

Ardent Leisure Pty Ltd

Engineering Services Report, The Spit Marina, Mosman, NSW.



ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT
MANAGEMENT



P0701675JR03_v2
May 2010

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Document and Distribution Status								
Author(s)			Reviewer(s)		Project Manager		Signature	
Megan Bowling			Andrew Norris		Andrew Norris			
Revision No.	Status	Release Date	Document Location					
			File Copy	MA Library	Hamptons Planning			
1	Draft	10/04/08	1E	1H	1P			
2	Final	13/05/2010	1E	1H	1P			

Distribution Types: F = Fax, H = hard copy, P = PDF document, E = Other electronic format. Digits indicate number of document copies.

All enquiries regarding this project are to be directed to the Project Manager.

Executive Summary

Overview

The purpose of this report is to provide details of engineering services and discuss potential environmental impacts for the demolition and reconstruction of a new marina complex at The Spit Marina, Mosman, NSW.

Proposed Development

The following summarises our understanding of works associated with the proposed development:

- A number of alterations and extensions to the existing arms of the marina facility. Overall, 35 new berths will be created.
- Replacement of the existing slipway, located on the northern side of the building, with a new hardstand area. Car parking will also be provided on the hardstand area.
- Relocation of the fuel berth and sewerage pump out, and decommissioning of the existing underground storage tanks (UST's). New UST's will be located below the existing on-grade car parking area.
- Demolition of the existing marina complex and construction of a new building to enable the use of 2 floors. It is proposed to also replace the piling beneath the building for support.

Water Cycle Management

The proposed works at the Spit Marina includes the removal of the existing slipway and construction of a new slipway hardstand area with a boat lift. We understand that no additional activities are envisaged to be undertaken at the redeveloped slipway facility. Proposed water cycle management at the washdown area will ensure NSW EPA compliance and help to improve and better protect the water quality of Middle Harbour.

A water cycle management system is proposed at the Spit Marina to prevent pollutants and other waste produced from the washdown/maintenance area from discharging into Middle Harbour, and to promote water reuse. The total treatment capacity of the system is equal to the 'first flush' as required by the Department of Environment and Climate Change NSW (DECC).

Waste Management

The waste management plan for the Spit Marina is based around the principles of the 'NSW Waste Avoidance and Resource Recovery Strategy 2003' (Resource NSW) and the Waste Avoidance and Resource Recovery Act (2001). The primary aim of the Spit Marina, including the slipway area, refuelling station and sewage pump out, is to avoid the production of waste where possible. Where this is not possible, recycling and correct disposal shall take place.

The waste management plan provides details on managing;

- Sewage,
- Oily bilge,
- Solid Waste, and
- Chemical waste.

Sediment and Erosion Control

All required construction works shall comply with the guidelines and principles set out in the Landom 'Managing Urban Stormwater' handbook (2004). Locations of sediment and erosion control measures are provided on the site plan in Attachment C. Control measures proposed for the site include;

- Mooring facilities,
- Containment booms, and
- Sediment fences and straw bales.

Environmental Assessment

The environmental impacts of the proposed development have been assessed in terms of;

1. Water Quality,
2. Hazardous Materials,
3. Acid Sulfate Soils,
4. Underground Storage Tanks (Protection of the Environment Operations Regulation 2008), and
5. Hydrogeological Impacts.

Provided the recommended management techniques are adhered to, the proposed development will have no significant impact on the above environmental characteristics of the site.

Compliance Assessment

The proposed development has been assessed in terms of its compliance with a number of planning controls and guidelines including;

- NSW EPA (1999) Environmental Guidelines; 'Best Management Practice for Marinas and Boat Repair Facilities',
- DECC (2007) 'Environmental Action for Marinas, Boatsheds and Slipways',

- AS 3962 – 2001; 'Guidelines for the Design of Marinas',
- SREP 2005 – Sydney Harbour Catchment,
- Estuary Management Manual (NSW Government, 1992), and
- Licensing Requirements by various Government departments.

Conclusion

The proposed development at The Spit Marina, Mosman will see the demolition, upgrade and expansion of the existing facilities including the slipway. The potential for the proposal to adversely impact on existing environmental conditions has been addressed and the conclusion made is that the proposed development will result in no detrimental impacts, provided that site management measures detailed in this report are carried out as recommended. If adhered to, these management techniques ensure full compliance with relevant controls and guidelines.

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1 Overview

1.1 Background

The purpose of this report is to provide details of engineering services and discuss potential environmental impacts for the demolition and reconstruction of a new marina complex (the 'proposed development') at The Spit Marina, Mosman, NSW (the 'site'). This report has been assembled to support a Part 3A development application (DA).

1.2 Proposed Development

We understand that the existing marina complex is to be demolished and a new marina complex is proposed for the site. The following summarises our understanding of works associated with the proposed development:

- Construction of piers / piles for foundation support for the proposed marina complex.
- Minor additions and alterations to the existing floating pontoons.
- Demolition and re-construction of the marina slipway and maintenance docks.
- Decommissioning of the existing underground storage tanks (UST's), and excavation and installation of new UST's in another location on the site.
- Provision of ancillary services for boating including water supply, sewage pump out and power supply.

Attachment A gives the proposed layout for the reconstructed marina.

1.3 Project Scope

The aspects of this proposal that are considered in this report are as follows:

1. Review of stormwater management requirements.
2. Review of waste (including solid, liquid and chemical) management.
3. Site sediment and erosion control.
4. Review of water quality impacts.

5. Environmental assessment including;
 - Water quality risk assessment and management,
 - Hydrogeological risk and management,
 - Acid Sulfate Soils risk management, and
 - Vegetation risk management.
6. Compliance assessment of the proposal with relevant guidelines.
7. Identification of all approvals and licensing requirements under relevant legislation.

2 Site Description

2.1 Field Investigations

Site inspections were undertaken on the 13th and 14th of December, 2007. Works conducted during the field investigations included:

- A walk over inspection of the site and surrounding property to review drainage and topography.
- Excavation of ten (10) geotechnical bore holes to depths ranging between 4.5 and 10.5m b.g.l. using a 4WD mounted auger.
- Three (3) Dynamic Cone Penetrometer (DCP) tests to determine the strength and depth of subsurface materials at representative locations.
- Collection of water samples from the two (2) existing wells and collection of numerous soil samples for contamination and acid sulfate soil assessment.

2.2 Location and Existing Land-use

The site is located on the western side of Spit Rd, Mosman and is within the Mosman Municipal Council (MMC) LGA. The site is bounded by Spit Reserve to the south and comprises maritime leases 101 – 104 DP 1011363. The marina's jetty and floating pontoons are located on Middle Harbour to the east. Attachment A provides the site plan with pertinent site features.

The site is currently utilised as a marina, and has been generally operating in its current capacity since the 1960's. Located on the site is an existing marina complex (which includes restaurant, offices and toilets), maintenance / storage sheds, slipway, timber jetty and multiple floating pontoons. There is no vegetation on the site.

Figure 1 shows a site aerial photo and approximate site boundaries.



Figure 1: Aerial photo of The Spit, showing site location (source: Google Maps, 2007).

The landward component of the site is currently zoned 3(d) 'The Spit waterside business' under the MMC (1998) LEP. Within this zone, 'demolition' and 'marina development' is permissible with consent.

2.3 Topography and Drainage

The existing sea wall along the tidal boundary of the site generates a relatively flat site, which drains to the west, to Middle Harbour. The site is entirely covered by hardstand and buildings.

2.4 Existing Water Quality

2.4.1 Middle Harbour

According to the DECC's 'State of the Beaches 2006 – 2007' Report for Sydney Harbour, swimming water compliance for Middle Harbour is high. According to the report, the main sources of pollution at nearby Chinamans Beach, the closest sampling point to the site within the Mosman LGA, are stormwater flows and bacterial contamination from sewage overflows in upper Middle Harbour.

Despite this, over the last 5 years Enterococci and Faecal Colliform levels have complied with swimming guidelines between 86 – 100% of the time (DECC, 2007). In summary, the water quality within the upper Middle Harbour, including the site, is generally high.

2.4.2 The Spit Marina – Groundwater

Onsite testing conducted by Martens and Associates (12th and 13th December, 2007) from 2 existing groundwater wells revealed elevated contaminated levels of arsenic, copper, lead, zinc toluene and total xylenes above adopted guideline (EPA 1994 and ANZECC/ARMCANZ 2000) trigger values. It was found that this was likely to be the result of leakage from the existing underground storage tanks, rather than a more widespread water quality issue.

2.5 Vegetation

As the majority of the site is covered with impervious material, there is no terrestrial vegetation located onsite. Recent seagrass mapping (Rooney, 2007) has shown there is a minimal amount of significant seagrass species located within the lease area. Species within the lease area (*Halophila*) are noted as being 'patchy' in their distribution and not valuable habitat.

2.6 Hydrology

The existing hydrological conditions at the site have been assessed by Gary Blumberg and Associates Pty Ltd (2008) and are summarised below.

Morphology

Middle Harbour forms a tributary estuary which is morphologically similar to that of Sydney Harbour. At Middle Harbour, there is a relatively shallow tide delta, a deep mud basin and an estuarine channel.

Water Depths and Sediments

Middle Harbour, upstream of The Spit is relatively deep (up to 15m in the channel immediately upstream of the Spit Bridge). Sediments are primarily of marine origin reworked from the tidal delta off Chinamans Beach, under the influence of flood tidal currents and SE wind waves.

Water Levels

Water Levels at the site are influenced by tide and coastal weather systems. Tidal planes provided below have been taken from Gary Blumberg and Associates Pty Ltd (2008) report 'D'Albora Marina, The Spit EIS for Proposed Alterations and Additions'.

Table 1: Predicated Tidal Planes for The Spit, Middle Harbour (Gary Blumberg and Associates, 2008)

Tidal Plane	RL (m ZFDTG)¹	mAHD²
Mean High Water Springs	1.63	2.56
Mean High Water	1.50	2.43
Mean High Water Neaps	1.38	2.31
Mean Sea Level	0.86	1.79
Mean Low Water Neaps	0.61	1.53
Mean Low Water	0.49	1.42
Mean Low Water Springs	0.37	1.30
Spring Low Water	0.12	1.05
Zero Camp Cove	-0.01	0.92

Note: ¹ ZFDTG = Zero Fort Dennison Tide Gauge ² ZFDTG = 0.925m below AHD

Extreme elevated water levels would be influenced by oceanic surges during storms. Local wind and wave setup at Pearl Bay shoreline may also occur.

Waves and Wave Loading

The wave environment at the site is a result of wind waves (from the west) and boat generated waves. Wind wave climate at the site is independent of tide due to relatively large water depths.

Currents and Current Loading

Currents within the waterway at the Spit Marina are primarily due to tidal flows and wind induced water movements. Localised currents may occur at stormwater outlets.

3 Water Cycle Management – Slipway Redevelopment

3.1 Existing Slipway Procedures

As shown in Figure 2 and 3, the existing slipway is a single slipway directly north of the marina building.

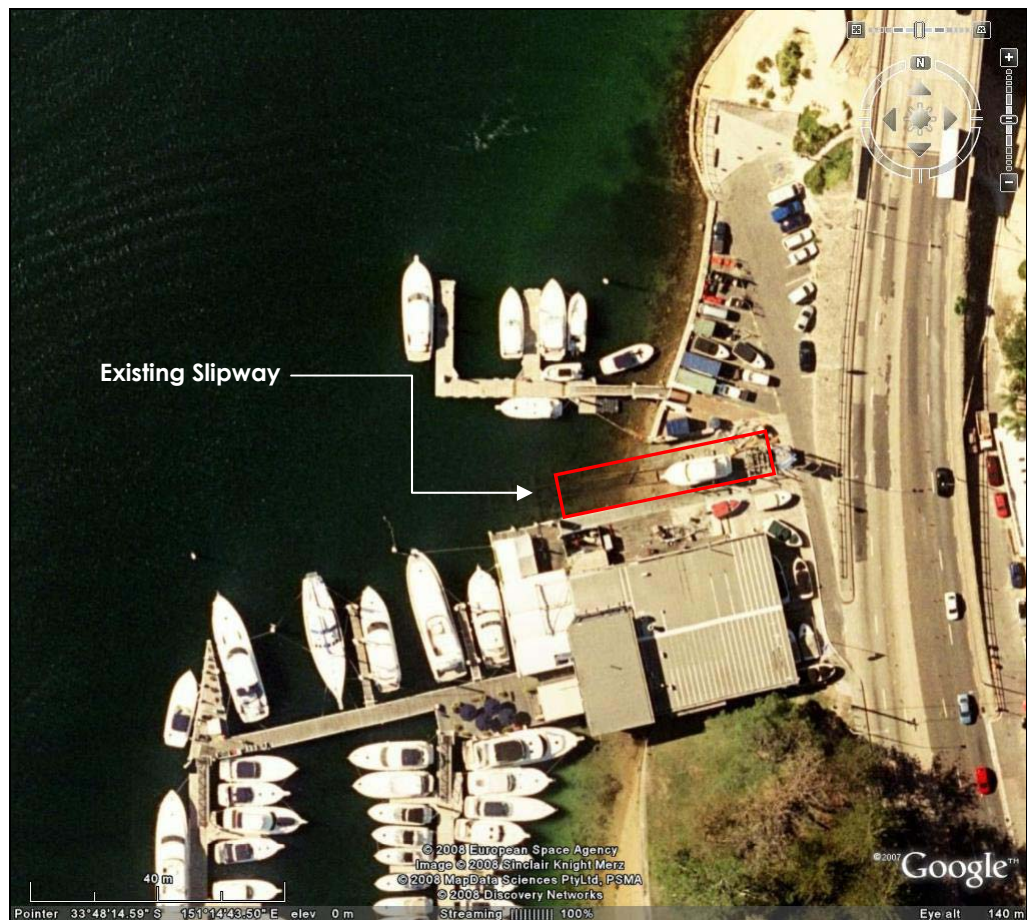


Figure 2: Existing slipway facilities; The Spit Marina, Mosman (Source: Google Earth, 2008).

The existing slipway facility carries out maintenance operations; no major refit works are undertaken.

We understand activities that presently occur at the slipway include:

- Antifouling,
- Hull polishing,
- Boat deliveries,

- Fuelling
- Sewage pump-out
- Engine service,
- Antifoul removal.

As shown in Figure 3, the existing slipway has no measures in place to prevent polluted washdown water from discharging into Middle Harbour, presenting a number of potential water quality issues.



Figure 3: Existing slipway posing a potential source of pollution; The Spit Marina, Mosman (20/11/07).

3.2 Proposed Redevelopment

The proposed works at the Spit Marina includes the removal of the existing slipway and construction of a new slipway hardstand area with a boat lift. We understand that no additional activities are envisaged to be undertaken at the redeveloped slipway facility. Proposed water cycle management at the washdown area will ensure NSW EPA compliance and help to improve and better protect the water quality of Middle Harbour.

Detailed design of the vessel washdown and boat lift is provided in Attachment B.

3.3 Water Cycle Management

A water cycle management system is proposed at the Spit Marina to prevent pollutants and other waste produced from the washdown/maintenance area from discharging into Middle Harbour, and to promote water reuse. The total treatment capacity of the system is equal to the 'first flush' as required by the Department of Environment and Climate Change NSW (DECC). The following water cycle process is indicative of such a system and subject to detailed engineering design.

1. The hardstand area (approximately 109.5 m²) is to be graded such that drainage is towards the centre where a catch drain will be located. This way, all waste water produced from washdown/maintenance activities enters the collection pit.
2. The collected water is stored in a 2 KL pit/balance tank. In accordance with DECC (2007) *'Environmental Action for Marinas, Boatsheds and Slipways'* this tank has been sized to hold the 15mm 'first flush' from the hardstand area.
3. Water is then to be pumped (at a rate to suit the treatment capacity i.e. no less than 2 KL/day) through a grease arrestor to an appropriately engineered water recycle system. At a minimum, it is recommended this system include;
 - A suitable oil – water separator to treat the captured waste water by removing sediments, oils and grease. We recommend the unit installed treats the water such that there is no visible grease and oil and removes total suspended solids to < 50mg/L and all particulates $\geq 60\mu$ (DECC, 2007).
 - A 10 KL reuse water storage tank to supply water for maintenance and washdown activities.
4. Treated water is suitable for reuse for slipway activities. Waste water from these activities is then caught by the collection pit and passes through the above treatment system again.

It is noted that where captured treated stormwater exceeds re-use needs, overflow of this treated stormwater will be discharged into Middle Harbour having no impact on existing water quality. A swale shall be constructed around the adjoining car park area to direct clean stormwater flows from surrounding areas directly west into Middle Harbour as currently occurs.

The installed stormwater treatment system shall be regularly maintained by a suitably qualified contractor every three (3) months or as specified within manufacturer's recommendations, to ensure operation at full capacity.

3.4 Slipway Management

The following recommendations are made to manage the everyday-operations of the proposed slipway area and protect Middle Harbour from pollution.

- Appropriate signage shall be used onsite to encourage boat owners to use the provided slipway and maintenance docks, and to teach them correct washing methodology to prevent the pollution of waterways.
- All slipway work areas shall be kept clean at all times and, in particular, prior to leaving the site. Paint chips and any gross pollutants shall be swept immediately after any scraping or sanding works – not hosed into the catch drain.
- Always use appropriate machinery and work practices to control dust and other potential pollution sources. Glues, resins and paints should be used with care to avoid accidental spills or leaks.

3.5 Stormwater Collection

In addition to the 10 KL reuse tank containing treated waste water, it is proposed an additional 20 KL of stormwater is captured from the roof of the marina's main building. Thus, a total of 30 KL of rainwater is harvested from the site and available for reuse.

4 Waste Management Plan

4.1 NSW Waste Avoidance and Resource Recovery Strategy 2003 (Resource NSW, 2003)

The waste management plan for the Spit Marina is based around the principles of the 'NSW Waste Avoidance and Resource Recovery Strategy 2003' (Resource NSW), the primary strategic document to guide the efforts in waste prevention and avoidance, re-use and recycling. The four key strategies for minimising waste under this document are;

1. Preventing and avoiding waste.
2. Increasing the recovery and use of secondary materials.
3. Reducing toxicity in products and materials.
4. Reducing litter and illegal dumping.

4.2 Waste Hierarchy

In accordance with Waste Avoidance and Resource Recovery Act (2001), the primary strategy of the site waste management plan is to follow the hierarchy for managing waste thereby meeting the objectives of the Act. The waste hierarchy (from most to least desirable) includes;

1. Avoid unnecessary resource consumption.
2. Recover resources (including reuse, reprocessing, recycling and energy recovery).
3. Dispose (as a last resort).

The primary aim of the Spit Marina, including the slipway area, refuelling station and sewage pump out, is to avoid the production of waste where possible. Where this is not possible, recycling and correct disposal shall take place. The following sections discuss specific aspects of waste management on site.

4.3 Sewage

The proposed development is to include a sewage pump-out facility. All sewage waste removed from vessels shall be disposed of through the existing Sydney Water town sewer connection.

4.4 Oily Bilge Disposal

The water that collects in the inner part of a vessel's hull (bilge water) is frequently contaminated with oil and other lubricants. Visitors and users of the site should be encouraged verbally, and through signage, to dispose of this water correctly.

We understand that currently all bilge pump outs are carried out by specialist contractors who take the material off site for appropriate disposal. This is not expected to change with the new development.

4.5 Solid Waste

Attachment A gives areas of the proposed site layout dedicated to garbage storage. The site shall have separate bins available for recyclable materials, organic waste and other waste materials to promote correct disposal of rubbish. Boat users shall also be encouraged, verbally and through signage, to dispose of any waste/rubbish appropriately once returning to the Marina and not into the waterway. As shown on the site plan (Attachment A) these bins are to be located close by to the pedestrian walkway and have self-closing lids or similar to prevent pollution.

Contractors shall be engaged to empty the bins on a regular basis and take these off-site to be recycled (as appropriate) or disposed of.

4.6 Chemical Waste

Any chemical waste (including oil, paint and other chemicals) produced by activities conducted at the slipway shall be collected and stored appropriately and taken off site on a regular basis. Chemical waste shall not be disposed of down the provided catch drains, sewer connections or into Middle Harbour.

Adequately stocked spill kits shall be kept on site in an easily accessible location in case of an accidental chemical spill.

Section 6.2 provides more detailed information regarding hazardous materials kept on site and their containment.

5 Sediment and Erosion Control

All required construction works shall comply with the guidelines and principles set out in the Landom 'Managing Urban Stormwater' handbook (2004). Locations of sediment and erosion control measures are provided on the site plan in Attachment C.

5.1 Mooring Facilities

We understand from discussions with the client that the likely foundation solution will be suspended concrete on driven piles. Construction by driven piles into the seabed will prevent dredging and suspension of marine sediments and the oxidation of any Potential Acid Sulphate Soils present.

5.2 Containment Boom

All construction works within Middle Harbour shall be done with a containment boom and silt net surrounding the works area. This will reduce sedimentation impacts during berth construction and reduce the impacts of an accidental spill in the works area by containing any potential pollutants.

5.3 Sediment Fencing and Straw Bales

It is recommended that sediment fencing and straw bales be installed above the high water mark in the areas where works to upgrade the existing marina are to take place. Stormwater flows are to be redirected around the construction site to prevent the transportation of sediments into the waterway. This shall also ensure construction materials and waste do not discharge into Middle Harbour during periods of rainfall.

All sediment fencing and straw bales shall be maintained and monitored on a regular basis and after periods of extended rainfall. Any damaged fencing shall be replaced immediately to prevent sedimentation of surrounding waterways. Sediment fencing and straw bales locations and typical specifications are provided in Attachment C.

6 Environmental Assessment

6.1 Water Quality Impacts

6.1.1 *During Normal Operations*

During normal operations, provided the recommended stormwater treatment system is monitored and maintained regularly, it is not expected that there will be any significant impact on the water quality of Middle Harbour. The proposed development is expected to result in an improvement in Middle Harbour water quality through the removal, or mitigation, of existing potentially contaminating operations. Recommendations and mitigation strategies are discussed further in Section 7.

6.1.2 *Events outside Normal Operations*

There are a number of potential water quality impacts associated with rare or unlikely events which could occur within a marina facility. Table 2 assesses the potential sources of water pollution associated with the proposed development, characterises each risk in terms of likelihood and recommends management strategies and measures to minimise risk and mitigate impacts. Likelihood has been categorised based on the following measures;

1. Almost Certain – event is expected to occur.
2. Likely – The event will probably occur under adverse conditions.
3. Possible – The event could occur under adverse conditions.
4. Unlikely – The event might occur under very adverse conditions.
5. Rare – The event is conceivable but only under exceptional circumstances.
6. Not Credible – The event is inconceivable.

Table 2: Risk Assessment: Rare/Unlikely events associated with the proposed development at The Spit Marina.

Risk	Likelihood	Management/Mitigation
Accidental fuel spill into Middle Harbour from fuel bowzers.	(5) Rare	<p>All nozzles to 'cut-off' automatically when back-pressure reaches a certain level and cannot be locked in the 'on' position. Fuel bowzers to be covered from the rain.</p> <p>A boom will be available for use in the event of an accidental spill of hydrocarbons and to prevent dispersion. An alert system shall be in place to ensure spills are dealt with quickly. All fuel bowzers to include an emergency shut-off button.</p>
Accidental spill from sewage pump-out facilities into Middle Harbour.	(5) Rare	<p>Regular monitoring and maintenance to prevent failure of facilities.</p> <p>Consequences of sewage spills are short lived and minimal as waste will be diluted and dispersed with wave action and tides.</p>
Discharge of gross pollutants, sediments, oil and grease due to failure of stormwater treatment system.	(4) Unlikely	<p>Regular monitoring of system operations, hydrocarbon capture system, maintenance of system and 'clean out' as required.</p>
Accidental release of fuel or waste from moored boats.	(4) Unlikely	<p>A boom will be available to prevent dispersion of hydrocarbons or waste during accidental spills. An alert system shall be in place to ensure spills are dealt with quickly.</p>
Chemical spill from storage areas into waterways.	(5) Rare	<p>A boom will be available to prevent dispersion of pollutants during accidental spills. Chemicals kept on site shall be correctly contained and stored in bunded areas. Any spills will most likely be intercepted by the stormwater treatment</p>

system thus allowing for pump out by contractors, preventing discharge to waterways. An alert system shall be in place to ensure spills are dealt with quickly.

The potential risk of water pollution caused by an event outside the scope of normal operations is considered unlikely provided facilities are regularly maintained and mitigation measures, such as emergency booms and alert systems, are provided.

6.2 Hazardous Materials Assessment and Management

6.2.1 Dangerous Goods

'Dangerous Goods' are those classified as corrosive, flammable, explosive, oxidising or reactive with water. The Dangerous Goods (Storage and Handling) Handling Regulations require dangerous goods be stored in accordance with the law.

Details regarding dangerous goods to be kept onsite, quantities and proposed storage have been discussed with the client. These have been grouped (by Class) and 'screened' in accordance with the 'Applying SEPP 33' document (DUAP, 1995). According to this document, the development is only considered 'potentially hazardous' and/or 'potentially offensive' if this assessment indicates that the quantities of Dangerous Goods kept on site exceed the recommended minimum amounts. This results in SEPP 33 being triggered and requires a Preliminary Hazard Analysis (PHA) be prepared to demonstrate its permissibility. Table 3 conducts the dangerous goods 'screening' for the site.

Table 3: Risk Screening: Screening Thresholds of Dangerous Goods kept onsite, as per Table 1 and 3 and Figures 5-9 (DUAP, 1994).

Class	Dangerous Goods Classification	Site Complies (Y/N) ¹
1.1	Explosives (mass explosion hazard)	Y
1.2	Explosives (projection hazard)	Y
1.3	Explosives (fire hazard)	Y
2.1 (pressurised)	Gases: Compressed, Liquefied or Dissolved under pressure: flammable gasses.	Y
2.1 (liquefied)	Gases: Compressed, Liquefied or Dissolved under pressure: flammable gasses.	Y
LPG (aboveground)	Gases: Compressed, Liquefied or Dissolved under pressure: flammable gasses	Y
LPG (belowground)	Gases: Compressed, Liquefied or Dissolved under pressure: flammable gasses.	Y
2.3	Gases: Compressed, Liquefied or Dissolved under pressure: Poisonous gasses.	Y
3PGI	Flammable Liquids: highly flammable.	Y
3PGII	Flammable Liquids: flammable liquids.	Y
3PGIII	Flammable Liquids: liquids.	Y
4	Flammable Solids Substances liable to spontaneously combustion and substances which in contact with water emit flammable gasses.	Y
5	Oxidising agents and organic peroxides.	Y
6	Poisonous substances (toxic) and infectious substances.	Y
7	Radioactive substances.	Y
8	Corrosive Substances	Y

Note: ¹ Site has levels below those of the screening thresholds given in Table 3 and Figures 5 – 9 of 'Applying SEPP 33' (DUAP, 1994). See Attachment D for minimum quantities as directed by Table 1 of the document.

6.2.2 SEPP 33 – Hazardous and Offensive Development

As shown in Table 3 all quantities of dangerous good kept onsite are below the screening thresholds, it can be assumed that, in accordance with SEPP 33, there is unlikely to be a significant risk. The proposed development therefore does not trigger SEPP 33 and does not require a PHA.

6.3 Acid Sulfate Soils Assessment and Management

According to the acid sulfate soils (ASS) planning map produced by Mosman Council (2005), the site is classified as having ASS risk. ASS risk refers to works that occur below 1m of existing ground level or works that disturb more than 1 tonne of soil.

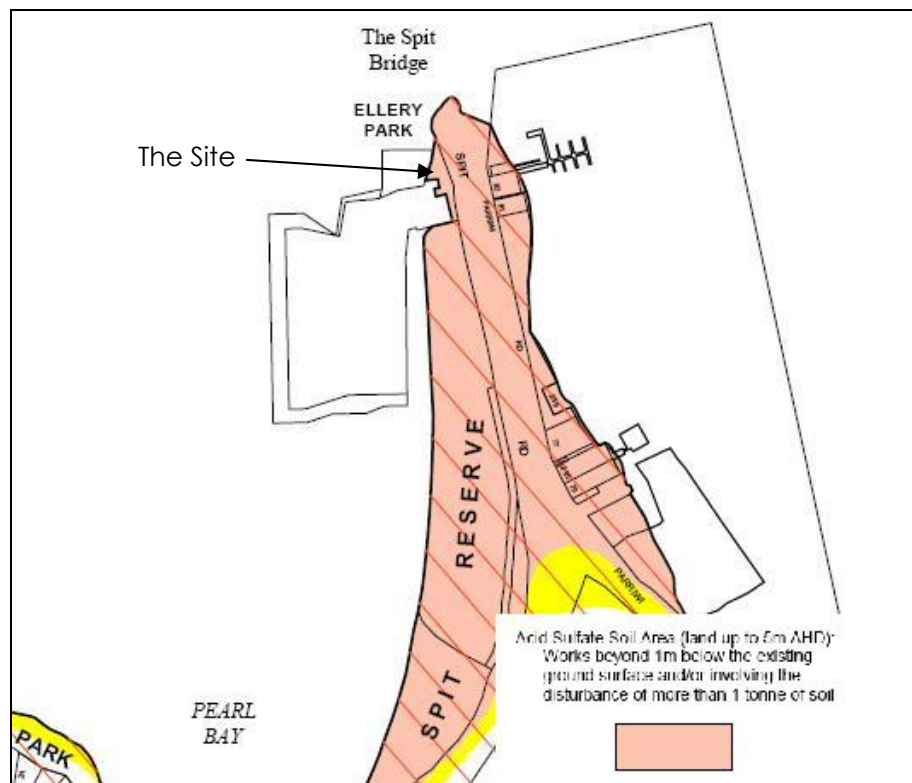


Figure 4: ASS risk map (Mosman Council, 2005).

A total of five (5) soil samples were analysed for the presence of ASS. On the basis of pH_{KCL} and pH_{OX} , the materials tested were classified as neither potential nor actual ASS and thus a site management plan is not required. More detailed information regarding onsite testing and laboratory results are provided in the 'Geotechnical, Acid Sulfate Soils and Stage 2 Contamination Assessment' (Martens and Associates, 2008 – Report number P0701675JR02_v1).

6.4 Underground Storage Tanks: Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008.

The proposed development at The Spit Marina includes the decommissioning of the existing underground storage tanks (UST's) and installation of new UTS's in a similar area. The recently gazetted UPSS Regulation 2008, applies to all underground storage systems and deals with their commissioning, decommissioning and monitoring. The following sections apply to onsite management of this system.

6.4.1 Commissioning and Decommissioning of Storage Systems

The following regulations apply to managing the instalment and decommissioning of UPSS's.

- A new storage system must be designed and installed by a duly qualified person.
- An equipment integrity test of the system must be carried out and certified by a suitable qualified person.
- The new storage system must include mandatory pollution protection equipment and groundwater monitoring wells (see Section 6.4.2).
- For sites where a system is to be decommissioned, a validation report for the storage site must be served to the relevant authority.

6.4.2 Groundwater Monitoring Wells

The following regulations apply to monitoring and managing a storage site using groundwater wells.

- A number of groundwater wells and their location must be determined and installed by a suitably qualified person to maximise the likelihood that contaminated groundwater will be intercepted.

Two groundwater wells have previously been installed at the site by suitably qualified engineers at Martens and Associates. Recent monitoring of the existing system suggests that there is no soil contamination as a result of the existing UST's. Groundwater sample results however, show the presence of hydrocarbons, suggesting there may be a leak in the existing system. Martens and Associates report 'Geotechnical, Acid Sulfate Soil and Stage 2 Contamination Assessment' (2008) for the site provides details of groundwater monitoring and recommendations for the remediation of the site.

6.4.3 Use of Storage Systems

The following regulations apply to managing the use of USS's.

- A storage system must not be used otherwise than in accordance with an Environmental Protection Plan which includes a loss monitoring procedure, an incident management procedure and a maintenance procedure. We recommend an Environmental Protection Plan for the proposed site USTs be developed in accordance with this Regulation once detailed design becomes available.
- A system is not to be used unless all gauges, indicators and monitoring wells have been checked and maintained in accordance with manufacturer's instructions.
- Groundwater must be tested for petroleum once every 6 months in order for a system to be deemed 'usable'.
- A record must be kept of all modifications, equipments tests and monitoring results. An incident log must also be kept on the storage site.

6.5 Hydrogeological Impact and Management

Table 4 lists the impacts, as identified by Gary Blumberg and Associates Pty Ltd (2008), of the proposed development on the hydrological characteristics of the site and their management, if required.

Table 4: Hydrological Impacts Assessment: The Spit Marina (Gary Blumberg and Associates, 2008).

Hydrological Characteristic	Impact of Proposal	Management/Mitigation
Morphology	Proposal would have no impact on the morphological behaviour of the site.	All new waterside structures to be designed to accommodate water depths, water flows and bed materials.
Water Depths and Sediment	The proposal will have no impacts on existing water depths.	The reconfigured berths are to be restrained by piles. The piling design would have regard to existing water depth and bed materials.
Water Levels	No impact provided mitigation measures detailed are adhered to.	Pile cut-off levels are to be suitably elevated and have appropriated bending capacity. Pile lengths should cater for a still water level of RL 2.4 (m ZFDTG) and wave amplitude of 400mm. Ramps are to be operable for a still water level between RL -0.3 and 2.8.
Waves and Wave Loading	Waves will impinge on the marina resulting in the movement of vessels at their berths and imparting loads on the marina itself.	Appropriately designed conventional concrete encased floating marina systems with piling restraint would readily withstand current loads on the marina. To be accounted for in the detailed design.
Currents and Current Loading		Conventional concrete encased floating marina systems with piling restraint would readily withstand current loads on the marina. To be accounted for in the detailed design.

7 Compliance Assessment

The following sections deal with specific objectives and criteria set by relevant guidelines and planning controls to this sort of development.

7.1 NSW EPA (1999) Environmental Guidelines; 'Best Management Practice for Marinas and Boat Repair Facilities'

The proposed upgrade ensures full compliance with the NSW EPA 'Best Management Practice for Marinas and Boat Repair Facilities'. Table 5 below demonstrates how the proposed redevelopment of the Spit Marina meets these guidelines.

Table 5: Compliance of proposed development with NSW EPA 'Best Management Practice for Marinas and Boat Repair Facilities' Guidelines – Section 2.

Guideline (of Section 2 pg 5-12)	Requirement	Proposed	Complies
General Management	All facilities must provide appropriate controls to prevent materials/wastes from discharging to the environment.	Catch drain and stormwater treatment system prevents waste water from discharging into the environment and allows for re-use. The hardstand area is surrounded by a swale redirecting clean upslope runoff to the waterway. Hazardous materials/chemicals are correctly stored (Section 6.2).	Yes
	All works on vessels that could lead to pollution must be done over a hardstand area not inundated during high tide.	All vessels are proposed to be removed from the water by the boat lift and worked on on the hardstand area. This area is well above the highest astronomical tide.	Yes
	All wastewater and solid waste must be collected on site for further management. Clean hulls of vessels over a collection system that is capable of capturing and/or treating the volume of water to be used to prevent polluting the	Oily bilge, solid waste and chemical waste to be correctly stored and taken off site. Stormwater to be captured, treated on site and reused during slipway activities.	Yes

Guideline (of Section 2 pg 5-12)	Requirement	Proposed	Complies
	receiving waters		
Liquid Wastes	Liquid wastes collected on site to be disposed of in 1 of the 4 ways as specified on pg 6	Liquid waste to be treated on site and discharged to the sewer (under agreement with sewage authority) or removed by a registered waste contractor.	Yes
Solid Wastes	Solid waste must be disposed of at an appropriate facility	Recyclable, organic and rubbish to be collected in separate bins in the specified area (Attachment A) and taken off site by a suitably qualified contractor.	Yes
	All activities that generate dust must be done such that they do not pollute the air or waters	Stormwater treatment system to remove suspended solids prior to discharge/reuse. Sanding/blasting techniques which minimise dust are to be used.	Yes
Stormwater	Minimising waste and water use. Recycle where possible.	Stormwater to be collected from marina roof and recycled for boat washing. Wash down water is treated and re-used.	Yes
	Ensuring stormwater is effectively controlled and recycled where appropriate.	Water capture and recycling system will control stormwater discharge and recycling.	Yes
	Fit litter retention devices to improve the quality of stormwater prior to its discharge into waterways.	Stormwater is treated to remove particles > 60µm.	Yes
	Any part of the slipway operations exposed to the weather and where contaminants may be present requires a collection	Stormwater treatment system services all hardstand areas exposed to weather.	Yes

Guideline (of Section 2 pg 5-12)	Requirement	Proposed	Complies
	system.		
	Collected water must be treated before discharge.	Stormwater/washdown water treatment system provided.	Yes
	The collection system must be capable of capturing contaminated run-off and emptied within a time frame that allows the capture of contaminated water flowing from exposed areas during subsequent rainfall events e.g. a first-flush system	Stormwater treatment system designed to be capable of holding and treating the first flush event (first 15mm of rain) and of processing and captured water within 1 day.	Yes
Environmental Safety and Emergency Response	Marina must have an environmental safety and response plan.	Environmental Safety and Response plan to be developed prior to construction. All workers to be aware of the plan and procedures. All safety equipment should be inspected and tested in accordance with manufacturer's recommendations and workers are to be trained appropriately in their use.	Yes
Managing Collection of Sewage from vessels	Pump-out facilities shall display information on the correct use on an easy to read sign. Provide cleaning up facilities for spillages.	Clear signage to indicate correct use and procedures of all sewage pump out facilities.	Yes
Bilge water	Ensure contaminated bilge water is not discharged into the environment. Encourage use of oil-absorbent products on all vessels with inboard motors.	Specialist contractors to pump out bilge water and take off site for correct disposal. Signage and verbal advice/directions to be given to boat owners regarding correct use of these facilities and discouraging their discharge into Middle Harbour.	Yes

Guideline (of Section 2 pg 5-12)	Requirement	Proposed	Complies
Fuel Management	Any spills to be reported to Local Ports Authorities. Marina operator/owner to regularly inspect and maintain fuel pump-out facilities.	Marina operator to keep a log of fuel pump-out inspections or repairs. Containment booms to be easily accessible in case of an accidental spill. Any fuel refilling points shall be in accordance with POEO Regulation.	Yes
	Environmental Safety and response plan to be in place.	Plan to be developed prior to construction.	Yes
	Pipes distributing fuel are to be adequately protected against damage and have an automatic shut-off. Drip trays or other devices to be used to prevent drips from entering waterways during refuelling.	Pipe distributing fuel will not change location and thus remain adequately protected and have an automatic cut-off. Dispensers will utilise devices which capture drips before entering waterways.	Yes
	Fuel nozzles that do not remain open to be used. Dispensers to be attended at all times. An automatic cut-off to be installed to prevent tank from overflowing. Fuel dispensing facilities are to be regularly inspected.	Fuel bowzers are to be fit with nozzles that are manually held so customers are unable to leave/walk away. Cut-off switches are to be installed to prevent overfilling. Signage and verbal advice to be given on site to educate visitors on correct refuelling procedures/techniques. Operator to regularly inspect bowzers.	Yes
Litter Collection	Encourage and educate patrons about the right way to dispose of litter (both recyclable and non-recyclable materials). Make sure facilities are regularly emptied.	Clearly labelled litter bins and signage to be used to encourage correct disposal and/or recycling of materials. Bins to be located in a prominent position with self-closing lids to prevent pollution. Litter/recyclable materials to be taken off site by a suitably qualified contractor and disposed	Yes

Guideline (of Section 2 pg 5-12)	Requirement	Proposed	Complies
		of appropriately.	
Control of Stormwater during Construction/Upgrade	Prevent soil erosion and pollution by using appropriate site work practices.	Construction methods to be in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) and sediment and erosion control plan provided in Section 5. Detailed sediment and erosion control to be provided at CC stage of development.	Yes

7.2 DECC (2007) 'Environmental Action for Marinas, Boatsheds and Slipways'

This document is the complement of the EPA guidelines and makes recommendations for the correct management of slipways and marina facilities such that water, noise and air pollution is mitigated. It has listed a number of priority actions for marinas, slipways and boatsheds. As shown in Table 6, the stormwater and waste management system proposed for the site ensures compliance with the guidelines.

Table 6: Compliance Assessment; Priority Actions for Marinas, Slipways and Boatsheds (DECC 2007, pg 2).

Priority Action	Compliance (Y/N/NA)
Bund and Cover fuel dispensing facilities	Y
Ensure 'first flush' catchment system is of sufficient capacity and is regularly maintained	Y
Discourage boat owners from discharging bilge water	Y
Provide pump-out facilities and encourage their use	Y
Encourage boat owners to take steps to avoid polluting waters when washing their boats	Y
Ensure all slipways and work areas are graded, bunded and fitted with catch drains to collect waste water and chemical spills	Y
Carry out all work above catch drains	Y
Keep slipway work areas clean at all times. Ensure the area is cleaned up before leaving the site	Y
Obtain all necessary consents, permits and licenses	Y
Ensure carparks and gardens are free from litter	Y
Ensure drains and collection pits are clear of debris	Y
Place spill clean-up kits at likely spill locations and train staff in their use.	Y
Erect signage to remind clients of your commitment to reduce noise and protect the environment.	Y
Keep workshops clean of materials and waste	Y
Ensure all staff are properly trained in the correct use of hazardous materials	Y
Store hazardous materials, including fuel, oils and chemicals, in correctly segregated, bunded and covered areas. Ensure all lids are in good condition.	Y
Develop an emergency response procedure for chemical spills and train staff in managing and preventing spills.	Y
Regularly check the integrity of underground storage tanks	Y

Provided the recommendations provided within the report are followed, the proposed development at the Spit Marina complies with

the DECC (2007) 'Environmental Action for Marinas, Boatsheds and Slipways'.

7.3 AS 3962 – 2001; 'Guidelines for the Design of Marinas'.

The objective of AS 3962-2001 is to provide designers, manufacturers and operators of marina and vessel berthing facilities with a set of guidelines. Section 6 and 7 of the standards outline the service requirements and facilities for Marinas. As shown in Table 7; the proposed slipway upgrade and waste and stormwater management plans comply with these standards.

Table 7: Compliance Assessment; AS 3962-2001 Guidelines for Marinas.

Section (AS 3962 – 2001)	Requirement	Compliance (Y/N/NA)
Section 6 – Services; <i>Water Supply</i>	Water supply, if provided from public mains, should be in accordance with the relevant authority	N/A
	Marinas may provide sewage pump-out facilities and facilities for disposal of other liquid wastes such as waste oil	Y
Section 6 – Services; <i>Waste Management</i>	Garbage and solid refuse disposal facilities should be located a minimum practical distance from the head of the gangway	Y
	Garbage receptacles contain self-closing lids to prevent rubbish escape by way of wind, birds/animals and exclude rainwater entry	Y
Section 6 – Services <i>Stormwater Control and Disposal</i>	Contaminated run-off from hardstand, including boat maintenance areas, should be capable of being isolated so that run-off can be collected, treated and disposed of.	Y
	Equipment that can be rapidly deployed to contain and clean up any fuel spillage should be provided.	Y
Section 6 – Services <i>Fuel Supply</i>	It is desirable that fuel berth should be a separate structure from the marina berths and should be isolated.	Y (located on maintenance berths separate from main berths)
Section 7 – Onshore Boat Facilities <i>Hardstand</i>	The hardstand can consist of any flat, well-drained, well-compacted, load bearing surface. Sealed is preferred for water quality considerations.	Y

7.4 SREP 2005 – Sydney Harbour Catchment

The document applies to all land within the Sydney Harbour Catchment and aims to protect the natural assets of the area. According to the zoning maps for SREP 2005, the water component of the site is zoned as 'W5 – Water Recreation' which carries its own objectives as well as the generic catchment objectives.

This planning document has been considered in relation to the proposed Spit Marina development – specifically hydrogeological impacts and management (see Section 6.4). Table 8 assesses the compliance of the proposed development with SREP 2005 – Sydney Harbour Catchment.

Table 8: Compliance Assessment; SREP 2005 – Sydney Harbour Catchment.

Clause	Requirement/Planning Principle	Proposed	Complies
Part 2 – Clause 13 <i>Sydney Harbour Catchment</i>	(a) Development is to protect and, where practical, improve the hydrological, ecological and geomorphologic processes on which the health of the catchment depends.	Stormwater treatment and waste management plan aims to protect and enhance the health of Middle Harbour	Yes
	(b) The natural assets of the catchment are to be maintained and, where feasible, restored for their scenic and cultural values and their biodiversity and geodiversity.	Proposed development will have no impact on the natural assets of the catchment.	Yes
	(c) Decisions with respect to the development of land are to take account for the cumulative environmental impact of development within the catchment.	Development has been assessed from a total catchment management perspective to mitigate environmental impact.	Yes
	(d) Action is to be taken to achieve the targets set out in Water Quality and River Flow Interim Environmental Objectives: Guidelines for Water Management: Sydney Harbour and Parramatta River Catchment (1999) and be consistent with ANZEC water quality guidelines.	Proposed development aims to improve the existing water quality by preventing discharge of polluted slipway water into Middle Harbour.	Yes

<p>(e) development in the Sydney Harbour Catchment is to protect the functioning of natural drainage systems on floodplains and comply with the guidelines set out in the document titled <i>Floodplain Development Manual 2005</i> (2005),</p>	<p>Development is upgrading existing facilities and thus has no impact on the functioning of natural drainage systems on floodplains.</p>	<p>Yes</p>
<p>(f) development that is visible from the waterways or foreshores is to maintain, protect and enhance the unique visual qualities of Sydney Harbour</p>	<p>Development is within the character of the Sydney Harbour Foreshore and Zone W5.</p>	<p>Yes</p>
<p>(g) the number of publicly accessible vantage points for viewing Sydney Harbour should be increased</p>	<p>Sydney Harbour is not visible from the site.</p>	<p>Yes</p>
<p>(h) development is to improve the water quality of urban run-off, reduce the quantity and frequency of urban run-off, prevent the risk of increased flooding and conserve water,</p>	<p>Proposed stormwater treatment system will treat washdown water and recycle it thus requiring no additional water use. Stormwater from the Marina roofs will also be captured and reused.</p>	<p>Yes</p>
<p>(i) action is to be taken to achieve the objectives and targets set out in the <i>Sydney Harbour Catchment Blueprint</i>, as published in February 2003 by the then Department of Land and Water Conservation</p>	<p>Proposal complies with SREP 2005 'Sydney Harbour Catchment' which aims to implement the actions outlined in the <i>Sydney Harbour Catchment Blueprint</i>.</p>	<p>Yes</p>

	(j) development is to protect and, if practicable, rehabilitate watercourses, wetlands, riparian corridors, remnant native vegetation and ecological connectivity within the catchment	Development will have no impact on the hydrological or geomorphologic nature of the catchment, including vegetation, wetlands and riparian corridors. Stormwater treatment will enhance water quality and improve local environment.	Yes
	(k) development is to protect and, if practicable, rehabilitate land from current and future urban salinity processes, and prevent or restore land degradation and reduced water quality resulting from urban salinity	The site is currently free from urban salinity. Proposal will improve water quality.	Yes
	(l) Development is to avoid or minimise disturbance of acid sulphate soils in accordance with the <i>Acid Sulphate Soil Manual</i> (ASSMAC, 1988).	Site investigations have shown no potential of actual ASS on site.	Yes
Part 2 – Clause 14 Foreshores and Waterways Area	(a) development should protect, maintain and enhance the natural assets and unique environmental qualities of Sydney Harbour and its islands and foreshores,	Stormwater treatment and waste management aim to protect and enhance the local natural assets and environmental qualities.	Yes
	(b) public access to and along the foreshore should be increased, maintained and improved, while minimising its impact on watercourses, wetlands, riparian lands and remnant vegetation,	Proposal includes public walkways and seating to provide access to the local foreshore and marina area. Development does not ingress on any wetlands, riparian lands or remnant vegetation.	Yes

(c) access to and from the waterways should be increased, maintained and improved for public recreational purposes (such as swimming, fishing and boating), while minimising its impact on watercourses, wetlands, riparian lands and remnant vegetation.	Proposal provides improved recreational boating access to The Spit and Middle Harbour and has no significant impact on watercourses, wetlands, riparian lands and remnant vegetation.	Yes
(d) development along the foreshore and waterways should maintain, protect and enhance the unique visual qualities of Sydney Harbour and its islands and foreshores,	Development is within the character of the local area thus protecting and enhancing the local visual quality.	Yes
e) adequate provision should be made for the retention of foreshore land to meet existing and future demand for working harbour uses,	The foreshore component of the proposed development will have a similar footprint to the existing marina and therefore will result in a negligible loss of foreshore land.	Yes
(f) public access along foreshore land should be provided on land used for industrial or commercial maritime purposes where such access does not interfere with the use of the land for those purposes,	Public access along the foreshore area is provided as part of this proposal.	Yes
(g) the use of foreshore land adjacent to land used for industrial or commercial maritime purposes should be compatible with those purposes,	NA	NA
(h) water-based public transport (such as ferries) should be encouraged to link with land-based public transport (such as buses and trains) at appropriate public spaces along the waterfront,	NA	NA

	(i) The provision and use of public boating facilities along the waterfront should be encouraged.	NA	NA
Part 2 - Clause 15 <i>Heritage Conservation</i>	(a) Sydney Harbour and its islands and foreshores should be recognised and protected as places of exceptional heritage significance,	Proposed development has no significant impact on the heritage significance of Middle Harbour.	Yes
	(b) the heritage significance of particular heritage items in and around Sydney Harbour should be recognised and conserved,	NA	NA
	(c) an appreciation of the role of Sydney Harbour in the history of Aboriginal and European settlement should be encouraged	NA	NA
	(d) the natural, scenic, environmental and cultural qualities of the Foreshores and Waterways Area should be protected,	Proposal has been assessed to have no significant impact on Foreshores and Waterways area. Stormwater treatment and waste management aim to protect and further enhance these areas.	Yes
	(e) significant fabric, settings, relics and views associated with the heritage significance of heritage items should be conserved,	NA	NA
	f) Archaeological sites and places of Aboriginal heritage significance should be conserved.	NA	NA

Part 3 – Clause 17 Zone Objectives: 'Zone W5 Water Recreation'	a) to give preference to and increase public water-dependent development so that people can enjoy and freely access the waters of Sydney Harbour and its tributaries,	Development is to expand and improve the facilities at The Spit Marina which provides public access to waters of Sydney Harbour and tributaries.	Yes
	(b) to allow development only where it is demonstrated that the public use of waters in this zone is enhanced and will not be compromised now or in the future,	Development is to take place at the existing Spit Marina site. Stormwater treatment, waste management and construction methodology ensure waters in this zone are enhanced.	Yes
	(c) to minimise the number, scale and extent of artificial structures consistent with their function,	Design of proposed marina facilities is such that artificial structures are minimised and their extent is consolidated.	Yes
	(d) to allow commercial water-dependent development, but only where it is demonstrated that it meets a justified demand, provides benefits to the general and boating public and results in a visual outcome that harmonises with the planned character of the locality,		Yes
	(e) to minimise congestion of, and conflict between, people using waters in this zone and the foreshore	Marina development will result in no significant conflict between water use and foreshore use. Land based development is within a similar footprint to the existing Marina facility.	Yes

(f) to protect and preserve beach environments and ensure they are free from artificial structures,	Proposed development does not impinge on beach environments. Foreshore development is within a similar footprint to the existing.	Yes
(g) To ensure that the scale and size of development are appropriate to the locality, and protect and improve the natural assets and natural and cultural scenic quality of the surrounding area, particularly when viewed from waters in this zone or from areas of public access.	Development is within the character of the area and thus is deemed as appropriate to the locality, which is where the existing Marina facility exists. Development will protect and improve natural assets and scenic quality of the area.	Yes

The proposed upgrade of The Spit Marina is compliant with SREP 2005, provided the recommendations within the report are followed.

7.5 Estuary Management Manual (NSW Government, 1992)

The Estuary Management Manual (1992) aims to ensure the long term sustainability of estuarine habitats and ecosystems. Appendix J outlines the principles in managing human activities within these environments. Table 9 summarises these principles and demonstrates how the proposed development complies with the document.

Table 9: Compliance Assessment; Estuary Management Manual (NSW Government, 1992).

Management Principle	Objective	Proposed	Complies
General Principle	Whenever possible, estuarine foreshores, wetlands and aquatic habitats should be preserved in their natural state.	Proposed development is demolishing and updating the existing facilities. Existing estuarine foreshore environment is currently not in its natural state.	Y

	Habitat restoration should be undertaken wherever there is an opportunity to repair past environmental damage.	No habitat restoration is required.	Y
	The cultural heritage of estuaries should be protected by appropriate measures.	The site is not an aboriginal cultural or historic site.	Y
	All management and development activities by state and local government authorities should be subject to full public consultation and appropriate environmental controls.	Development will be placed on public display as required and in accordance with the Department of Planning's requirements.	Y
	Any 'activity' or 'development' which is likely to affect an estuary should be referred for assessment to appropriate authorities.	Development application will be referred to all relevant authorities including (but not limited to) DECC, Fisheries and DPI.	Y
Habitat Protection	Estuarine habitats should be protected by appropriate zoning and development controls.	Proposed development is within relevant zoning constraints and complies with relevant planning development controls (Section 7)	Y
	Representative and unique aquatic and terrestrial habitats should be protected and managed by reservation under appropriate legislation	No unique/representative aquatic or terrestrial habitats are significantly impacted as a result of this development.	Y
Foreshore Reserves and Recreation	Existing public access to and along estuarine foreshores should be maintained and improved where possible.	Public access to and along the foreshore area will be maintained as part of this development.	Y
	When waterfront land is rezoned, a well-marked foreshore reserve of at least 30 metres width should be established	Proposal does not involve rezoning of waterfront land.	Y

	Larger foreshore reserves are needed in some areas to protect ecologically sensitive areas and to provide public facilities for water based recreation.	Development does not involve foreshore reserves.	Y
	Water-based and passive recreation should be given priority in the future development of foreshore reserves.	The proposed development is to expand the existing facilities promoting water-based recreation.	Y
Fisheries	Recognised fishing grounds should not be alienated for foreshore of subtidal structures.	Proposed development will have no significant impact on recognised fishing grounds in the area.	Y
	Developments or activities should not interfere with commercial or recreational fishing, or with the oyster farm industry	Proposed development will have no significant impact on recreational or commercial fishing in the area. There is no oyster farming in the Middle Harbour estuary.	Y
Water Quality	Water quality criteria should be based on the maintenance of the estuarine ecosystem and the protection of fisheries, oyster farming and recreational amenity.	Proposed development captures and treats stormwater to a level which will maintain and enhance the existing estuarine ecosystem.	Y
	Pollution of estuaries should be minimised, either by alternative disposal methods or by high-level treatment of wastes.	Stormwater will be captured, treated to a high level and reused on site to minimise pollution of the estuary.	Y
Development	Areas zoned for development should be separated by 'buffer zones' of adequate width from ecologically sensitive areas, especially wetlands.	Development is not in close vicinity to any ecologically sensitive areas.	Y

Necessary public developments should be directed to areas which will suffer the least ecological damage.	Proposed development is within a similar footprint to the existing structures which will minimise ecological damage.	Y
Developments or activities should not be allowed to restrict tidal exchange, tidal inundation of low-lying lands, or fish passage.	Proposed development will not restrict tidal exchange, tidal inundation or fish passage.	Y
Developments and activities near intermittently opening coastal lagoons should be strictly controlled with the objective of maintaining a level of water quality suitable for fish and other aquatic life.	Development is not in the vicinity of an intermittently opening coastal lagoon.	Y
Environmental compensation should be an integral part of the planning process for any development or activity that causes unavoidable damage to any estuarine habitat or associated habitat of importance to the estuary.	Proposed development does not cause any unavoidable damage to the existing estuarine environment or associated habitat.	Y

7.6 Licensing Requirements

The licensing requirements for the proposed upgrade/redevelopment of The Spit Marina have been investigated and are identified below. We note this list is subject to change once detailed design and construction methodology has been developed.

- The Department of Environment and Climate Change (DECC) require an application be sought for an '*Environmental Protection Variation*' to carry out scheduled development work and activities.
- If dewatering is required (unlikely) a Licence under Chapter 3, Part 2 of the Water Management Act 2000. Other forms of 'water supply work' or 'water management work' may require a license under Part 3 of Chapter 3.

- Although minor, any dredging or reclamation works to be carried out will require approval under Section 201 of the Fisheries Management Act 1994.
- A licence for the works will be required under section 47 of the Protection of the Environment Operations Act 1997.
- A 'controlled activity approval' will be required under section 91 of the Water Management Act 2000 for the erection of a building, the carrying out of work and the removal of material (although minor). An 'aquifer interference approval' may also be required under this section of the Act if an aquifer is to be penetrated, interfered with or obstructed.

8 Conclusion

The proposed development at The Spit Marina, Mosman will see the demolition, upgrade and expansion of the existing facilities including the slipway. The potential for the proposal to adversely impact on existing environmental conditions has been addressed and the conclusion made is that the proposed development will result in no detrimental impacts, provided that site management measures detailed in this report are carried out as recommended. If adhered to, these management techniques ensure full compliance with relevant controls and guidelines.

9

References

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NSW Government (1992) *Estuary Management Manual*

Resource NSW (2003) 'NSW Waste Avoidance and Resource Recovery Strategy 2003'.

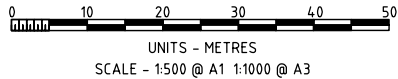
State Environmental Planning Policy (SEPP) 33 – *Hazardous and Offensive Development*

Sydney Regional Environmental Plan (2005) 'Sydney Harbour Catchment'

Underground Storage Tanks: *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008*.

Waste Avoidance and Resource Recovery Act 2001

10 Attachment A – Site Plans



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CLIENT/ PROJECT		TITLE		DESIGNED:	DATUM:	SHEET 1 OF 2 SHEETS	REV.	DESCRIPTION	DATE	ISSUED
d'ALBORA MARINAS THE SPIT MOSMAN		EXISTING SITE PLAN THE SPIT MARINA, MOSMAN		MLB	mAHd		1	ENGINEERING SERVICES REPORT	10/04/2008	MLB
THIS PLAN MUST NOT BE USED FOR CONSTRUCTION UNLESS SIGNED AS APPROVED BY PRINCIPAL CERTIFYING AUTHORITY All measurements in mm unless otherwise specified.		PROJECT MANAGER: MR ANDREW NORRIS		DRAWN: MLB	HORIZONTAL RATIO: 1:500 @ A1 1:1000 @ A3					
		DRAWING NUMBER: P0701675J003_V1		REVIEWED: ASN	VERTICAL RATIO: 1:500 @ A1 1:1000 @ A3	PAPER SIZE: A1 / A3				



EXISTING LEASE BOUNDARY

PROPOSED LEASE LINE

W1 MARITIME WATERS

W5 MARITIME WATERS

WASTE STORAGE/PICKUP AREA
SEAGRASS AREA
HARDSTAND/SLIPWAY AREA
BOAT LIFT
SEAGRASS AREA
PROPOSED FUEL BERTH AND
SEWERAGE PUMP OUT

SPIT BRIDGE

SPIT ROAD

Spit Road

SEE ATTACHMENT B

1154
1164
1166



UNITS - METRES
SCALE - 1:600 @ A1 1:1200 @ A3

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CLIENT/PROJECT
d'ALBORA MARINAS
THE SPIT
MOSMAN

THIS PLAN MUST NOT BE USED FOR CONSTRUCTION UNLESS
SIGNED AS APPROVED BY PRINCIPAL CERTIFYING AUTHORITY
All measurements in mm unless otherwise specified.

TITLE

PROPOSED SITE PLAN
THE SPIT MARINA, MOSMAN

PROJECT MANAGER:
MR ANDREW NORRIS

DRAWING NUMBER:
P0701675JD03_V1

DESIGNED:
MLB

DRAWN:
MLB

REVIEWED:
ASN

DATUM:
mAHD

HORIZONTAL RATIO:
1:600 @ A1
1:1200 @ A3

VERTICAL RATIO:
1:600 @ A1
1:1200 @ A3

SHEET

2

OF 2
SHEETS

PAPER SIZE:
A1 / A3

REV.

DESCRIPTION

1 ENGINEERING SERVICES REPORT

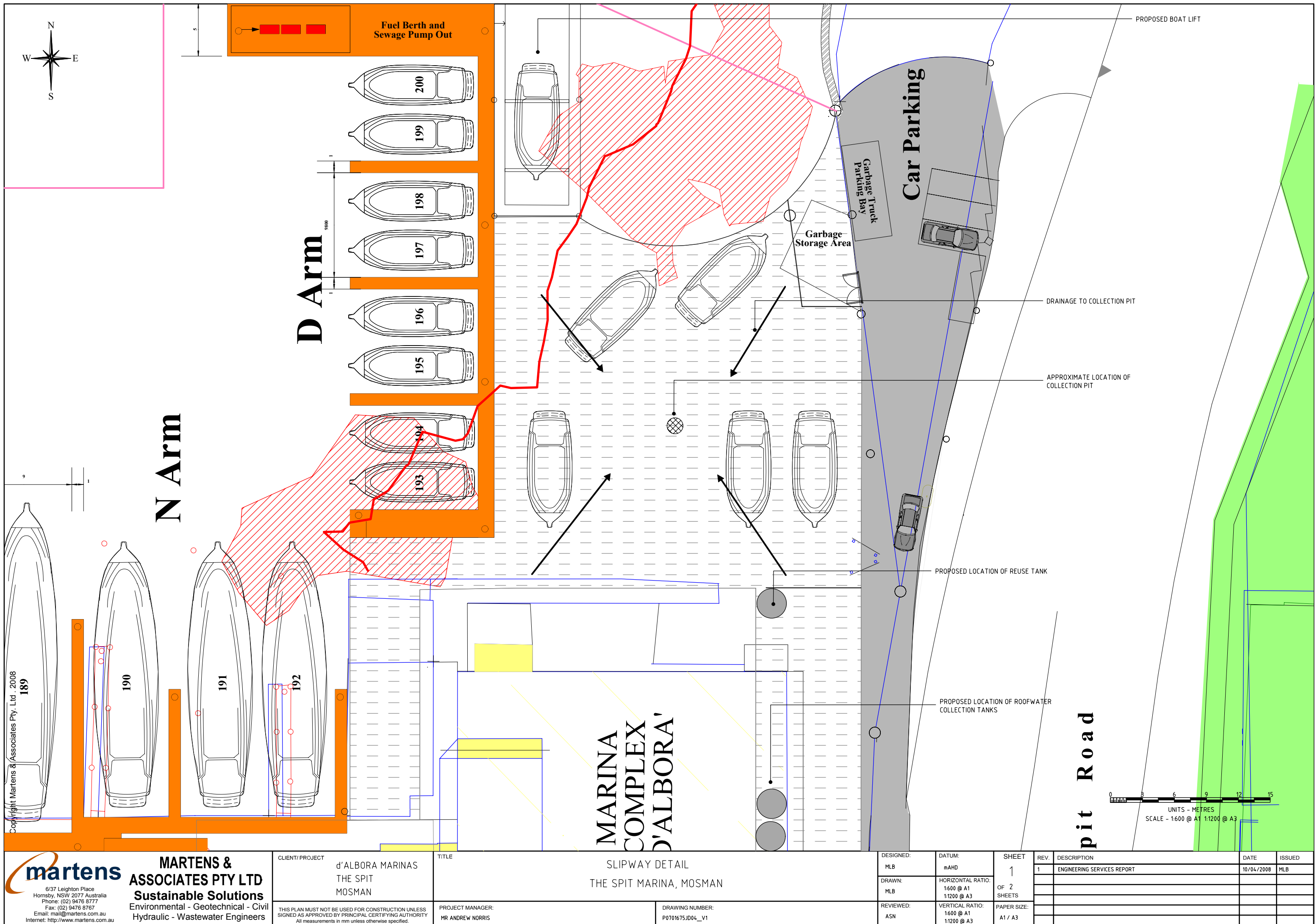
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11 Attachment B – Slipway Detailed Design

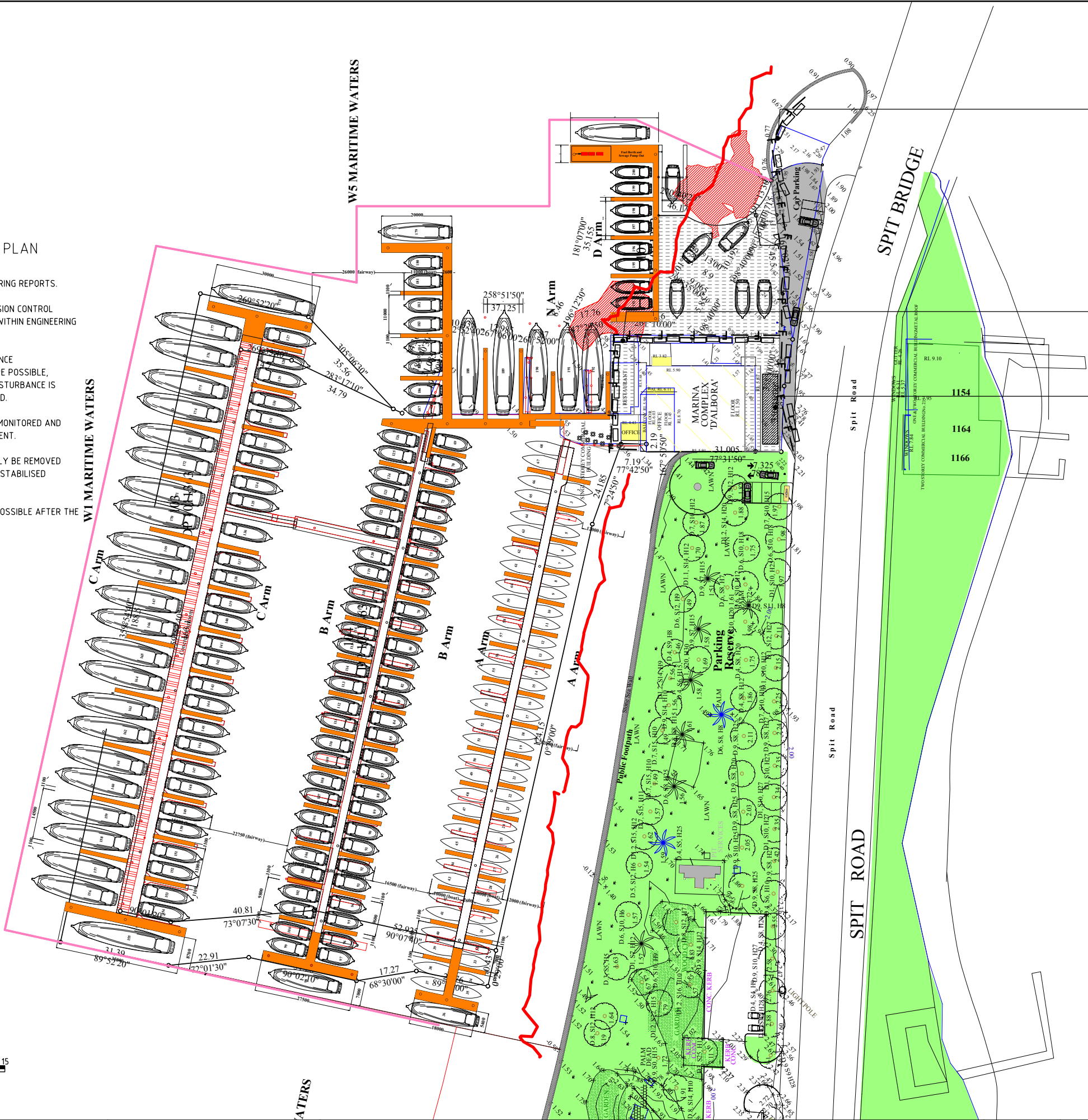
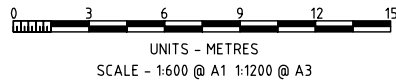


12 **Attachment C – Sediment and Erosion Control**



SEDIMENT AND EROSION CONTROL PLAN

1. THIS PLAN IS TO BE READ IN CONJUNCTION WITH ENGINEERING REPORTS.
2. THE CONTRACTOR WILL ENSURE ALL SEDIMENT AND EROSION CONTROL MEASURES ARE LOCATED AS INDICED ON THIS PLAN AND WITHIN ENGINEERING DOCUMENTATION.
3. SITE DEVELOPMENT SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE ENGINEERING DOCUMENTATION AND PLANS. WHERE POSSIBLE, THE DEVELOPMENT SHALL BE STAGED SUCH THAT LAND DISTURBANCE IS MINIMISED AND POLLUTION OF THE WATERWAYS PREVENTED.
4. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MONITORED AND MAINTAINED AS SPECIFIED WITHIN THE ENGINEERING DOCUMENT.
5. SEDIMENT AND EROSION CONTROL MEASURES ARE TO ONLY BE REMOVED FROM SITE ONCE LAND AND SURROUNDING AREA HAS BEEN STABILISED AND REHABILITATED.
6. ANY LANDSCAPING SHALL BE CONDUCTED AS SOON AS POSSIBLE AFTER THE COMPLETION OF CONSTRUCTION ACTIVITIES.

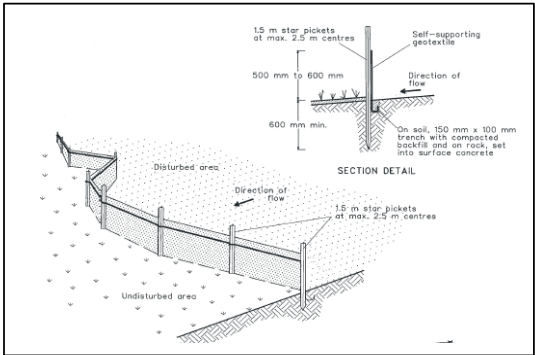


SEDIMENT FENCING AND STRAW BALES
SURROUNDING WORKS AREA

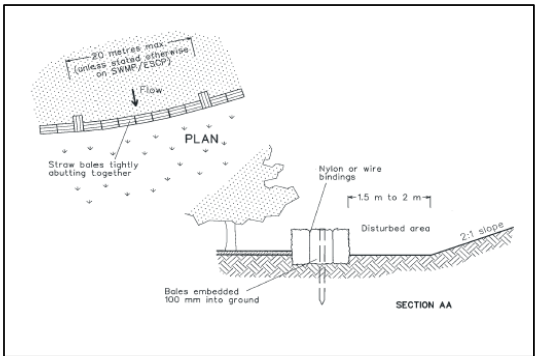
SEDIMENT FENCING AND STRAW BALES
SURROUNDING WORKS AREA

APPROXIMATE LOCATION OF EXISTING
UNDERGROUND STORAGE TANKS

SEDIMENT AND EROSION CONTROL SPECIFICATIONS



SEDIEMENT FENCE
(LANDCOM, 2004)



STRAW BALES
(LANDCOM, 2004)

**13 Attachment D – Applying SEPP 33 (DUAP, 1994);
Screening Threshold Assessment - Table 1, Table 3 and
Figures 5-9.**



TABLE 1. SCREENING METHOD TO BE USED

Class	Method to Use/Minimum Quantity
1.1	Use graph at figure 5 if greater than 100 kg
1.2–1.3	table 3
2.1 — pressurised (excluding LPG)	figure 6 graph if greater than 5 m³
2.1 — liquefied (pressure) (excluding LPG)	figure 7 graph if greater than 1 m³
LPG (above ground)	table 3
LPG (underground)	table 3
2.3	table 3
3PGI	figure 8 graph if greater than 1 m³
3PGII	figure 9 graph if greater than 2 m³
3PGIII	figure 9 graph if greater than 2 m³
4	table 3
5	table 3
6	table 3
7	table 3
8	table 3

Note: Classes 1.4, 1.5, 1.6, 2.2, 7 and 9 are excluded from the risk screening. Classes used are those referred to in the Dangerous Goods Code and are explained in appendix 6.

If table 1 indicates that a graph is to be used:
If the quantity is below the minimum quantity in table 1, then it is not potentially hazardous and there is no need to use the graph.

Using the appropriate graph, plot the group total quantity against the distance from the nearest boundary. If the point lies below the screening threshold line, the proposed development is potentially hazardous.

For class 3 materials only, if storage is underground, the capacity of the tank should be divided by five prior to assessing it against the screening threshold.

If table 1 indicates that table 3 is to be used:
If the quantity is in excess of the quantity listed in table 3, the development is potentially hazardous.

Repeat this procedure until all hazardous materials have been assessed.

Consider Transportation Issues

The proposed development may be potentially hazardous if the number of generated traffic movements (for significant quantities of hazardous materials entering or leaving the site) are above the annual or weekly cumulative vehicle movements shown in table 2.

If the proposal is found to be potentially hazardous with respect to transportation, a route evaluation study should be completed in accordance with the route selection guidelines prepared by the Department of Planning.

TABLE 2. TRANSPORTATION SCREENING THRESHOLDS

Class	Vehicle Movements		Minimum quantity* per load (tonnes)	
	Cumulative Annual	Peak or Weekly	Bulk	Packages
1	see note	see note	see note	
2.1	>500	>30	2	5
2.3	>100	>6	1	2
3PGI	>500	>30	1	1
3PGII	>750	>45	3	10
3PGIII	>1000	>60	10	no limit
4.1	>200	>12	1	2
4.2	>100	>3	2	5
4.3	>200	>12	5	10
5	>500	>30	2	5
6.1	all	all	1	3
6.2	see note	see note	see note	
7	see note	see note	see note	
8	>500	>30	2	5
9	>1000	>60	no limit	

Note: Where proposals include materials of class 1, 6.2 or 7, the Department of Planning should be contacted for advice. Classes used are those referred to in the Dangerous Goods Code and are explained in appendix 6.

* If quantities are below this level, the potential risk is unlikely to be significant unless there are a large number of traffic movements.

Determine Whether SEPP 33 Applies

If any of the above tests result in a screening threshold being exceeded, the proposed development should be considered potentially hazardous and SEPP 33 will apply. In such cases, a preliminary hazard analysis (PHA) is required to be submitted with the development application. The PHA should be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 — Guidelines for Hazard Analysis*. An outline of the preparation and assessment of a PHA is given in appendix 4.

TABLE 3. SCREENING THRESHOLD QUANTITIES

Class	Screening Threshold	Description
1.2	5 tonnes	or are located within 100 m of a residential area
1.3	10 tonnes	or are located within 100 m of a residential area
2.1	(LPG only — not including automotive retail outlets)	
	16 m ³	if stored above ground
	64 m ³	if stored underground or mounded
2.3	5 tonnes	anhydrous ammonia, kept in the same manner as for liquefied flammable gases and not kept for sale
	1 tonne	chlorine and sulfur dioxide stored as liquefied gas in containers <100 kg
	2.5 tonnes	chlorine and sulphur dioxide stored as liquefied gas in containers >100 kg
	100 kg	liquefied gas kept in or on premises
	10 m ³	other poisonous gases (measured at metric standard conditions of 101.3 kPa at 15°C)
4.1	5 tonnes	
4.2	1 tonne	
4.3	1 tonne	
5.1	25 tonnes	ammonium nitrate — high density fertiliser grade, kept on land zoned rural where rural industry is carried out, if the depot is at least 50 metres from the site boundary
	5 tonnes	ammonium nitrate — elsewhere
	2.5 tonnes	dry pool chlorine — if at a dedicated pool supply shop, in containers <30 kg
	1 tonne	dry pool chlorine — if at a dedicated pool supply shop, in containers >30 kg
	5 tonnes	any other class 5.1
5.2	10 tonnes/10 m ³	
6.1(a)	0.5 tonnes/0.5 m ³	
6.1(b)	2.5 tonnes/2.5 m ³	
6.2	0.5 tonnes/0.5 m ³	includes clinical waste
7	all	should demonstrate compliance with Australian codes
8	5 tonnes/5 m ³	packaging group I
	25 tonnes/25 m ³	packaging group II
	50 tonnes/50 m ³	packaging group III

Note: The classes used are those referred to in the Dangerous Goods Code and are explained in appendix 6.

FIGURE 5. CLASS 1.1 EXPLOSIVES

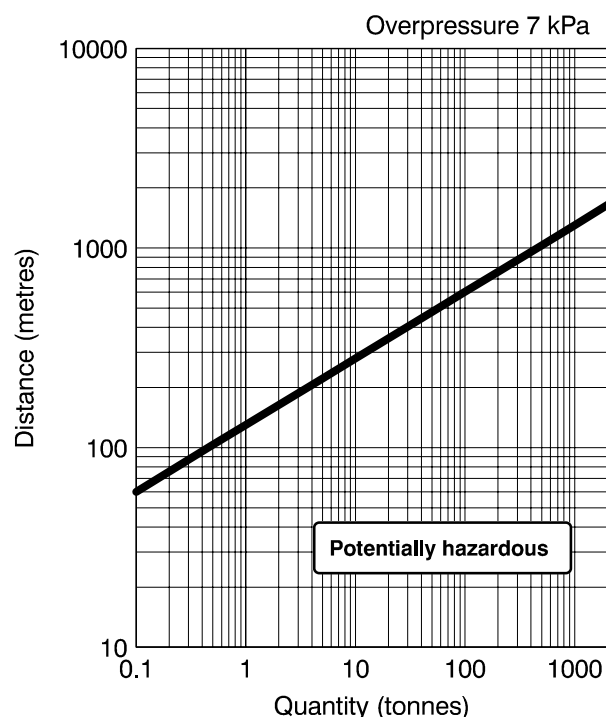
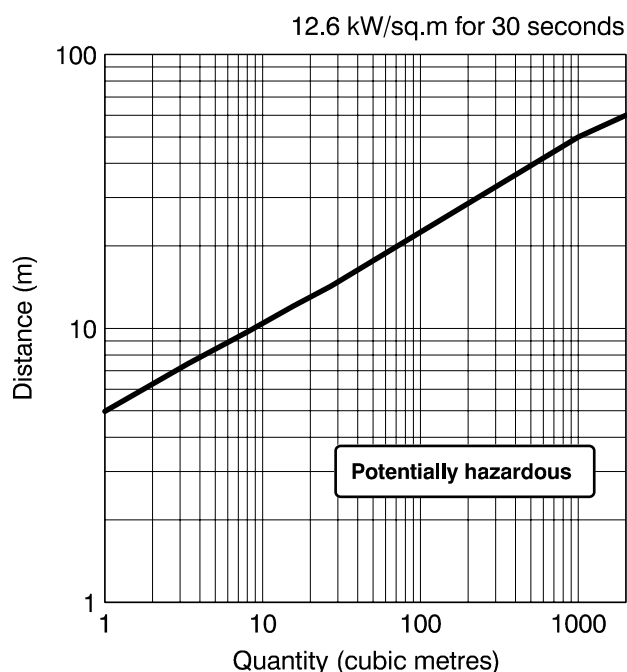
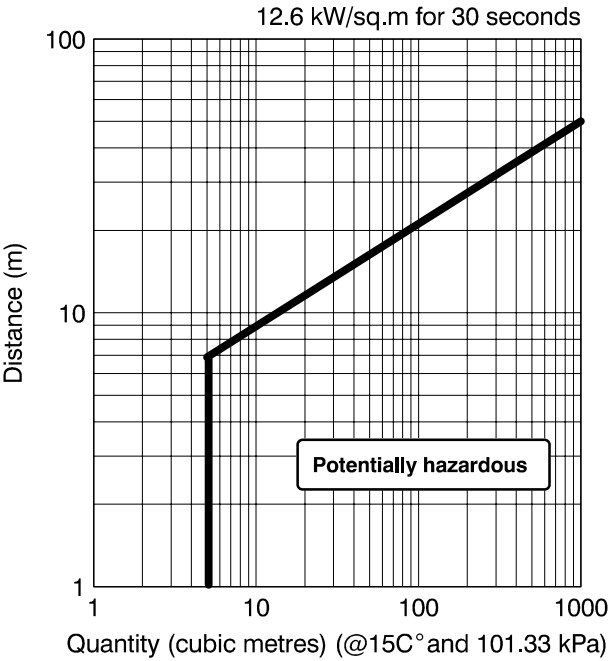


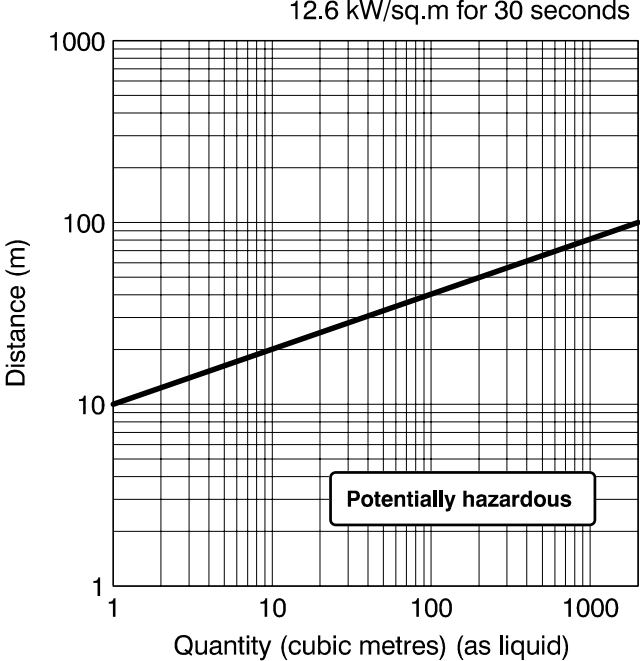
FIGURE 8. CLASS 3PGI FLAMMABLE LIQUIDS



**FIGURE 6. CLASS 2.1 FLAMMABLE GASES
PRESSURISED (EXCLUDING LPG)**



**FIGURE 7. CLASS 2.1 FLAMMABLE GASES
LIQUEFIED UNDER PRESSURE (EXCLUDING LPG)**



**FIGURE 9. CLASS 3PGII AND PGIII FLAMMABLE
LIQUIDS**

