

MULTI-LEVEL RISK ASSESSMENT

For

**RCI GROUP PTY. LTD.
ABN 61 132 443 997**

At

79 Barrenjoey Road

MONA VALE - NSW

27 March 2019



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Preamble:

The following report has been completed on behalf of RCI Group Pty Ltd. (RCI), for the proposed development of a Fuel Dispensing Station, for public use, and at the site specified within. A Multi-Level Risk Assessment (MLRA) has been completed, the level of which has been determined from information supplied by RCI Group Pty Ltd. and their agents to myros design pty. ltd.

Disclaimer:

- The comments, drawings, checklists and recommendations in this report, prepared by myros design pty. ltd. and their agents ("myros") are on the basis of works RCI Group Pty Ltd. (RCI).
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- Where reference is made to any individual person, then this should be seen as a reference to that person's part in the system management and operation and not to be regarded as a reflection on his/her competency or integrity.
- Any matter not referred to in this report should not be regarded as having been inspected. Recommendations are not exhaustive, and where applicable, all works are subject to full compliance and approval by the National and State Authorities.
- Any party, which makes use of this report, drawings & checklists, is the responsibility of such party. myros design pty. ltd. and their agents accepts no responsibility whatsoever for damages if any are suffered by any party in reliance on information contained in the comments, drawings, checklists and recommendations.
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- "myros" have used all reasonable care and skill.

Site Information

Site Location:	79 Barrenjoey Road, MONA VALE - NSW
Reference Drawings:	Proposed Site Layout Plan (Petrols & Diesel)
Storage:	All Substances are stored in Double Wall Underground Storage Tanks.
Transportation:	Hazardous Substances are transported to site by approved Petroleum Products Road Tankers. Reference: Australian Code for the Transportation of Dangerous Goods by Road and Rail, 7 th . Edition.
Number of deliveries:	Expected number of deliveries annually will be less than <u>300</u> .

Class 2.1 Hazardous Substances: Not to be installed at this stage.

Hazardous Material	Quantity (kL)	Classification & Package Group
Auto Liquefied Petroleum Gas	NIL	--

Class 3 Hazardous Substances: Refer to Proposed Site Layout Plan.

Hazardous Material	Quantity (kL) Nom. Capacity	Classification & Package Group
Unleaded 91	40	3 PG II
Ethanol10	30	3 PG II
Premium Unleaded Petrol 98	30	3 PG II
Premium Unleaded Petrol 98	30	3 PG II
Automotive Diesel Fuel	50	3 PG II**
Total Class 3	180 kL	

** Combustible Liquid Class C1, treated as Class 3 PG II for assessment purposes, as it is stored together with petrols.

Minimum Boundary Distances: Distances from boundaries to hazardous substances filling and dispenser points are listed.

Class 3 Hazardous Substances: Refer to Proposed Site Layout Plan.

Boundary	Minimum Distances (in m)	
	Fill Point	Dispensers
North	26.60	27.07
South	19.64	19.53
East	6.46*	9.81
West	25.06	7.32*

* Denotes remote filling / dispenser within potentially hazardous areas as determined by SEPP 33. Refer Threshold Screening section below.

Layout Approvals:

SafeWork New South Wales Dangerous Goods Notification will be required prior to opening.

Site Layout Plan for Fuel System **has been assessed**. Dangerous Goods Site Layout Plan for Fuel System has been stamped by Rolando Ferreira, Accredited Dangerous Goods Consultant for Myros Design Pty Ltd for DA only. (no pipework).

Trade waste disposal to be carried out in compliance with relevant authorities. Appropriate approval to be sought for their disposal.

THRESHOLDS SCREENING –Applying SEPP 33**Storage Screening:****Fuel System – Petrol and Diesel Storage:**

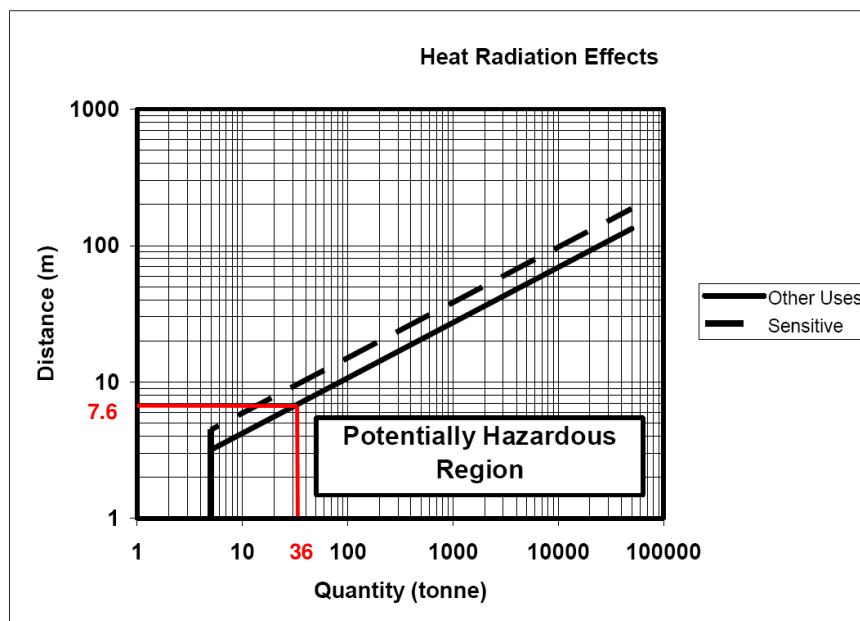
Total Storage Capacity: 180,000 litres. (180 kL), therefore 180 kL should be considered for screening purposes.

Since the fuel is stored under ground, the Screening Capacity becomes:

$$\text{Screening Capacity} = \frac{\text{Storage capacity (180)}}{5} = 36 \text{ kL}$$

The graph shown here is from the Hazardous and Offensive Development Application Guidelines.- “Applying SEPP 33”, January 2011.

Figure 9: Class 3PGII and 3PGIII Flammable Liquids



For a screening quantity of **36 kL**, the **minimum** separation distance from the **remote filling** and **dispenser points** is **7.6 metres**.

Since there are site boundaries within this separation distance, the storage and dispensing of the fuel does not pass initial screening. Further analysis is required; refer to PHA (Appendix C) for further measures to reduce the risk.

Transport Screening:

For substances of class 3 PG II, the screening value for cumulative vehicle movements per annum is 750. (Refer Applying SEPP 33 Table 2).

Since the expected number of deliveries is less than 300 per annum, transport threshold figures do not exceed required amount.

Refer Appendix A for Screening Procedure Summary.

Risk Classification:

The analysis will determine what level of further risk assessment is required. (Refer Appendix B for Multi-Level Risk Assessment diagram).

Classification of Type of activities and Inventories:

Since we are dealing with **Underground Fuel Storage** at service stations, and the total capacity of the site is 180 kL, therefore 180 kL should be considered for screening purposes, but since the fuel is stored under ground, the screening capacity becomes 180 divided by 5 = **36 kL**.

Reference No. 6 (Petrol)
Effect category is BII (Petrol)

(Refer IAEA Table II)
(Refer IAEA Table IV [a]).

Maximum Distance and Area of Effect:

From IAEA Table V, we get the following:

Maximum Distance =
Area, A=

PETROLS
25 - 50 m
0.4 ha

Population Distribution:

From IAEA Table VI: Population Density (d).

We need to estimate the number of people within the above region at any one time. Using a circle of 36 m radius which is slightly over 0.4 of an hectare (ha), from the centre of the new underground fuel tanks, there are: to the North, Service Station Building & 8 car parking spaces, to the South, forecourt of the canopy & Self Storage units, to the West, Mona Vale Autos & to the East, entry & exit driveways & Barrenjoey Road (6 lanes width) within this circle, (by using the Dept. of Planning Guidelines for LPG methodology), therefore we will have a population density of approximate:

Population density: $d = 8.0$ persons / ha.

Population Correction factor:

From IAEA Table VII: Population Correction Factor (f_A).

The Population Correction Factor is to determine what percentage of the area within a 50 m radius (for petrols) from the site is populated.

Therefore: Total area = $\pi \times r^2 = \pi \times 50^2 = 7,854 \text{ m}^2$ (for petrols).

Site Area = $1,628 \text{ m}^2$

Population Correction Factor, f_A

$$f_A = \frac{\text{total area} - \text{site area}}{\text{total area}} = \frac{7854 - 1628}{7854} = \mathbf{0.793}$$

Mitigation Correction Factor:

From IAEA Table VIII, Correction factor for mitigation, $f_m = 1$

Estimation of External Consequences:

$C_{a,s} = A \times d \times f_A \times f_m$ Thus: BII = $0.4 \times 8.0 \times 0.793 \times 1 = \mathbf{2.54}$ fatalities per accident.

Estimation of Probability of Major Accidents:

The probability number is given by the formula: $N_{i,s} = N_{i,s}^* + n_l + n_f + n_o + n_p$

Where: Average Probability Number, $N_{i,s}^* = 7$ for Ref No.6. (Refer IAEA Table IX).

Correction Factor for:

Loading, $n_l = -1$

(Refer IAEA Table X {A})

Flammables, $n_f = 0$

(Refer IAEA Table XI)

Organisational Safety, $n_o = 0$

(Refer IAEA Table XII)

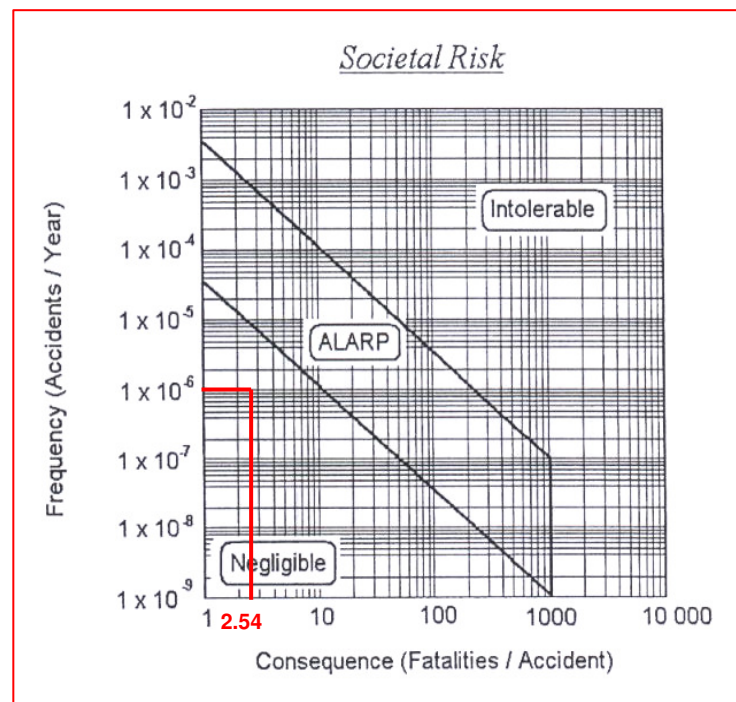
Wind Direction, $n_p = 0$

(Refer IAEA Table XIII)

Therefore, Probability Number: $N_{i,s} = 7 + -1 + 0 + 0 + 0 = \mathbf{6}$

And converting Probability Numbers into Frequency of Events per year, (Refer IAEA Table XIV):
 $\mathbf{P = 1 \times 10^{-6}}$

Level of Risk:



By intersecting the Frequency ($P = 1 \times 10^{-6}$) with the Consequence ($BII = 2.54$) in the graph above, we could see that the risk to society from the proposed development falls within the negligible area, and all possible measures shall be taken to ensure that the level of risk is kept as low as possible.

The steps to be undertaken by RCI Group Pty Ltd. (RCI) or their lessees to reduce the risk of an incident occurring have been included in Appendix C and forms part of the Preliminary Hazards Analysis.

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 Appendix C.

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 have been included in the PHA, including all monitoring procedures.

Further comments

Listed below are the minimum required separation distances for Fuel Systems (Petrols) to boundaries, together with references.

Fuels (Petrol & Diesel)	Australian Standards & Clauses references
☒ Fill point : 3 & 4 metres	AS 1940-2017, Clause 5.3.2(c) & AS/NZS 60079.10.1:2009 Annex ZA Clause 5.2.2 (c) & Clause 5.2.9 (c).
☒ Dispensers : 4 metres	AS 1940-2017, Clause 7.3.1(b) & AS/NZS 60079.10.1:2009 Annex ZA Clause 4.4.2.2 & Fig. ZA.4.

The design of this proposal meets and exceeds the above Australian Standard requirements. These distances can also be achieved if vapour barriers are installed, (not required in this instance).

References:**Australian Standards:**

AS1940 – 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 /NZS 3000 – 2007	“Electrical Installations (ANZ 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.

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. 1 - Industry emergency Planning Guidelines.
Hazardous Industry Planning Advisory Paper No. 2 - Fire Safety Study Guidelines
Hazardous Industry Planning Advisory Paper No 3 - Environmental Risk Impact Assessment Guidelines
Hazardous Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use Safety Planning
Hazardous Industry Planning Advisory Paper No. 5 - Hazard Audit Guidelines
Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis
Hazardous Industry Planning Advisory Paper No. 7 - Construction Safety Study Guidelines
Hazardous Industry Planning Advisory Paper No. 8 - Hazard and Operability Studies
Hazardous Industry Planning Advisory Paper No. 9 - Guidelines for the Development of Safety Management Systems
Hazardous Industry Locational Guidelines No. 1 Liquefied Petroleum Gas, Automotive Retail Outlets.

NSW EPA Guidelines:

Information Sheet 3 of Environmental Action for Service Stations. Forecourt Design, Operation & Maintenance.

Other Documentation:

NSW Work Health & Safety Act 2011 and the Regulation of the same name dated 2011.
Local Authorities requirements, SafeWork NSW and EPA Acts and Regulations.
Equipment Suppliers Specifications, Requirements and Instructions.
Fuel System Specifications and Drawings.
Site Specific drawings and suppliers specifications.

APPENDIX “A”

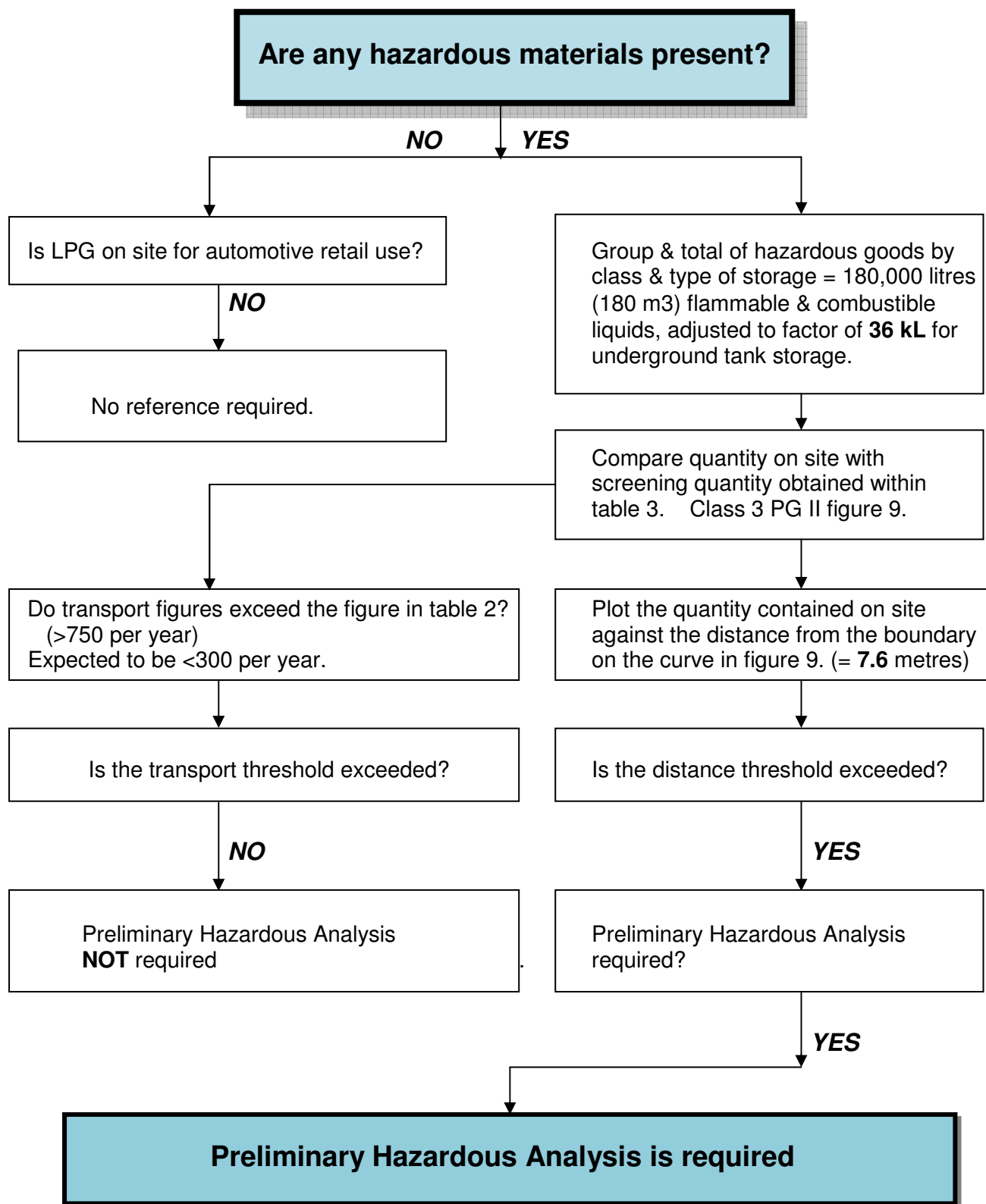
SEPP 33

Risk Screening Procedure

SALAMANDER BAY - NSW

27 March 2019

SEP33 Risk Screening Procedure Summary Sheet



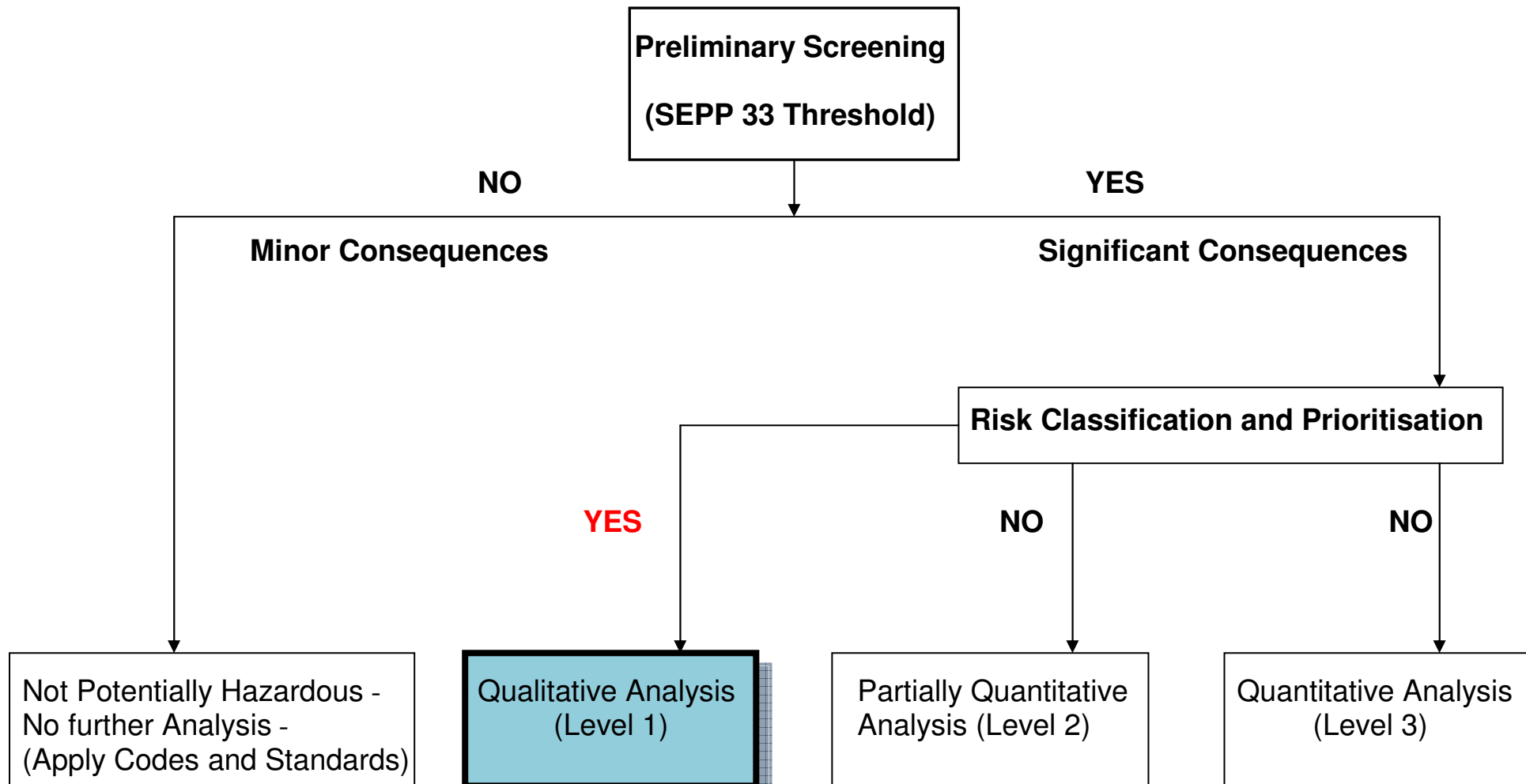
APPENDIX “B”

MULTI LEVEL RISK ASSESSMENT

Screening Thresholds

27 March 2019

MULTI-LEVEL RISK ASSESSMENT



APPENDIX B

APPENDIX “C”

Preliminary Hazards Analysis and Summary

for

MONA VALE - NSW

27 March 2019



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Purpose of Hazard Analysis

The main purpose for the development of the refueling facilities of the Service Station, is to provide an improved service to the motoring public by providing them with a facility to purchase a variety of fuels, prior or after using the other facilities.

To enable best practices for safe operation and environmental protection, the equipment will have the following features, protection devices and benefits:

All equipment will be designed and installed to the latest technology and techniques available to date from approved suppliers.

The design & installation of the underground petroleum storage system to comply with AS 4897 - 2008 and with Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulations 2014 and Protection of the Environment Operations (Clean Air) Regulation 2010 (if required by legislation). Also will comply with AS 1940.

Auto LPG will NOT be installed on this site at this stage.

Underground storage Tanks – Fuel

- 2 x Type 90 (90,000 litres nominal capacity) underground storage tanks, (one tank to be split 50,000 / 40,000 litres and the other to be split 30,000 / 30,000 / 30,000 litres nominal capacity) underground storage tanks with a manufacturer's warranty of 30 years. Safe Fill level of tanks is 95% of marked capacity.
- Double walled fiberglass tank (Tank Solutions or Envirotank– double wall type) complete with a built-in liquid level monitory system. Alternatively steel tank shell with a separate steel shell wall of fiberglass outer shell, (Permatank – double wall type), complete with integral and permanent precision test system (PTS). Using a near perfect vacuum gauge to achieve a hermetic seal, this will monitor for any leaks that may occur in the steel tank shell.
- All tank outlet product fittings to be enclosed in one containment turret installed on the tank top, with any potential leaks from joints in pump and pipe work fittings being contained in the turret for safe and approved disposal methods.
- Tank farm area to be monitored for any petroleum leaks with two observation wells installed on opposite corners of tank excavation.
- Tank and pipe work system to have an automatic tank gauging system installed which will serve as a tank gauging system and a leak detection on the complete fuel system.

In tank Submersible Pump Units - Fuel.

- Submersible turbine pumps complete with mechanical leak detectors for fuel, to be installed inside tank containment turrets for ease of servicing, and any leaks are contained within the containment turrets for ease of servicing. Any fuel leaks detected by the leak detector will immediately shut down the fuel pumping system.

Underground Pipe Work – Fuel.

- Product delivery lines from tanks to dispensers to be Lined Polyethylene Flexible pipe (UPP or NUPI) type, with any joints being welded and or terminated inside tank containment turret and dispenser containment.
- Vent, vapour recovery, fill and syphon lines to be Lined Polyethylene Flexible Pipe (UPP or NUPI).
- All underground malleable fittings to be protected with Denso tape or corrosion protection.

Aboveground Fuel Vent Pipe Work.

To be galvanized steel and supported to specification.

- Vent terminations to be minimum 4.5 m high, with up draft vents caps and located to meet AS1940 – 2017 and AS/NZS 60079.10.1:2009 requirements.

Fuel Vapour Recovery System Stage 1.

Petrol Underground tanks vent system to be connected to a vapour recovery system to return vapours from underground tanks into delivery vehicle tank vapour recovery system, during product deliveries from delivery vehicle.

Fuel Vapour Recovery System Stage 2.

Underground pipework from all dispenser bases, falling back to one petrol underground tank to eventually return vapours from cars via dispensers to underground tanks. This may not be required by legislation at this site.

Overfill prevention on Fill line

Underground tanks to have overfill prevention valves to stop delivery of product if delivery vehicle tries to overfill during product deliveries.

Fuel Dispenser Units

- To be 10 hose units to dispense Unleaded 91, Ethanol10, Premium Unleaded 98, Premium Unleaded 95 and Automotive Diesel Fuel and located under a canopy of concrete pavement area and on site forecourt and to meet AS1940-2017.
- Dispenser units to have containment sumps fitted to all units to capture any leaks from fittings and joints, to prevent any soil and ground water contamination.
- Dispenser units to be protected from vehicle damage with steel bollards fitted near each unit on concrete forecourt area.
- Dispenser unit hoses to have automatic shut nozzles to prevent overfilling of vehicle fuel tanks.
- Underground pipe work near dispensers to be protected with impact shear valves being fitted in all product lines, in the event of a vehicle impacting on a dispenser, the impact valve will immediately stop the flow of product.

PA System

- PA system to be installed in the forecourt area and retail building to enable the site operator to communicate in the event of an emergency with client vehicles on the forecourt area.

Fuel Filling Points for Underground Tanks

- Filling Point to be a double containment box system installed to ensure that any minor spills from delivery hoses are captured in the inner box, and with a drain valve and pipe work to allow fuel to drain into an underground tank.
- Outer box protected with heavy duty galvanized steel lid to prevent damage from vehicles.
- Overfill prevention valves fitted into tank fill pipe to prevent accidental overfill of tanks.
- Overfill protection valves fitted into tank vent system to prevent accidental overfill of tanks.

Installation Comments

- All equipment to be installed to manufactures, suppliers and to Oil Company specifications, by accredited and experienced installing Contractors.
- All work to be tested, checked and certified by Fuel System Certifying Consultants.
- Tank excavation to have a minimum of 2 observation wells to comply with AS 4897.

Pavement Area of under canopy areas

- To be concrete to Australian Standards with a pollution control drainage system incorporated to capture any spills on the forecourt area to a pollution control unit. Refer to site specific drawing and standard drawings.

Fuel Spill Control

- An environmental spill kit to be held outside main building for any small spills on forecourt area.

Fire protection (**minimum**)

- Two (2) 4.5kg dry chemical fire extinguishers to be installed on canopy columns in the event of small fires on or near vehicles.
- One (1) 4.5 kg dry chemical fire extinguisher fitted inside building.

Pumps and Dispensers Emergency Stops

- Emergency stop switches fitted to both inside and outside of building, to shut down power to all dispensers in the event of spillage or fire.

Emergency Response

- A step by step emergency response Instructions, complete with telephone numbers and contacts, to be placed near site operator in building.

Safety Signage

- All dispensers to have mandatory safety signs, complete with instructions, fitted on canopy columns and dispensers.

Fuel and LPG Work Practices and Training Procedures

- All site staff to complete work practices and safety training with the manual kept on site for inspection and auditing by appropriate authorities.

Groundwater Monitoring Wells

- They will be installed; number and location will be determined by a duly qualified person on a site specific basis and to comply with the relevant authorities' requirements and Australian Standards.

Inspections and Certification of Works

- The works to be inspected and documented at the following stages:
 1. Before and during underground tank installation, which included observing, checking methods and equipment employed to ensure correct installation to specifications and standards. Works to be carried out by accredited installers.
 2. After underground tanks and pipe work installation which includes witnessing of the pressure integrity testing of tanks and pipe work to approved standard and specifications, prior to backfilling.
 3. After submersible turbine pumps, leak detectors and dispensers are installed, including checking for leaks and correct operation of all fittings and pump systems inside underground tank turrets and dispenser containment sumps.
- ☐ Fuel System will be inspected at stages 2 & 3 by myros design pty. ltd., Consultants and Sub-Consultants.
- ☐ At the second & third stage an Equipment Integrity Test also will be carried out by accredited companies to comply with AS 4897 – 2008 & NSW Regulations.

Preliminary Hazards Analysis Summary for Mona Vale - NSW		
Potential Incident	Hazard Prevention Equipment	Hazard Response Procedures
Underground Tanks Leak	Tank farm observation wells	Checked on a regular maintenance program
	Automatic tank gauging	Tanks constantly monitored by automatic tank gauging system
	Submersible pump & pipeline leak detector	If leak detected, pump system shuts down automatically
	Integral tank precision test system	Checked on a regular maintenance program
	Statistical Stock Control system	Daily stock control with automatic tank gauge system
Underground Pipe Leaks	All joints welded and / or terminate in tank turrets or dispenser sumps	Submersible pump system automatically shuts down when leak detected by electronic leak detector
	Product delivery lines installed with approved flexible materials	Submersible pump system automatically shuts down when leak detected by electronic leak detector
	Statistical stock control system	Daily stock control with automatic tank gauging system
Delivery vehicle hose leaks at underground tank fill point	Liquid retention spill system at tank	Leak captured into liquid retention spill system inner spill box and drains into tank via drain valve and pipe
Delivery vehicle overfills underground tanks	Overfill protection valves in vent system	Overfill valves close when excessive pressure builds up in vent system & prevent further filling of tanks
	Overfill prevention valves fitted into tank fill pipes	Overfill valves close when excessive pressure builds up in fill pipe & prevent further filling of tanks
Fuel spilt by customer at dispenser	Environmental Spill Kit	Spillage mopped up with spill kit
	PA communication system	Site manager advises customers via PA system
	Forecourt Drainage Pollution control	Spillage controlled and drained into pollution control system
	Automatic shut off nozzles	Nozzle automatically shuts off
Dispenser nozzle or hose leak	Emergency stop at Managers counter	Site Manager shuts off site with emergency stop
	PA communication system	Site Manager advises customers via PA system
	Forecourt drainage pollution control	Spillage controlled and drained into pollution control system
	Environmental Spill Kit	Spillage mopped up with spill kit

Preliminary Hazards Analysis Summary for Mona Vale - NSW		
Potential Incident	Hazard Prevention Equipment	Hazard Response Procedures
Dispenser damaged by customer	Protection bollards in forecourt concrete	Bollards prevent vehicle damage to dispensers
	Under dispenser impact shear valve	Shear valve automatically shuts down fuel supply on vehicle impact
	Emergency stop at Site Manager counter	Site Manager shuts down site with emergency stop
	PA communication system	Site Manager advises customers via PA system
Fire at dispenser pumps	All equipment and electrical works petroleum industry approved and flameproof where required	Fire controlled initially on site by portable fire extinguishers and emergency services contacted if necessary
	Mandatory safety sign on forecourt canopy columns and main building	Emergency response instruction sheet on site
	Emergency stop at Site Manager counter & outside building	Site Manager shuts down site with emergency stop
	PA communication system	Site Manager advises customers via PA system
Fire at fuel filling point	2 x 4.5 kg (min) dry chemical fire extinguishers at canopy columns and an additional inside building.	Fire controlled initially on site by portable fire extinguishers and emergency services contacted if necessary
	All equipment and electrical works petroleum industry approved and flameproof where required	Emergency response instruction sheet on site
	Air operated shut down valves on delivery tanker	Emergency response instruction sheet on site
	Emergency stop at site managers counter and outside on building wall	Site Manager advises customers via PA system
	PA communication system	Site Manager advises customers via PA system
	Approved firewall or vapour barrier (where required) to protect next door buildings	Fire wall to a Fire Resistance Level (FRL) of 240 / 240 / 240