIED | 40000L |
| 6 | Cylinder Store | 2.1 | PETROLEUM GASES, LIQUIFIED | 84000L |
| 7 | Cylinder Store | 2.1 | PETROLEUM GASES, LIQUIFIED | 1600L |




## GENERAL ARRANGEMENT - PLAN
SCALE 1:250

## LEGEND

- FIRE EXTINGUISHER
- MFB EMERGENCY INFORMATION BOX
- FIRE HOSE REEL AND CABINET
- ELECTRICAL SWITCHBOARD
- DUAL FIRE HYDRANT
- FIRE HYDRANT
- SITE LIGHTING
- EMERGENCY STOP DEVICE
- FIRE HOSE REEL ONLY
- FIRST AID BOX
- GAS DETECTOR
- EYE WASH
- SAFETY SHOWER
- AIR COMPRESSOR
- VAPOUR COMPRESSOR
- LPG PUMP
- FIRE MONITOR

0 6250 12500 25000
1:250

drafting now
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Email: jason@draftingnow.com.au
Web: www.draftingnow.com.au



ELGAS

Elgas Limited
Po Box 1336, Chatswood NSW, 2067
Phone: 131 161

DRAWING NUMBER: D-NSW-NEW-FIR-001
SIZE: A1

TITLE
ELGAS LPG
NEWCASTLE DEPOT
EGRET STREET, NSW
FIRE SERVICES LAYOUT

| | | |
|---|---|---|
| SCALE : | AS SHOWN | REVISION: 0 |
| DRAWN : | J.LITTLE | 12.05.20 |
| CHECK : | P.EGAN | 12.05.20 |
| APPVD : | L.NOTTIDGE | 12.05.20 |
| DEPARTMENT: | ENGINEERING | |

| REV | DATE | DESCRIPTION | DRAWN | CHECK | APP |
|---|---|---|---|---|---|
| 0 | 14.05.20 | AS BUILT | JL | PE | LN |
| A | 12.05.20 | ORIGINAL ISSUE | JL | PE | LN |

| DRAWING DESCRIPTION | REFERENCE NUMBER |
|---|---|
| SITE P&ID | D-NSW-NEW-PID-001 |
| EVACUATION PLAN | D-NSW-NEW-EVA-001 |
| SITE TRAFFIC MANAGEMENT | D-NSW-NEW-TRA-001 |
| FIRE SERVICES LAYOUT | D-NSW-NEW-FIR-001 |
| HAZARDOUS AREAS | D-NSW-NEW-HAZ-001 |
| GENERAL ARRANGEMENT | D-NSW-NEW-GEN-001 |

EMERGENCY RESPONSE NUMBER
1800 819 783