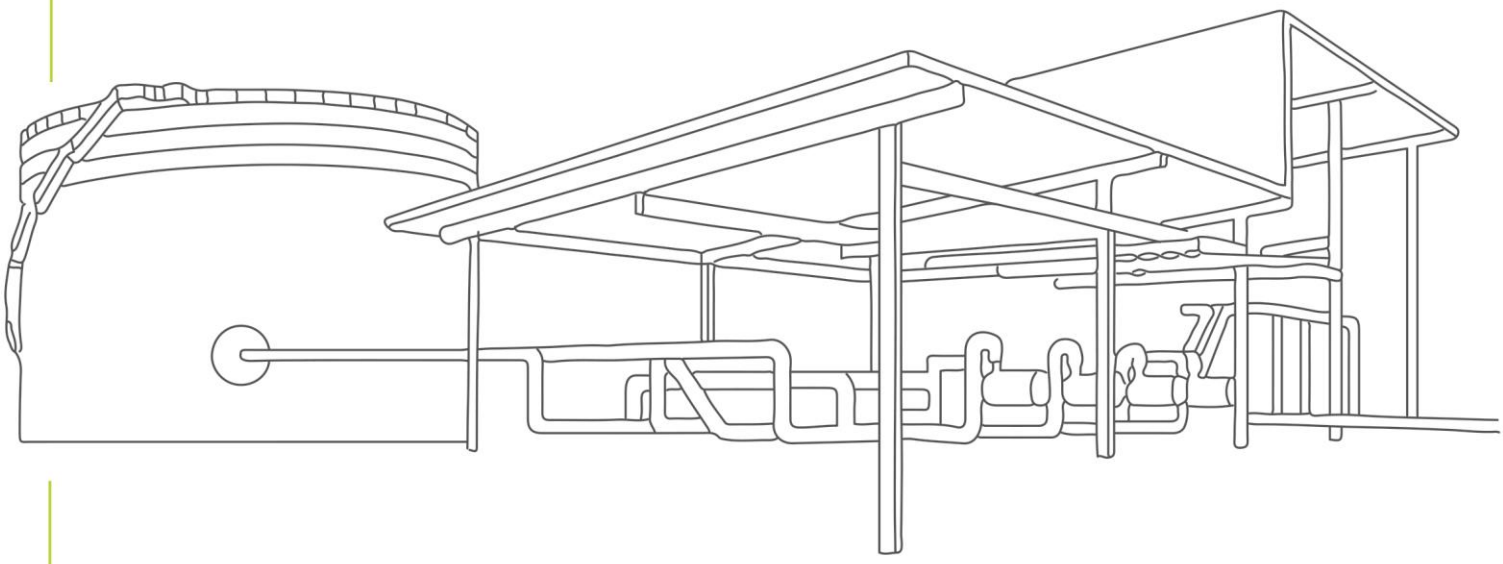
# ASSESSMENT REPORT – DG ADVICE



TFA Project Group

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# REPORT

## AS1940:2017 DESIGN COMPLIANCE

**CLIENT:** Blue Pacific Construction

**ADDRESS:** Blue Pacific Constructions Pty Ltd
Beach Road Palm Beach NSW 2108

**TFA REFERENCE:** 20225

**TFA CONTACT:** Keith Sharp

**Document Control:**

| REVISION | DATE | PREPARED BY | REVIEWED BY | COMMENTS |
|---|---|---|---|---|
| **1** | 04/08/2020 | B.Kallichurn | K. Sharp | Client Issue |
| **2** | 07/08/2020 | B.Kallichurn | K. Sharp | Amended LPG Location |
| **3** | 11/08/2020 | B.Kallichurn | K. Sharp | Modified LPG Layout |
| **4** | 11/08/2020 | B.Kallichurn | K. Sharp | Minor amendments |
| **5** | 08/02/2020 | B.Kallichurn | K. Sharp | Updated to reflect DA updates (LPG only) |

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# 1.0 EXECUTIVE SUMMARY

Pacific Blue Constructions (herein referred to as the Client), have engaged the services of the TfA Project Group to conduct a desktop study and assessment for the proposed storage of 210L of boat fuel in a fuel store and 5 x 140kg LPG cylinders (filled insitu) adjacent to the bin area at the Boat house (Beach Road Palm Beach NSW 2108) property. TfA have considered compliance against AS1940:2017, AS1596:2014 and AS60079.10.1: 2009.

The 210L drum of boat fuel in the proposed fuel store shed is considered minor storage under AS1940 and the proposed installation is in general accordance with the requirements of AS1940.

The nearby sewerage control panel must be installed a minimum of 1.5m above the ground or alternatively moved to a distance of 5m to avoid the hazardous zone.

The proposed location for the 5 x 140kg LPG cylinders stored adjacent to the bin area is considered to be in general accordance with the requirements of AS1596.

An LPG detector and light is proposed to be installed. It is recommended the detector be located at the loading bay end of the cylinders near the ground. The light should be located in a highly visible location. Deliveries at the loading bay should not be permitted if an LPG leak is detected or during in-situ filling of the LPG cylinders.

# 2.0 CLASSIFICATION METHODOLOGY

## 2.1 Basis

The basis of this review, as provided by the Client is as follows:

**Boat Fuel:**

- **Fuel stored:** 210L of Premium Unleaded 95, UN1203, ADG class 3, Packaging Group II, GHS category 2
- **Shed details:** 1,500mm x 1,600mm concrete shed with single door.
- **Additional fuels/LPG stored**: None
- **Fuel decanted in shed**: Yes
- **Drawings used in assessment:** SD01 20/2/20, SD03 20/2/20
- **Applicable standard:** AS1940: 2017 and AS60079.10.1: 2008

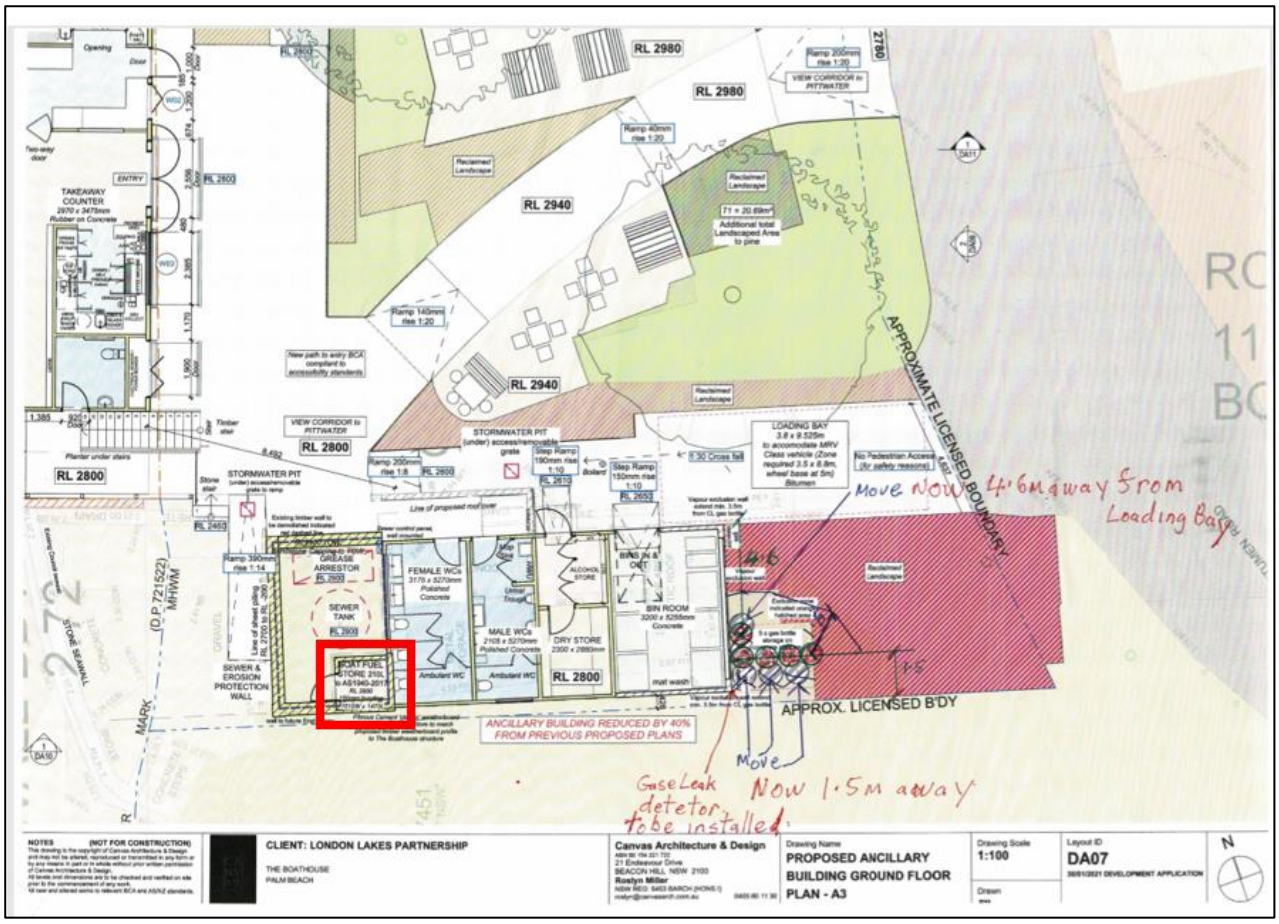


*Figure 1: Fuel shed location – (extract drawing DA07)*

**LPG bottles:**

- **LPG stored:** 5 x 140kg LPG gas bottles, , ADG class 2, Flammable Gases: Category 1
- **Storage details:** Bottles filled in-situ and connected in service
- **Ventilation:** Adequate (stored outside)
- **LPG filling on-site**: Yes in-situ
- **Drawings used in assessment:** DA07 (received 05/02/2021)
- **Applicable standard:** AS1596: 2014 and AS60079.10.1: 2008

## 2.2 General

- Review the information (drawings and images) provided by the Client.
- Desktop review only of drawings to confirm product volume and spillage containment volume.
- Identify relevant separation distance criteria compliance.
- This assessment and the check list has been prepared in accordance with:
    i. AS1940:2017 - the storage and handling of flammable and combustible liquids
    ii. AS60079.10.1:2008 – classification of areas explosive gas atmospheres
    iii. AS1596:2014 – The storage and handling of LP Gas
- The resulting classifications from the method prescribed by AS1940:2017, AS1596:2014 and AS60079.10.1:2008 are assessed with the most appropriate classification adopted for each particular source of release.

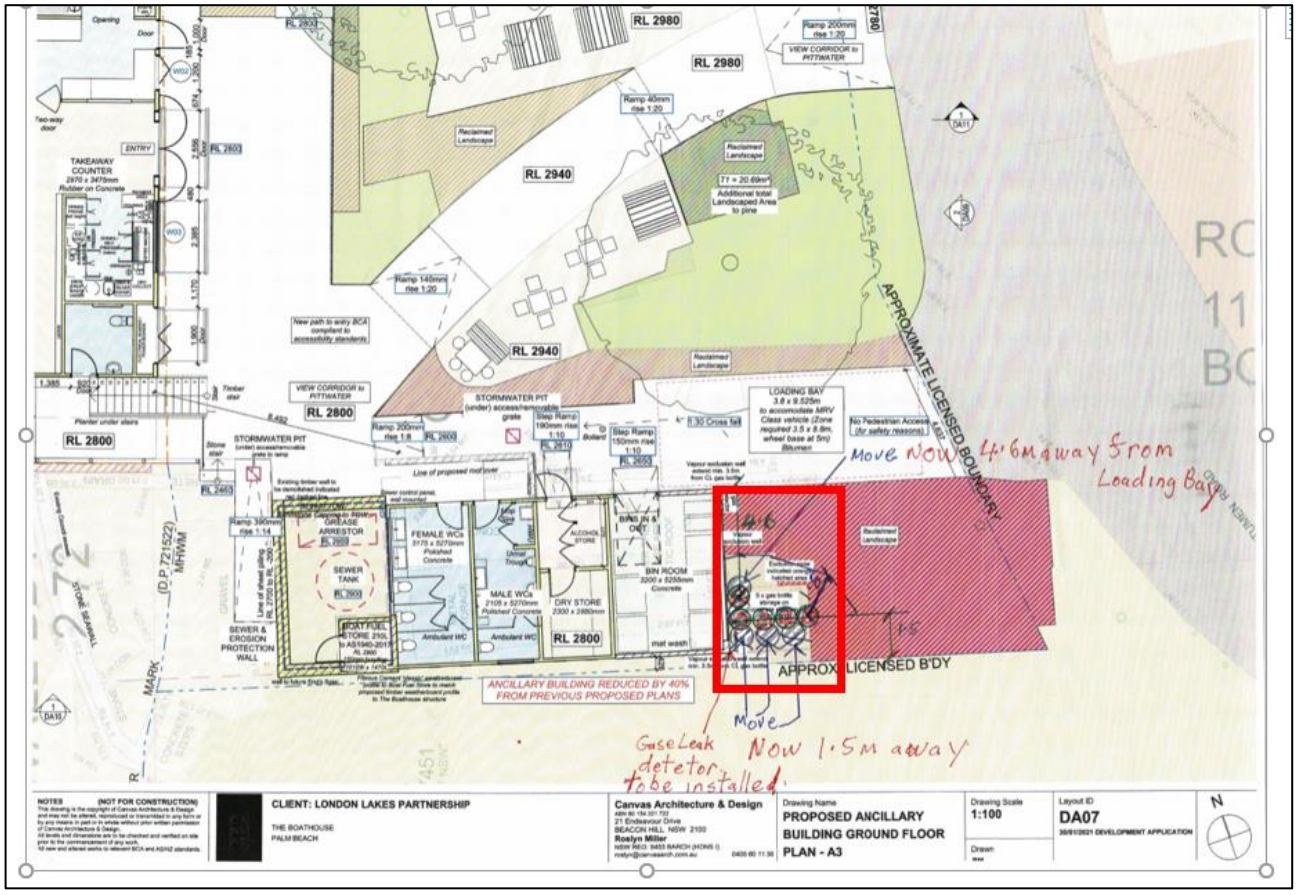


Figure 2: LPG Cylinder location (extract drawing D07)

## 2.3 Assumptions and Qualifications

The assessment is based on a desktop review of the following information provided by Pacific Blue Constructions and the drawing in figure 2. The following qualifications are deemed imperative:

<u>Fuel Store</u>

- Fuel storage for 210litres of 95/98 petrol for boat hire with decanting taking place inside the store.
- Size of internal floor space 1590/1600 at rl 2.9 with bunding height of 150 making it Rl 3.05, being 250mm above the FFPL OF Rl 2.8
- Adjoining wall separating fuel store from ancillary building is 190 concrete filled besser block 60/60/60 rated
- Fuel store ceiling will be 2 layers of fire check

- The other fuel store walls will be non-combustible from the inside
- The southern elevation shows a wall area inside the room of 4.6m$^2$. However with ceiling height for the room set at 2.4 then effective area for wall from inside the room is 3.84m$^2$. Metal louvres to be installed on southern wall with ventilation area of 2.3m$^2$ which exceeds 50% of wall area.
- The door is 4.4 m away from the control panel for the sewer
- We are 5m away from the MHWM and beyond that water
- The door will be lockable from the outside.
- Light within fuel store to be hazard rated
- There are no buildings or source of fire to the south just an open space with no chance of a building being built in the future.

LPG Cylinders

- Position of bottles as shown in figure 2.
- Distance to closest edge of loading bay has been increased from 2.9m to 4.6m from LPG bottles.
- Delivery trucks are now located outside the hazardous zone.
- As the loading bay is 3.8m wide and a typical MRV CLASS VEHICLE is 2.5m, it is highly unlikely that the truck would encroach on the reclaimed landscape are.
- The distance from the side of the leased bound (southern end) to centre of gas bottles is a minimum 1.5m.
- The parking area to the east of the LPG bottles (as illustrated in previous version of the report) is now a landscape area only
- There is a 1.5m exclusion zone in front of the bottles from centre of bottles
- Based on site photos there appear to be no protected places or fixed sources of ignition within 3.5m to the south of the bottles, just an open space.
- Gas detection device to be installed attached to a flashing light.
- There are no forklifts used on site for unloading as the space is to small and no storage facility for them.

## 2.4 Materials properties

- As advised by the Client, no Safety Data Sheet (SDS) is available. The Client advised that Premium Unleaded 95 would be an adequate representation of the fuel stored on site.

## 2.5 Volume of product stored

- 210L fuel
- 5 x 140kg LPG

## 2.6 Storage conditions

Guidelines summarised in the Executive summary table may be used to classify each application on a case by case basis.

# 3.0 ASSESSMENT:

## 3.1 AS1940: 2017

| AS1940 Clause No. | Criteria | Applicable (Y/N) | Compliant (Y/N) | Comment |
|---|---|---|---|---|
| | **Location of minor storage** | | | |
| 2.2.4 | Separation between minor storage and other stores. A minor storage shall be separated from any other store of flammable and/or combustible liquids that is larger than minor storage by— (b) at least 5 m | N | N/A | |
| Table 2.1 | Up to 250L of flammable PG II permitted at commercial buildings, factories, workshops, hospitals and warehouses:<br>a) In attached outhouses if separated by partition having an FRL of 60/60/60; or<br>b) Outside, or in a detached shed or outhouse separated from the factory or workshop by at least 1m | Y | Y | 210 L drum of petrol considered minor storage. Client installing 190mm concrete block wall (min 60/60/60) between shed and ancillary building.<br>As per AS3600:2018, 175mm effective thickness provides a fire resistance period (FRP) of 240min for insulation |
| 2.3.1 (d) | The storage shall be adequately ventilated | Y | Y | We understand one wall to be metal louvres with over 50% open area which meets the criteria of adequate ventilation. Refer recommendations (section 4.5.4.1 page) |
| | **Operations** | | | |
| 2.3.2 (a) | Persons who handle the liquid shall be fully aware of the hazards involved | Y | - | Client to include in Operating Manual |
| 2.3.2 (b) | All storage areas shall be secured against access by unauthorised persons at all times | Y | Y | Fuel shed to be lockable |
| 2.3.2 (c) | Packages shall not be placed where they could hinder escape from a building in an emergency | Y | Y | Client to include in Operating Manual |
| 2.3.2 (e) | Packages should be closed when not in use. | Y | Y | Client to include in Operating Manual |
| 2.3.2(f) | The area in and around the minor storage shall be kept free of combustible materials and residues | Y | Y | Client to include in Operating Manual |
| 2.3.2(g) | Any materials that might react dangerously if mixed shall be kept apart so that the possibility of reaction is minimized, e.g. fuel and pool chlorine | Y | Y | Client to include in Operating Manual |

| | | | | |
|---|---|---|---|---|
| 2.3.2 (h) | Liquids should not be stored near any hot surfaces (e.g. steam pipes, furnace walls, or engines) or where they might be accidently exposed to heat (e.g. from escaping steam) | N/A | N/A | |
| 2.3.2 (i) | Liquids should be transferred and moved in a manner that reduces the likelihood of spillage, vapour escape or fire | Y | Y | Client to include in Operating Manual |
| 2.3.4 | Spills to be cleaned up immediately. Any waste to be disposed of immediately, in accordance with local regulations. | Y | Y | Spill kit to be kept nearby. |
| 2.3.4 | Liquids shall not be allowed to reach ignition sources, stored of other chemicals, or combustible materials (e.g. timber and paper), or flow into drains or into neighbouring land, or enter any creek, pond or waterway. | Y | Y | Internal light nominated as hazardous rated. Shed to be bunded and spills cleaned up immediately. Client to include in operating manual |
| | **Fire protection and warning signs** | | | |
| 2.3.5(a) | At least one portable fire extinguisher, having a suitable rating for use within the range of materials being kept, shall be readily accessible and adjacent to the minor storage area. Where liquids are stored on open land, a fire extinguisher shall be provided if the liquids are decanted or transferred with 5m of the storage. | Y | Y | Fire extinguisher to be allowed for. |
| 4.5.4.1 | Natural ventilation-a natural ventilation system shall comprise one of the following, as appropriate to the design of the store:<br>(a) At least two walls completely open to outside atmosphere (see figure 4.5 (a) in AS1940:2017)<br>(b) A wall of wire mesh, or fixed louvres, lattice or the like, having at least 50% of its area as openings, is considered completely open.<br>(c) One wall completely open to outside atmosphere, with no other vents, provided that the distance to, and the length of, the opposite wall do not exceed the length of the open wall (see figure 4.5 (b) in AS1940:2017)<br>(d) Vents in one external wall, provided that the wall is at least 6m long and the opposite wall is not more than 5m away from it<br>(e) One wall open to atmosphere as in Item (b) and vents in one opposite wall is not more than 50m away from it<br>(f) Vents in two opposing walls | Y | Y | Shed construction to satisfy one of adequate natural ventilation criteria - metal louvres with over 50% open area. |

## 3.2 Assessment against AS60079.10.1: 2009 - classification of areas explosive gas atmospheres.

### 3.2.1 210L Fuel storage:

#### 3.2.1.1 Equipment Group and Temperature Classification:

Based on the SDS and AS/NZS 60079.10.1:2009 for the flammable material stored and handled within boat house, the most conservative classification is a Gas Group of IIA and a Temperature Class of T3.

#### 3.2.1.2 ZA.5.2.3 Package storage including drum or pail storage

Whilst the shed is adequately ventilated in accordance with AS1940 ventilation is considered differently when classifying hazardous areas under AS60079.10.1. The extent of hazardous zones will be as follows:

(i) Where packages may be opened for occasional decanting, sampling or testing—extent of inadequately ventilated space, e.g. interior of structure.....Zone 1

(ii) Outside inadequately ventilated space to a height of 1.5 m above ground level and 5 m laterally from any opening in the space.....Zone 2

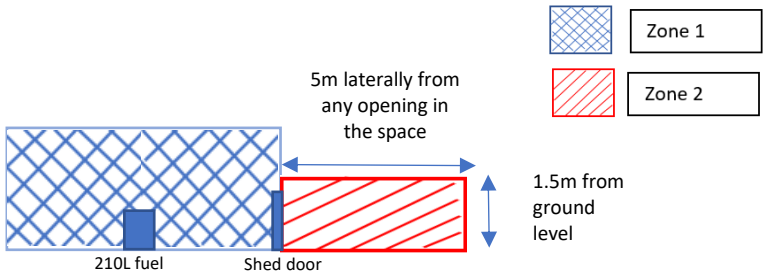


*Figure 3: Package storage including drum or pail storage – inadequate ventilation*

Based on the above it is noted the sewerage control panel is currently located 4.4m from the fuel store door. To avoid the hazardous zone is shall be installed a minimum of 1.5m above the ground or moved to a distance of 5m.

### 3.2.2 LPG storage

The basis for the LPG assessment is the 5 x 140kg LPG cylinders stored in the open area adjacent to the prep and washing area as advised by Blue Pacific Construction. Cylinders to be filled in-situ and connected for use. Note 140kg bottles non-standard size, if site chooses to upgrade to 5 x 210kg bottles, then the following assessment still applies:

#### 3.2.2.1 Assessment against AS1596:2014 – The storage and handling of LP G

**<u>As per Table 2.1:</u>**
Maximum quantity for minor storage and usage = 60kg
Blue Pacific Construction store 5 x 140kg cylinders on site so this is **not** considered minor storage

Aggregate capacity (water capacity) = (5 x 140kg) x 2.3* = 1,610L
**1 kg LPG = 2.3L (water capacity) as per table C1 page 135*

**As per table 4.1:**
Cylinder locations
For aggregate capacity >1,000L ≤2,500L, minimum distance from **public places = 1.5m** and minimum distance from **protected place = 3m ****
*** this distance may be reduced to zero where there are no confining structures (other than the protected place in question), such as a solid fence or building, within 3m.*

**Definitions:**
**Public places:** (applicable clause extracted) Any place, other than private property, open to the public and including a street or road. Note LPG stored within site boundary – note within the site boundary is not considered public place.
**Protected places:** is a factory, office, workshop, store warehouse shop or building where people are employed, except a building used for the storage and handling of LPG.

**General cylinder location criteria 4.4.3**

- Cylinder location must not obscure or restrict access to the cylinders for refilling or egress from the building
- Nearby fences, walls or vapour barriers must not prevent cross ventilation.

The cylinders must be located at least

- 1m from doors or building air vents
- 1m from pits or drains
- 500mm away from openable windows.

Based on the above assessment, the proposed location for the LPG storage in figure 2 is considered in general accordance with the requirements of AS1596.

### 3.2.2.2 Assessment against AS60079.10.1: 2009 - classification of areas explosive gas atmospheres.

It must be noted that any electrical equipment installed within the hazardous zones must be certified for use in hazardous areas. It is recommended that non-hazardous electrics such as light switches, GPO's. lights etc are installed outside the hazardous zone.

ZA.6.5.2.17 Cylinders, whether in storage or installed for use, adequately ventilated, in situ fill type (with limited gas bleeding for contents checking) (refer AS60079.10.1:2008- ZA.43)

Within space 0.5 m above and 1.5 m laterally from any cylinder valve, extending to a distance of 3.5 m laterally at the base of the cylinder .....Zone 2

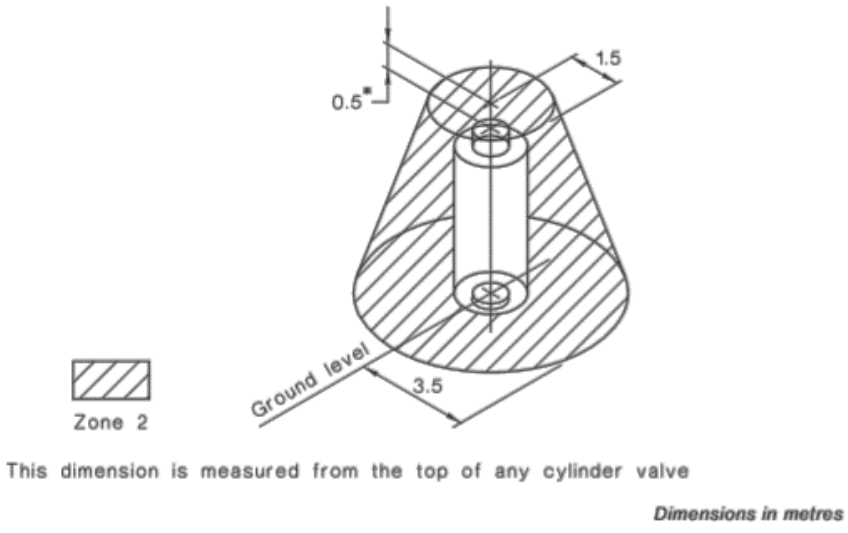


*Figure 4: In situ fill cylinder (as per AS60079.10.1 - Figure ZA.43)*

It is noted that:

- Distance to outside edge of parking bay previously noted as 2.9m. This distance is now 4.6m;
- As the parking bay is 3.8m wide and a typical MRV CLASS VEHICLE is 2.5m, it is highly unlikely that the truck would impede the reclaimed landscape are.
- The parking area to the east of the LPG bottles (as illustrated in previous report) is now a landscape area only
- In addition an LPG detector and light is proposed to be installed. It is recommended the LPG detector is installed at the loading bay end of the cylinders near the ground. The light should be in an easily visible location for staff and delivery personnel;
- The window in the adjacent wall are proposed to be a minimum of 600mm above the cylinders outside the hazardous zone;
- The proposed vapour barrier walls extend 3.5m horizontally from the cylinders effectively preventing the hazardous zone from extending into the bin enclosure.

# 4.0 OPERATING PROCEDURE GUIDELINES

Refer to AS1940:2017 Section 9 for complete guide on Operating Procedures, note below extract from AS1940:2017 Section 9 for clarity and general inclusions.

## 4.1 General requirements

Safe systems of work, including procedures commensurate with the quantity and nature of the liquids being kept, shall be developed, documented and implemented.

Written procedures shall be appropriate to the installation and shall include the following:

- A site plan (or plans) indicating tanks, plant, main pipework, switchboards or substations, emergency stop valves or actuating devices, fire protection systems and drainage.
- Operating procedures, covering all aspects of the day-to-day operation of the installation.
- Maintenance procedures, covering regular testing, inspection and monitoring of the equipment.
- Emergency procedures, covering actions to be taken in the event of fire, spillage, accident, equipment failure or other abnormalities or emergencies (see also Section 10).
- Construction and maintenance procedures, covering new facilities and repairs to and modification of existing plant.

## 4.2 Operating procedures

Operating procedures shall include, but not be limited to, the following as appropriate: (a) Initial commissioning procedures.

- Normal handling procedures.
- Liquid transfer procedures.
- Monitoring of essential functions and components.
- Control of hazards, including ignition sources.
- Manufacturer’s operating instructions for equipment.
- Earthing and bonding.
- Fault conditions.
- Housekeeping and site upkeep.
- Isolation, deactivation and identification of equipment not in use.
- Maintenance of clear spaces for access.
- Management of leakage, spillage and clean-up.
- Personnel safety and protective equipment.
- Environmental monitoring.
- Operation of utilities.
- Fire protection systems.

- Control of access, movement and activities.
- Every endeavour shall be made to prevent leaks or spills, and to control them if they do occur. A spill response kit shall be readily available where flammable or combustible liquids are stored, dispensed or in transit storage in order to prevent spills from reaching ignition sources, stores of other chemicals, or combustible materials (e.g. timber and paper), or flow into drains or onto neighbouring land, or enter any creek, pond or waterway. The following is a typical list of such materials and equipment:
- Adequate quantities of absorbent material, e.g. absorbent pads, loose absorbent or suitable proprietary substances.
- A sufficient number of resealable waste-recovery containers, e.g. drums, made of materials compatible with the substances being kept and appropriately marked as being for emergency use only.
- Portable pumps and decanting equipment. NOTE: Petrol-powered or non-flame proofed electric pumps are unsuitable for use with flammable liquids.
- Shovels.
- Yard brooms.
- Booms (on-ground and floating).
- Drain covers and drain plugs.

# 5.0 RECOMMENDATIONS

**Boat Fuel storage**

- Include operating procedure (refer section 5 above and section 9 - AS1940:2017 for guidelines)
- Store to be clear of combustible vegetation/refuse for a distance of at least 3m
- Fuel shed to be lockable and non-combustible construction
- Only hazardous certified electrical equipment to be installed in hazardous areas as described in section 3.1 above.
- The sewerage control shall be installed a minimum of 1.5m above the ground or moved to a distance of 5m.

**LPG storage**

- Cylinders should be stored on a concrete pad upright and prevented from falling.
- It is recommended the LPG detector is installed at the loading bay end of the cylinders near the ground. The light should be in an easily visible location for staff and delivery personnel.
- Unloading of trucks at the loading bay should not be permitted if an LPG leak is detected or during in-situ filling of the LPG cylinders.

Plans of management to be signed off before the building can receive its OCCUPATIONAL CERTIFICATE from the certifier.