Vopak Terminals Pty Ltd
09-Oct-2015

Vopak Site B4 Project

State Significant Development - Environmental Impact Statement

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State Significant Development - Environmental Impact Statement

Client: Vopak Terminals Pty Ltd

ABN: 67 004 754 750

Prepared by

AECOM Australia Pty Ltd
17 Warabrook Boulevard, Warabrook NSW 2304, PO Box 73, Hunter Region MC NSW 2310, Australia
T +61 2 4911 4900 F +61 2 4911 4999 www.aecom.com
ABN 20 093 846 925

09-Oct-2015

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Quality Information

Document Vopak Site B4 Project

Ref 60344169

Date 09-Oct-2015

Prepared by Simon Murphy

Reviewed by Scott Jeffries

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	29-May-2015	Draft	Simon Murphy Senior Environmental Planner	
B	19-Jun-2015	Draft - Vopak Review	Simon Murphy Senior Environmental Planner	
C	01-Jul-2015	Draft - NSW Ports Review	Simon Murphy Senior Environmental Planner	
D	17-Aug-2015	Draft - NSW Ports 1st Review comments addressed	Simon Murphy Senior Environmental Planner	
E	26-Aug-2015	Draft - NSW Ports 2nd Review comments addressed	Simon Murphy Senior Environmental Planner	
F	09-Oct-2015	DP&E adequacy review comments addressed	Simon Murphy Senior Environmental Planner	

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Table of Contents

List of Plates

List of Figures

List of Tables

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Declaration under Part 3, Schedule 2 of the Environmental Planning and Assessment Regulation 2000

Author of the Environmental Impact Statement

Name	Simon Murphy
Address	17 Warabrook Boulevard, Warabrook, NSW 2304
Qualification	Bachelor of Environmental Science Grad Dip. Urban and Regional Planning Master of Social Science (Environment and Planning)

Author of the Environmental Impact Statement

Name	Scott Jeffries
Address	Level 21, 420 George Street, Sydney NSW 2000
Qualification	Master of Environmental Law Bachelor of Chemical Engineering (Hons Class 1)

Address of the Land to which this EIS Applies

The land subject to this EIS is located in Port Botany within the Randwick local government area as follows:

- 37 Friendship Road, Lot 201 DP 1210638;
- 1 – 9 & 20 Friendship Road, Lot 10, DP 1126332 and Lot 21, DP 1045324; and
- Friendship Road reserve, Lot 52, DP 1182618.

Description of the Project to which this EIS Applies

This EIS examines the works that would be required for the Project. The key project elements include:

- Stage 1 (B4A) - Construction of three storage tanks and bunding dedicated to Combustible Fuels (generally Automotive Diesel Oil: ADO with a nominal total capacity of 105,000 m^3);
- Stage 2 (B4B) - Construction of four storage tanks (nominal total capacity of 95,000 m^3) capable of storing flammable (Class 3) or Flammable or Combustible product;
- Construction of new pipelines/culverts to inter-connect with the Site B manifold, installation of manifold/transfer pumps and connections to utilities; and
- Installation of fire protection system.

Assessment of the Environmental Impact of the Project

An assessment of the environmental impact of the Project is contained in this Environmental Impact Statement.

Declaration

Pursuant to clause 6(f), Part 3, Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, I declare that this Environmental Impact Statement:

a) Has been prepared in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* and the *Environmental Planning and Assessment Regulation 2000*;

b) Contains all available information that is relevant to the environmental assessment of the Project to which this Environmental Impact Statement relates; and

c) Contains information that is neither false nor misleading.

Simon Murphy
9 October 2015

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Executive Summary

Introduction

This Environmental Impact Statement (EIS) has been prepared by AECOM Australia Pty Ltd (AECOM) on behalf of the proponent, Vopak Terminals Sydney Pty Ltd (Vopak), for a State Significant Development (SSD) application for the construction and operation of the Petroleum Tank Farm B4 at Port Botany, NSW (the Project). Vopak is seeking approval for the B4 Site to be developed as a refined fuels storage terminal with the construction of seven petroleum storage tanks with a total nominal capacity of 200 ML (the Project).

Approval for the Project is being sought under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979 (*EP&A Act). AECOM has prepared this EIS pursuant to the requirements of the EP&A Act and the *Environmental Planning and Assessment Regulation 2000*. The EIS also addresses the Secretary's Environmental Assessment Requirements (SEAR's) which were issued to the proponent on 30 April 2015.

Site and Context

The Site is located on part of the former Qenos Hydrocarbon Terminal at 37 Friendship Road, approximately 12 km south-east from Sydney's Central Business District. The land on which the Site is located is leased from the NSW Ports, and encompasses Lot 201 DP 1210638. The closest residential receiver is located approximately 1,500m to the east of the Site. The Project would also involve works connecting the Site to Vopak's existing Site B (Lot 10, DP 1126332 and Lot 21, DP 1045324), and pipework through a culvert under Friendship Road reserve (Lot 52, DP 1182618).

Vopak currently occupies two terminal sites in Port Botany known as Site A and Site B. Part of Site A operates under Environment Protection Licence (EPL) 6581 to facilitate the scheduled activities of chemical storage and waste storage. The other part of Site A operates as a bitumen facility. Vopak has decommissioned part of Site A and is currently negotiating the transfer of assets to a third party. Vopak is pursuing a business strategy of specialising in the Ground/Aviation Fuels Storage and Distribution market. The entire Site A was formerly known as 49 Friendship Road (Lots 3, 4 and 5 DP 635791). As part of Vopak handing back Part of Site A to NSW Ports, NSW Ports subdivided and renumbered the address of Site A. The chemical storage facility area is now known a 51 Friendship Road (Lot 103 DP 1182871) with the bitumen facility occupying 49 Friendship Road (Lot 4 DP 1182871).

Site B is located at 20 Friendship Road (Lot 21 DP 1045324 and Lot 10 DP 1126332). It is also known as 1-9 Friendship Road. It was developed in three stages known as Site B1, B2, and B3. It currently operates under EPL 6007 to facilitate chemical storage (for the purposes of liquid fuels storage) and shipping in bulk.

Project Description

The Project would involve the construction and operation of a liquid fuels storage terminal. The Project would involve the construction of seven storage tanks with a total nominal capacity of 200,000 m^3 enabling Vopak to satisfy existing customer demands as well as forecast demand increases from the Sydney and surrounding markets. The Project would benefit the Sydney and NSW economy through the provision of fuels to supporting, in particular, the transport sector. Due to the increasing divestment of major oil companies and refining capacity from Australia, it is important that fuel import terminals are developed to provide an ongoing supply of fuel to Sydney and NSW

Vopak proposes to undertake the Project in two stages as follows:

- Stage 1 (B4A):
    - Construction of three storage tanks and bunding dedicated to Combustible Fuels (generally Automotive Diesel Oil: ADO would have with a nominal total capacity of 105,000 m^3);
    - Construction of new pipelines/culverts to inter-connect with the Site B manifold;
    - Installation of manifold/transfer pumps and connections to utilities; and
    - Extension of the existing Site B fire protection system to cover the B4A site.
- Stage 2 (B4B):
    - Construction of four storage tanks (nominal total capacity of 95,000 m^3) capable of storing Class 3 Flammable or Combustible products;

- Construction of additional transfer pipelines to Site B manifold systems; and
- Installation of a new fire protection system complying with AS 1940 requirements.

It should be noted that Vopak have a concurrent Section 75W modification application before the DP&E for modifications to the existing Site B Terminal (submitted on 19 June 2015) to which the proposed Project would be connected by pipe. The Section 75W application includes the product throughput of this B4 application as the flow to/from the ships and road tankers and pipelines is via the existing Site B distribution facilities.

Proposal Justification

The Project would provide economic benefits to the local, regional and State economies, in particular through providing improved efficiencies and access to fuels for the economy of the Sydney Region and NSW in general. The additional storage capacity would allow for larger shipments of fuel to be imported therefore creating efficiencies by increasing the amount of fuel per shipment. Increased static storage capacity would also provide a supply buffer in the event of a disruption to imports.

Importantly the increased storage capacity is required to make up for the decrease in onshore refining in Australia. In Sydney this is evidenced by the closure of the Kurnell (Caltex) and Gore Bay (Shell) facilities. In order to maintain adequate fuel supplies to the local economy import and storage facilities such as the Project are required.

Statutory Planning

The Site is subject to the Three Ports SEPP (under which it is permissible), and is declared to be State Significant Development (SSD) under that policy. The application would therefore be assessed and determined by the Minister for Planning.

Being declared as SSD and within the Three Ports SEPP area, the provisions of the LEP 2012 do not apply to the Site. The Project is nevertheless consistent with the provisions of local, regional and State planning instruments and strategies which would otherwise apply to the proposal, including:

- *State Environmental Planning Policy 33 – Hazardous and Offensive Development*;
- *State Environmental Planning Policy 55 – Remediation of Land*; and
- *State Environmental Planning Policy (Three Ports) 2013*.

The Project was also assessed against a range of strategic planning documents and found to have been compatible with their aims and objectives. This includes the:

- *NSW 2021: A Plan to Make NSW Number One (NSW Government 2011)*;
- *Eastern Sydney and Inner West Regional Action Plan (Department of Premier and Cabinet, 2012)*; and
- *A Plan for Growing Sydney (DP&E, 2014)*.

Identification of Issues

An assessment of the likely environmental issues and associated level of risk was made for the Project based on issues raised during the planning for the Site, the SEARs or in consultation with stakeholders. The assessment identified that the prioritisation of environmental issues and therefore the focus of environmental assessment for the Project should be as follows:

- High: hazard and risk;
- Medium: traffic, air quality, and noise; and
- Low: soils and water; visual impacts; greenhouse gas; waste; ecology; heritage and socio and economic.

Hazard and Risk

The PHA shows that the HIPAP 4 criteria are met for the Project and that the cumulative risk from Site B plus the Project does not have a significant effect on the risk contour presented in the Port Botany Land Use.

While the PHA identifies existing risk control measures and safeguards, it does not provide a detailed demonstration of the adequacy of the control measures in place to control risks to levels considered So Far As Reasonably Practicable (SFARP). The Project's risk control measures and safeguards would be further considered as part of detailed design and Vopak's MHF Safety Case review (as per the requirements of the *Work*

Health and Safety Regulation 2011 (Section 9.3, Division 4). Review and demonstration of SFARP would be done as part of the Safety Case update).

Traffic and Transport

Construction activities would generate up to 84 light vehicles (based on 100 staff and an occupancy rate of 1.2 persons per vehicles) and up to 15 heavy vehicles travelling to the site per day over the construction period.

The cumulative effects of construction traffic and existing traffic volumes show that overall the project is likely to have a minor impact on the operation of the Botany Road / Bumborah Point Road intersection which would operate at a B level of service. Similarly the Project would have a negligible impact on the volume capacity ratios of the midblock capacity on Botany and Bumborah Point Roads.

The Project would not generate operational traffic beyond occasional inspection or maintenance access requirements. Operational traffic from the existing site would be affected however this traffic is being assessed under a separate Section 75W modification application for Site B (submitted 19 June 2015).

Air Quality

Some minor construction dust generation may occur as a result of the Project however such impacts would be reduced through active management and temporary in nature.

The primary source of air quality emission from the Project is vapour loss from the fuel storage tanks which may contain volatile organic compounds (VOC's). The predicted cumene concentrations were the closest to the criteria, representing 29 percent of the criteria value (6.1 $\mu g/m^3$ against a criterion of 21 $\mu g/m^3$). The predicted concentrations of cumene decreased with increasing distance from the Site, with concentrations at very low levels at the closest residential areas (less than 1.0 $\mu g/m^3$). The same dispersion pattern occurred for the other pollutants which included benzene, cyclohexane, ethylbenzene, n-hexane, toluene and xylenes. The Project is not expected to adversely affect the air environment or the amenity of sensitive receptors. All predicted pollutant concentrations were all well below their respective assessment criteria.

Noise

Noise modelling was undertaken for a number of atmospheric and operational scenarios and concluded that under all scenarios, for day and night activities during both construction and operational phases, there would be no exceedance of the site specific noise criterion.

Other Environmental Considerations

Other issues that have been assessed include soils and water, waste, visual, social and economic, ecology and heritage impacts. The Project would have only minor impacts in this area with the application of appropriate mitigation and management measures.

Furthermore, the Project would have a number of positive benefits particularly in relation to meeting some of the growing demand for refined fuels in the Sydney area and throughout greater NSW, and through improved efficiencies in the fuel supply chain.

Environmental Management

A range of environmental management measures would be applied to the Project. These have been compiled on an issues basis, as informed by the EIS and the environmental risk analysis. Notably, Vopak already has in place a range of environmental and safety management plans and controls for the existing facility (Site B Terminal). This includes environmental, safety/emergency and traffic management plans that have been prepared in consultation with the relevant government agencies. All Vopak operations are undertaken in accordance with these plans of management. Vopak's existing environmental management systems would be extended to include the B4 Site.

Conclusion

This EIS describes the Project, its possible alternatives, and provides an assessment of the potential environmental impacts from construction and operation. Where potential impacts have been identified, management measures have been identified to minimise impacts to acceptable levels. This EIS has also demonstrated that the Project is both permissible and would have a range of benefits that, when considered relative to potential impacts, justify the Project proceeding.

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Part A – Project Background

This Part describes the background to the project and location, existing approvals and the environmental impact assessment for the Project.

1.0 Introduction

1.1 Overview

This Environmental Impact Statement (EIS) has been prepared by AECOM Australia Pty Ltd (AECOM) on behalf of Vopak Terminals Sydney Pty Ltd (Vopak), for the construction and operation of Petroleum Tank Farm B4 (the Project) in Port Botany NSW. The Site is located on a parcel of land managed by NSW Ports formerly occupied by the Qenos Hydrocarbon Terminal.

The Petroleum Tank Farm B4 would provide an additional seven storage tanks with a total nominal capacity of 200,000 m^3, enabling Vopak to satisfy customer demand as well as forecast throughput demand. Currently, Vopak supplies in excess of 20 percent of Sydney and New South Wales' petroleum requirements.

The Project is declared to be a State Significant Development approval (SSD) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and in accordance with *State Environmental Planning Policy (Three Ports) 2014* (Three Ports SEPP).

The Secretary General of the Department of Planning and Environment (DP&E) issued the Secretary's Environmental Assessment Requirements (SEARs) for the Project EIS on 30 April 2015. The SEARs forms the basis of this EIS.

1.1.1 Background

With the recent cessation of petroleum refining in Sydney (Caltex at Kurnell and Shell at Clyde), there is an increasing reliance on importing refined fuels to supply the NSW market, which are received via ship freight.

Refined fuel imports continue to travel through terminal facilities such as Port Botany where there is existing infrastructure to support the unloading, storage and dispatch of fuel products. Indeed, Vopak's existing Botany infrastructure allows it access to fuel products from around the world. The increased throughput capacity sought by the Project would allow additional volumes of petroleum fuels (mainly gasoline, diesel and jet) to be imported and stored at Port Botany to meet demand.

1.1.2 Existing Operations and Approval

Vopak currently operates both the Site B Terminal and a Bitumen Storage and Distribution Terminal (on a section of the Vopak Site A Terminal in Port Botany.

Site A operates under Environment Protection Licence (EPL) 6581 to facilitate the scheduled activities of chemical storage and waste storage. Vopak has decommissioned Site A and is currently negotiating the transfer of assets to a third party. Vopak is pursuing a business strategy of specialising in the Ground/Aviation Fuels Storage and Distribution market. The entire Site A was formerly known as 49 Friendship Road (Lots 3, 4 and 5 DP 635791). As part of Vopak handing back part of Site A to NSW Ports, NSW Ports subdivided and renumbered the address of Site A. The chemical storage facility area is now known a 51 Friendship Road (Lot 103 DP 1182871) with the bitumen facility occupying 49 Friendship Road (Lot 4 DP 1182871). An EPL Licence Variation has recently been approved by the EPA whereby the Bitumen Facility has been excised from EPL6581 because:

- Bitumen Storage Facilities are not a Scheduled Activity under the *Protection of the Environment Operations Act 1997*; and
- The land on which the Bitumen Terminal is located has been re-surveyed by NSW Ports and registered as a separate parcel of land (now known as Lot 103 DP 1182871).

Site B is located at 20 Friendship Road (Lot 21 DP 1045324 and Lot 10 DP 1126332). It is also known as 1-9 Friendship Road. It was developed in three stages known as Site B1, B2, and B3. It currently operates under EPL 6007 to facilitate chemical storage (for the purposes of liquid fuels storage) and shipping in bulk. The Site B Terminal is also integrated into a wider network of petroleum and liquid fuels transfer infrastructure with oil industry corporations (GHD, 2007). The existing Site B terminal imports fuels through two adjoining Bulk Liquids

Berths known as BLB1 and BLB 2. It has operated under various development consents as described in the following sections, and includes the individual components which have been previously referred to as Site B1, Site B2 and Site B3, as described in more detail below. Collectively Sites B1, B2 and B3 are today known as Site B. As part of the Part 3A approval granted for the Bulk Liquids Storage Expansion, the Site B1 and B2 consent conditions were surrendered and consolidated into one single consent.

Terminal

On 16 January 1995, Powell Duffryn -Van Ommeren received development consent for Development Application (DA) number 38/94 to build a bulk liquids storage facility for petroleum products on six hectares of land at 20 Friendship Road, Port Botany forming part of the Site B Terminal. The first stage of the terminal development was commissioned in October 1996. This portion of the Site has been known previously as Site B1.

Terminal Expansion
On 30 June 1998, development consent (for DA number 549/97) was obtained to expand operations and develop the remaining one hectare of Site B under Section 101(8) of EP&A Act 1979. Consent was received from the Minister for a range of elements including, five fuel storage tanks with a total volume of 58,800 m3, pipeline extensions, an additional road tanker gantry bay, 24 hour operations and total throughput of Site B of 1,600,000m^3 per year. This portion of the Site has been known previously as Site B2.

A subsequent modification was approved for the increase of total terminal throughput to 2,100,000 m^3.

Bulk Liquids Storage Expansion

The Part 3A Project 06_0089 was approved for the expansion of the Vopak Bulk Liquids Storage Facility to increase storage capacity by approximately 185,000m^3 to a total approved throughput for all Vopak operations at Port Botany of 3,950,000m^3.

This included provision of additional tanks for storage of petroleum products, ethanol, biodiesel, methanol, vegetable oils, additives and product dyes. These expansion works necessitated the relocation of Friendship Road to the south so as to be adjacent to the southern boundary of the site (as approved by the lease with the then Sydney Ports Corporation). This portion of the Site has been known previously a Site B3.

Project Approval – Bitumen Facility at Vopak Site A (February 2012)

Part 5 Project C11/1695 was approved by the then Sydney Ports Corporation (SPC) under Clause 2, Schedule 7 to the SEPP (Major Development) 2005 for the construction and operation of a Bitumen Storage and Distribution Facility and associated infrastructure with a capacity of 21,000 tonnes at Site A Terminal.

Project Approval - Bulk Liquids Berth 2, Port Botany (Vopak as proponent on behalf of SPC)

Part 3A Project 07_0061 was approved for the construction and operation of a second bulk liquids berth facility, associated infrastructure including pipelines, marine loading arms, fire protection systems, hose handling gantries, berthing, mooring equipment and augmentation of existing facilities at Site B.

A modification through MP 07_0061 MOD 1 was subsequently approved to delete condition 2.7 from Project Approval 07_0061, thereby allowing pile driving activities on Saturdays in accordance with condition 2.5.

Note that Bulk Liquids Berth 1 (BLB 1) was commissioned by the then Sydney Ports Corporation following the finalisation of reclamation works for Port Botany in 1979.

Reference is made to **Figure 2** which shows the locations of these key elements in relation to the proposed Site B4.

1.1.3 Concurrent Modification Application

In addition to the application described in this EIS, Vopak has submitted a request under section 75W of the EP&A Act on 19 June 2015 to modify the project approval granted to the bulk liquids storage facility (Site B) expansion. The primary purpose of the modification is to allow for an increased throughput, through the Site B Terminal. To enable this, the modification request includes the following items that are both relevant and complementary to the proposed Vopak Project:

- Increased terminal throughput, 7,800,000m^3/year. Product would be received from ships via the Site B manifold system, and then be pumped back to the Site B distribution points (road tanker loading tanks, pipeline transfer tanks);
- Three extra road tanker loading bays on Site B to facilitate future throughput proposed as part of the Project;

- New entry roadways to accommodate all road tankers onsite;
- General flow-rate improvements (i.e. removing restrictions in pipework, manifolds and tank appurtenances) to maximise discharge rates from both Bulk Liquids Berth (BLB) 1 and BLB 2 during shipping operations; and
- Additional modifications requested as part of the current S75W application which are non-related to the Project are not listed here.

The works proposed under the modification have an estimated current capital value in excess of $20 million.

The Site B4 Facility would be a satellite storage facility only whereby product is delivered from ships discharging at BLB1 or BLB2 through the existing Site B wharflines and manifolds into new pipelines that would cross Friendship Road to service the new B4 Tanks. As required, product would then be transferred from Site B4 tanks back to Site B tanks, to allow for the final off-site distribution by Road Tanker or Pipeline Export.

There are obvious interconnections between both proposals. Discussion of the key elements of both project and how they interact is provided in **Table 1.** Despite the obvious connection between the two sites separate approvals are required due to:

- Existing Site B is physically separated from the B4 Site by a Main Port Road (Friendship Road);
- The existing approval for Site B does not currently include the land holding on which Site B4 is proposed; and
- The Site B4 Project is of a size and nature that should be assessed under a new SSD application.

Table 1 Relationship between the Project and Proposed Modification to Existing Site B

Element	Relevant Approval / Site	
	Site B – S75W MOD	Site B4 – SSD (The Project)
Throughputs: - Proposed total Site B output: • Output by road – 3,700,000m^3 • Output by pipeline – 2,100,00m^3 - Existing total approved Site B output: • Output by road – 1,897,500m3 • Output by pipeline – 1,867,500mm.	MOD required for Site B because the Road Tanker Loading Gantries are located on Site B and the increased throughput would be distributed from Site B either by road tanker, pipeline export or ship export.	All fuels being delivered to and stored at Site B4 would arrive from Site B via new transfer pipelines from Site B to B4. When required, the fuels would be transferred back to existing Site B tanks for distribution offsite.
Construction of Three New Road Tanker Loading Bays (Bays 8 & 9 and Bay 7) and associated infrastructure.	MOD to extend existing truck loading facilities from 6 Bays to 9 Bays.	NA
Construction of One Road Tanker Unloading Bay for Biofuels, Additives and other ancillary products together with truck unloading pumps.	MOD to construct dedicated truck unloading facility to increase efficiency.	NA
Construction of a New Drivers' Amenities Building at Fishburn Road entrance.	MOD to construct new Driver Amenities at new truck entry to Terminal	NA
West Entry Northern Approach Roadways - requiring the need to lease an additional 2,870 m^2 of land from NSW Ports to the north and west of Site B plus the modification to the Simblist Road intersection with Friendship Road.	MOD required to facilitate construction and operation of Bay 7.	NA
Vapour Recovery Unit Upgrade.	VRU to be upgraded in capacity to accommodate both Site B and B4.	NA
Improved ship import/export efficiencies through the installation of improved fuel transfer infrastructure.	Existing Site B fuel transfer facilities upgraded to improve efficiency of shipping	Tanks / pipelines would be designed to remove bottlenecking.

	operations.	
Additional Ship connection Marine Loading Arm (MLA) and related landside infrastructure to increase the number of simultaneous shipping operations.	Construction of an additional MLA at BLB2.	NA
Increase in the size of the approved Warehouse from 8m x 12m to be 12m x 20m.	Increase size of existing Site B Warehouse.	NA
Ongoing maintenance and enabling works would be undertaken, as required, throughout the life of the terminal, including: - fittings, fixtures and infrastructure; - truck parking areas (for full and empty trucks), car parking areas, and other paving works; - landscaping, lighting, utilities and service facilities, security cameras and devices; - temporary uses; - change of products within tanks, and other minor works; and - environmental works.	Approve sought to cover these standard terminal activities that are currently covered by the 3 Ports SEPP 2014 and may otherwise require a Complying Development Certificate.	B4 EIS references these standard terminal activities as applicable to B4. Such activities may also be covered by the Three Ports SEPP 2014 through a Complying Development Certificate (CDC).
Construction of 3 (three) Bulk Storage Tanks and Bunding dedicated to Combustible Fuels. Construction of 4 (four) Bulk Storage Tanks and Bunding capable of storing either Combustible or Flammable products.	NA	Construct new tanks/facilities on a separate site i.e. this Project.
Construction of new pipelines/culverts to inter-connect with Site B Manifold.	NA	To allow import/export for B4 tanks from BLB1/BLB2 via existing Site B infrastructure.
Installation of manifold/transfer pumps and connections to facilities.	NA	To allow export from B4 tanks to Site B and to allow tank-to tank transfers and recirculation of B4 tanks.
Extension of the existing Site B Fire Protection system for B4A. Installation of a new Fire Protection system for B4B complying with AS1940 requirements.	NA	Fire Protection for B4A tanks as per AS1940 through extension of the existing Site B system. B4B (Flammable) tanks would require a new (on-site) Fire Protection system to comply with AS1940.
Amendments to conditions of consent for Project Approval DA06_089 (28 Feb 2007)	Modify Sch 2, Conditions 9, 10 &11, and Sch 3 Conditions 6 & 27. Modifications of condition wording to better reflect current operational practices.	NA

1.2 Project Outline

The Project is seeking approvals to operate the proposed tank farm for the purpose of a satellite bulk liquids storage facility to be operated in coordination with the existing bulk liquids facility known as Site B currently operated by Vopak at Port Botany.

Vopak proposes to undertake the Project in two stages as follows:

- Stage 1 (B4A):

- Construction of three storage tanks and bunding dedicated to Combustible Fuels (generally ADO) with a nominal total capacity of 105,000 m^3);
- Construction of new pipelines/culverts to inter-connect with the Site B manifold;
- Installation of manifold/transfer pumps and connections to utilities; and
- Extension of existing Site B fire protection system to B4A site.

- Stage 2 (B4B):
  - Construction of four storage tanks (nominal total capacity of 95,000 m^3) capable of storing any Class 3 Flammable or Combustible product;
  - Construction of additional transfer pipelines to Site B manifold systems; and
  - New fire protection system complying with AS 1940 requirements.

The Project would be required to meet certain safety, pollution and environmental management requirements under applicable legislation, government policy and Australian Standards. This EIS therefore also seeks approval for the ongoing maintenance, repair and replacement of equipment, pipes, hoses, pumps, services and the like to allow Site B and Site B4 to operate in a safe and environmentally responsible manner. This includes activities relating to storage tank inspections and minor upgrades unrelated to the volumes of product stored onsite. Full details regarding all elements of the Project including the relationship between approved and proposed elements is provided in **Part D.**

1.3 Location and Setting

The Site would be located on 4.2 hectares of the original nine hectare site formerly occupied by the Qenos Hydrocarbon Terminal at Gate B40, formerly known as 39 Friendship Road. This land has been recently subdivided into Lots 201 and 202 DP 1210638. The Site is located on Lot 201 and is now referred to as 37 Friendship Road. It is around 12 km south-east of Sydney's Central Business District. Reference is made to **Figure 1** showing the regional context of the Site. The Project would also involve works connecting the Site to Vopak's existing Site B (Lot 10, DP 1126332 and Lot 21, DP 1045324), and pipework through a culvert under Friendship Road reserve (Lot 52, DP 1182618).

1.4 The Proponent

Vopak is the world's largest independent tank storage company by capacity, specialised in the storage and handling of oil products, liquid chemicals and gasses. It operates 80 terminals in 28 countries with a combined storage capacity of around 34.0 million m^3, with another 4.0 million m^3 under development (to be added by 2017).

Vopak's mission is to ensure safe, reliable and effective storage and handling of bulk liquid products at key marine locations that are critical to its customers around the world. The majority of its customers are companies operating in the oil, chemicals and gas sector, for which Vopak stores a large variety of products destined for a wide range of industries. Vopak's Australian headquarters are located in Port Botany, NSW within its Site B.

1.5 Project Need and Benefits

The Project would have the following direct and indirect benefits:

- Increase supply of fuels to the Sydney and NSW market to meet the expected increase in demand, partly due to reduced onshore refining capacity in Australia;
- Increased efficiency in the importation and storage of refined fuels to businesses and industry that are key to the NSW economy; and
- Direct investment and employment generation in Port Botany from the operation of the Site.

1.6 Environmental Impact Assessment Process

As detailed fully in **Section 0** the Project is a declared State Significant Development.

1.6.1 Environmental Assessment Requirements

On 8 April 2015, Vopak submitted a request to DP&E for the Secretary's Environmental Assessment Requirements (SEAR's) for the Project. In order to inform the SEARs for the Project, DP&E consulted with a number of key agencies for input regarding the assessment methodologies and requirements of the EIS. The Project specific SEARs are detailed in full in **Section 9.1**.

1.6.2 Stakeholder Consultation

During the preparation of this EIS, key stakeholders were consulted in accordance with the requirements of the SEARs. In addition key local, State Government agencies were also consulted. Throughout the preparation of the EIS, these stakeholders have been kept informed of the progress of the Project and have requested certain matters be addressed. Further details regarding stakeholder consultation are provided in **Section 9.0**.

1.6.3 EIS Exhibition

In accordance with section 89F of the EP&A Act, this EIS would be placed on public exhibition by DP&E for a period of not less than 30 days. During this time interested parties would be able to review project documentation and provide feedback for consideration by the proponent and DP&E.

1.6.4 Decisions and Assessments

In accordance with section 89D of the EP&A Act, the Minister is the consent authority for SSD.

1.7 Structure of this Report

This report is generally structured as follows:

Part A – Project Background.

Part B – Location and Context.

Part C – Project Need and Alternatives.

Part D – Project and its Management.

Part E – Issues Identification.

Part F – Environmental Impact Assessment.

Part G – Environmental Management and Monitoring.

Part H – Project Justification.

Part I – EIS Findings.

Part J – References.

Part B – Location and Context

This Part describes the location of the Project, the historical land uses, and the context of this location in relation to surrounding land uses

2.0 Regional and Local Context

2.1 Regional Overview

The Site is located in Port Botany, which is located on the north-eastern edge of Botany Bay, around 12 km south-east of Sydney's Central Business District, NSW. The immediate region around the Port comprises primarily industrial and suburban land uses (refer **Figure 1**).

2.2 Land Use Context

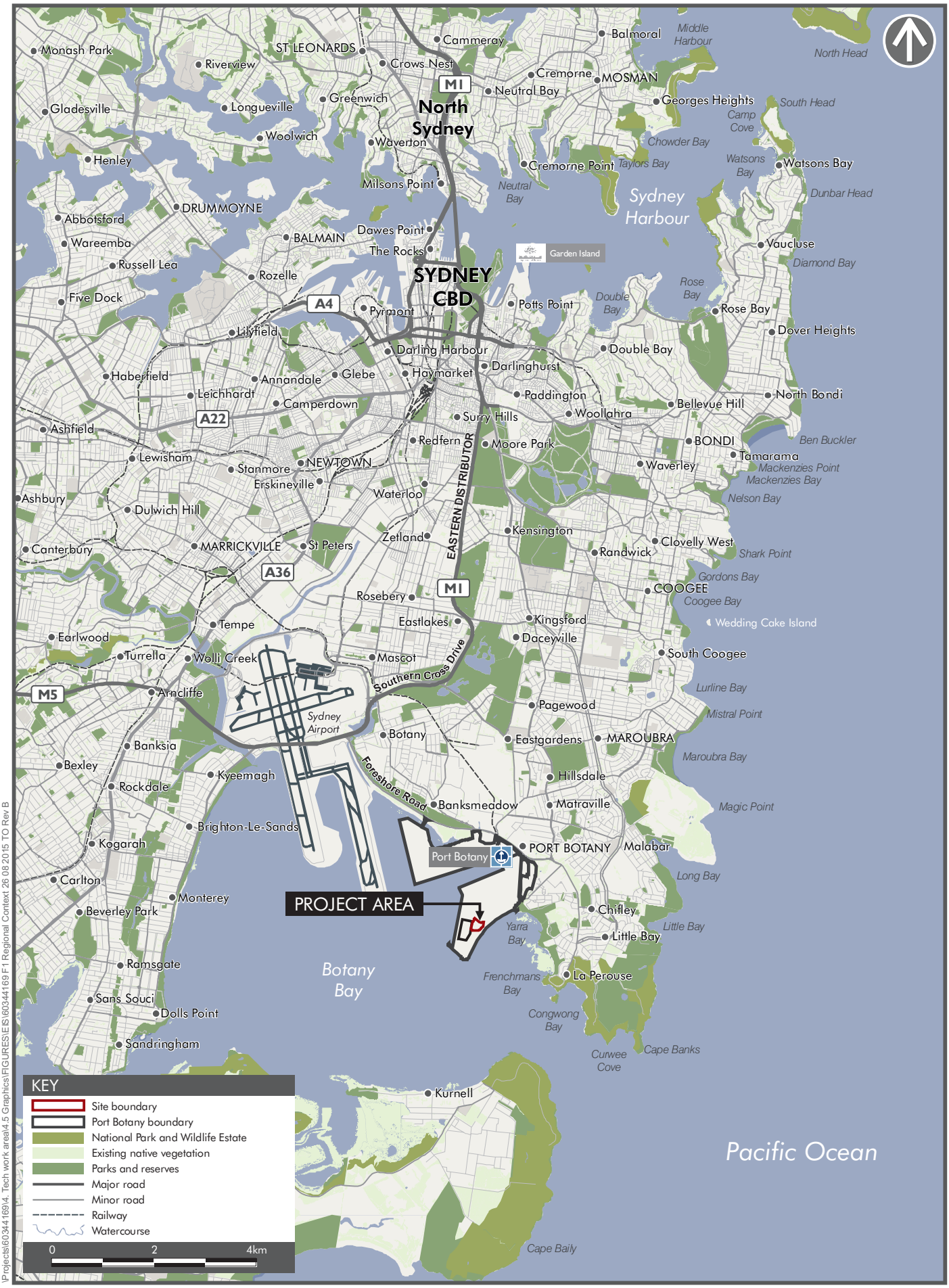
The Site is located at Friendship Road, Port Botany in the vicinity of Yarra Bay adjacent to established industries at Port Botany. The Port was developed in the 1970s to meet the growing trade and port requirements for Sydney and NSW and continues to expand to meet growing demands. Port Botany is the major NSW port for the handling of containers, bulk liquids and petrochemicals with Sydney's international and domestic airports located nearby to the north.

The Site is located on part of the former Qenos Hydrocarbon Terminal site located in an area dominated by Port and industrial land uses, with the nearest residential premises being located approximately 1,500m away. The closest residential properties to the southeast are located in Yarra Road and Elaroo Avenue, Philip Bay, approximately 1,800m away from the Site across Yarra Bay.

The Site and adjoining lands are topographically flat and lie at an elevation of around 3.8 m Australian Height Datum (AHD). Land uses surrounding the site in all direction comprise industrial and port related development for a distance of one to two kilometres.

The Site is bounded by Simblist Road to the south and Friendship Road to the west. Prince of Wales Drive and Simblist Road separate the Site from Yarra Bay, which lies to the east and forms part of the larger Botany Bay. The Site is bounded to the north by the remaining portions of the former Qenos Hydrocarbon Terminal.

Figure 2 shows the context of the Site in relation to surrounding land uses.



\Projects\60344169\4. Tech work area\4.5 Graphics\FIGURES\ES\60344169 F1 Regional Context 26 08 2015 TO Rev B

AECOM

REGIONAL CONTEXT

Environmental Impact Statement
Vopak Terminals, Port Botany, New South Wales

FIGURE 1

\Projects\60344169\4. Tech work area\4.5 Graphics\FIGURES\EIS\60344169 F2 Site Location 08 10 2015 TO Rev D

AECOM

SITE LOCATION

Environmental Impact Statement
Vopak Terminals, Port Botany, New South Wales

FIGURE 2

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3.0 Site Location and History

3.1 Site Location and Description

The Site is located within 4.2 hectares of the original nine hectare site formerly occupied by the Qenos Hydrocarbon Terminal at 37 Friendship Road. The project Site represents 4.3ha of land that was recently subdivided from the Qenos site. The remaining portion of the Qenos site continues to contain Qenos operations and infrastructure.

Both the Site and the remaining sections of the Qenos Hydrocarbon Terminal are zoned SP1 Special Activities under *State Environmental Planning Policy (Three Ports) 2013*. Qenos has recently demolished the former propane and butane storage tanks and associated infrastructure at the Site. All 4.3 ha of the Site would be leased by NSW Ports to Vopak for the Project. The existing land uses on Port Botany are shown on **Figure 3. Figure 4** shows the proposed layout of the Project on the Site.

3.2 Ownership and Legal Description

The lots (refer to **Section 1.3**) to which this EIS and SSD application apply are subject to a 99-year lease to NSW Ports, which is the land manager and who leases the land to Vopak (post closure of the site by Qenos). The legal description of the land parcels to which this application relates is provided in **Table 2**.

Table 2 Land Parcels

Lot	DP	Description	Project Element
201	1210638	Former Qenos site, current Site B4	Tank farm
10	1126332	Current Site B	New Site B4 connection to existing Site B manifold, additional transfer pipeline to Site B manifold, and extension of existing Site B fire protection system to cover Site B4A.
21	1045324		
52	1182618	Friendship Road reserve	Pipework through culvert under road

3.3 Site History

Port Botany was developed in the 1970's to meet growing trade and port requirements. The 4.3 hectare Site is part of a nine hectare area which was most recently used by Qenos (the Qenos Site) as a storage terminal for emergency feedstock supplying Qenos' Olefines Plant in the nearby Botany Industrial Park (Qenos Pty Ltd, 2013). The Qenos Site was originally designed as an ethylene storage and export facility, with a liquefied petroleum gas terminal constructed pursuant to a joint venture agreement in 1982 during the construction of the Olefines plant. Qenos was the majority asset-holder in the joint venture, and operated the Qenos Site (Qenos Pty Ltd, 2013).

In 1996 Qenos' Olefines plant was converted to 100 percent ethane storage with feedstock supplied by pipeline from South Australia. Thereafter, the Qenos Site continued to only store emergency feedstocks for the Olefines plant. At this point the Qenos Site comprised (Qenos Pty Ltd, 2013):

- Two 7,000 tonne storage tanks (propane and butane);
- Pumps and pipework for delivery of feedstock to the Olefines Plant;
- Pipework for connection to the port terminals for unloading of tankers;
- Associated compressors and equipment for liquefaction of propane and butane for storage;
- An elevated flare and associated pipework and drums;
- Nitrogen supply and pipework; and
- Firewater ring main.

Following an alternative supply becoming available to improve feedstock security for the Qenos' Olefines Plant, infrastructure on the Qenos Site became redundant. On 20 June 2014, the Planning Assessment Commission under delegation from the then Minister for Planning, granted approval to Qenos to demolish butane and propane storage tanks and associated equipment, and make good the land for return to NSW Ports (Qenos Pty Ltd, 2013). Primary site preparation works have since been completed by Qenos in accordance with its approval (DA_6329).

\Projects\60344169\4. Tech work area\4.5 Graphics\FIGURES\ES\60344169 F3 Land Use Zoning 26 08 2015 TO Rev C

AECOM

LAND USE ZONING

Environmental Impact Statement
Vopak Terminals, Port Botany, New South Wales

FIGURE 3

\Projects\60344169\4. Tech work area\4.5 Graphics\FIGURES\EIS\60344169 F4 Existing VOPAK Terminal Layout 13.08.2015 TO Rev A

AECOM

EXISTING VOPAK TERMINAL LAYOUT

Environmental Impact Statement
Vopak Terimnals, Port Botany, New South Wales

FIGURE 4

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Part C – Project Need and Alternatives

This Part describes the need for the Project and the alternatives that were considered during the planning and design of the Project to allow the proponent to arrive at the preferred project option.

4.0 Objectives and Project Need

4.1 Project Objective

The primary objective of the Project is to:

- Provide additional storage to expand Vopak's existing Site B fuel terminal in Botany Bay to meet the forecasted increase in terminal throughput demand as a result of increased fuel consumption in Sydney and NSW.

4.1.1 Biophysical Objectives

The biophysical objectives for the Project are to:

- Minimise the potential impacts to soils and groundwater by implementing best practice construction management measures, as well as dedicated spill prevention and response measures during operation; and
- Minimise potential impacts to the Botany Bay catchment by maintaining measures to minimise hydrocarbon release into surface waters.

4.1.2 Socio-Cultural Objectives

The socio-cultural objectives for the Project are to:

- Minimise the impact of the Project on the community with a focus on appropriately managing potential impacts from:
    - Traffic;
    - Noise; and
    - Air quality.
- Construct and operate the Project in a manner that minimises hazards and risks;
- Construct and operate the Project in a manner that safeguards the amenity of the nearby urban areas locality; and
- Maintain an ongoing dialogue with the community regarding the Project and any future changes to the Site.

4.2 Project Need

The Project is of economic significance to the regional, State and national economies due to the changes in the Australian fuel supplies market, and the need to provide secure fuel supplies for the ongoing operation of Australian businesses and industry. The need for the Project is outlined below in relation to the fuel market, the customers that the Project would service, and the wider implications in the regional and State economies.

Australian Fuel Demand and Supply

Consumption of fuel is increasing in Australia, driven by economic growth and high demand from the resources industry. Growth in demand has been around two percent per annum over the past decade (AIP, 2013). Over the same time, diesel use has increased by around 56 percent and jet fuel by around 80 percent. Petroleum use has declined marginally, due to improved fuel efficiency of newer model vehicles (AIP, 2013).

Around 30 percent of refined fuels globally are now produced in Asia (including on the scale of mega-refineries), and the Asian region continues to produce surplus fuel products (AIP, 2013).

The Australian fuel supply market has been experiencing significant changes over recent times and particularly over the last 12 to 24 months. In Sydney the closure of refinery operations (e.g. Shell) in Sydney at Clyde and Caltex in Kurnell (end of September 2013) removed approximately 4.8 billion litres of refining capacity that needed to be met by alternative means. Increasingly competitive prices on fuels refined in Asia, and improvements to

logistics operations in the bulk fuel industry has allowed smaller facilities to handle increased throughput of fuels more efficiently further reducing the economic argument for operating refineries in Australia.

The vast majority of Australia's fuel requirements are now met by imports. With the recent closure of many refinery operations, NSW is increasingly reliant on imported fuel to meet the growing demand for fuels. The increasing need for imported fuels in Australia has seen an increased focus by overseas organisations and business to secure supplies of refined fuels within Australia from overseas sources. These organisations need access to independent storage facilities such as those operated by Vopak. Currently, Vopak supplies in excess of 20 percent of Sydney and New South Wales' petroleum requirements. As demand for refined fuel products continues to grow, there is an increased need for storage capacity at key import locations such as Port Botany. The Project would provide this increased import and storage capacity.

The Project is proposed by an independent supplier of fuels into the NSW market place. Not only does this increase the economic benefits (e.g. increased competition, more efficient fuel supply chain), but it also increases diversity and therefore security of supply to the NSW economy. With the recent divestment of assets being undertaken by the major oil companies, independent suppliers have become increasingly important to the economy in order to secure energy supplies to business and industry.

Increasing demand for fuels in light of the reduced onshore refining capacity has created a need for more locally based fuel importation, storage and dispatch facilities thus driving the need for the Project.

4.3 Project Benefits

There is a range of benefits associated with the Project. These include:

- Improved operational efficiency of the fuel logistics chain through the ability to import larger shipments of fuel;
- Improved security of supply for customers by having a larger storage. More stored fuels would minimise the effects of impacts to the international supply chain;
- Improved reliability in fuel supply capability to Sydney and NSW businesses;
- The repurposing and reuse of port land (the former Qenos Site) for a high value port related activity and in doing so the realising the capital expenditure and flow on effects to the NSW economy; and
- Direct capital investment and employment generation during the construction and operation of the Project.

5.0 Alternatives Considered

5.1 Project Alternatives

Several alternatives to the Project have been considered in this EIS, two of which would seek to meet the objective of enhancing the security and reliability of NSW's fuel supplies and one that would not. These alternative options are summarised as:

- Alternative port sites in Sydney the Sydney Region;
- Alternative port sites outside the Sydney Region – Port Kembla and the Port of Newcastle; and
- A 'do nothing' option whereby the Project would not be undertaken;

These alternatives are discussed in the following sections.

5.1.1 Alternative Locations in the Sydney Region

While there is potential for other locations to be considered for fuel import terminals in the Sydney Region, no other location provides direct connection to an existing fuel terminal, connection to fuel pipelines, direct access to existing bulk liquids berths and connection to key transport routes. Other locations would require the establishment of significant additional infrastructure, which would result in potentially significant disruption to the community, other businesses and the environment.

5.1.2 Alternative Locations – Port Kembla and the Port of Newcastle

A number of potential alternative locations exist in Port Kembla and Port of Newcastle, which could be used for the establishment of additional bulk fuels import terminals. As the Project seeks approval for an increase in throughput for the existing Site B terminal to service forecast demand from the Sydney metropolitan area situating a terminal facility outside of the Sydney metropolitan area would lead to inefficiencies due to transport and infrastructure establishment costs.

5.1.3 Do Nothing

The do nothing alternative would continue to see a business as usual situation exist in the Sydney fuel supply market. In this scenario the existing terminal would continue to operate in accordance with its existing Project Approval and the Project would not be undertaken. If the 'do nothing' alternative remained in place, none of the benefits would be realised and the regional fuel market would continue to be constrained in the amount of fuel that can be imported and stored at the terminal would not be increased to meet the anticipated demand.

The do nothing option would not result in an increase of available fuel supplies in NSW potentially leading to increased susceptibility to shortages if one or more existing supply chains are interrupted.

5.1.4 Preferred Option

The preferred option is for the proposed Site B4, Stages A and B to be approved for operation as part of the overall Vopak Terminal site. This would allow the storage tanks to be operated through Vopak's existing Bulk Liquid Berths and gantry infrastructure. The preferred option is optimal as it:

- Would occur on a site zoned for port uses which is currently underutilised;
- Would occur in association with existing import (wharf and berthing) and fuel terminal infrastructure minimising the need for additional construction works and associated impacts; and
- Is on a site with excellent transport connections being adjacent to a deep water shipping berth and arterial road network.

The preferred option, the Project, is described in detail in **Part D.**

In order to demonstrate that the preferred option can achieve its proposed benefits whilst continuing to have minimal community or environmental impacts a detailed impact assessment has been undertaken and is contained in **Part F** of this EIS. Where there is potential for an impact to occur, mitigation measures have been identified to manage these to an acceptable level.

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Part D – Project and It's Management

This Part describes the Project, including those elements already operating and those to be constructed, and details how the Project in its entirety would be operated.

6.0 Project Description

6.1 Overview

The Project seeks approval for the construction and operation of Petroleum Tank Farm B4. This would involve the construction of seven storage tanks with a total nominal capacity of 200,000 m^3.

Vopak proposes to undertake the Project in two stages as follows:

- Stage 1 (B4A):
  - Construction of three storage tanks and bunding dedicated to Combustible Fuels (generally ADO with a nominal total capacity of 105,000 m^3);
  - Construction of new pipelines/culverts to inter-connect with the Site B manifold;
  - Installation of manifold/transfer pumps and connections to utilities; and
  - Extension of existing Site B fire protection system to B4A site.
- Stage 2 (B4B):
  - Construction of four storage tanks (nominal total capacity of 95,000 m^3) capable of storing flammable (Class 3) Flammable or Combustible product;
  - Construction of additional transfer pipelines to Site B manifold systems; and
  - New fire protection system complying with AS 1940 requirements.

Collectively the entire Vopak complex (including the Project) would achieve a throughput of 7,800,000 m^3 per year in accordance with the Site B Project Approval (MP 06_0089), if modified. It should be noted that this EIS relates only to the operation of the Site B4 tank farm. All other aspects of Vopak's operations (i.e. fuel unloading fuel distribution, etc.) are governed by the Site B approvals for the import and distribution of fuels from Port Botany.

As there would be a level difference between Site B4 and the remaining Qenos Site, Vopak would also install an appropriate retaining structure at the Site B4 boundary. Appropriate fencing and any other boundary features, such as emergency access, would be considered in consultation with Qenos.

The Project would be required to meet certain safety, pollution and environmental management requirements under applicable legislation, government policy and Australian Standards. This EIS therefore also seeks approval for the ongoing maintenance, repair and replacement of equipment, pipes, hoses, pumps, services and the like to allow Site B and Site B4 to operate in a safe and environmentally responsible manner. This includes activities relating to storage tank inspections and minor upgrades unrelated to the volumes of product stored onsite.

Reference is made to **Figure 5** which provides an overview of the Site including the Project. Layout plans detailing the proposed layout of the Project are at **Appendix A**.

6.2 Strategic Context

The existing Vopak Terminal was established to serve an identified need for an independent petroleum distribution facility in the greater Sydney Region. The Terminal caters for the distribution of petroleum products to oil companies, independent petroleum retailers and distributors. This allows for free competition between the petroleum companies and improves the diversification of the market.

The terminal is also integrated into a wider network of petroleum and liquid fuels transport infrastructure with other Vopak facilities at Port Botany, oil industry corporations including Caltex Banksmeadow and Mobil Silverwater Terminal. Following the Australian fuels market move away from the refining of fuels at Australian bases (refer **Section 4.2**) there is an increasing need for import capacity to meet the shortfall in local production. Consequently, the existing terminal is a critical part of a petroleum distribution network that enables other facilities

in the immediate area to also operate in an efficient and environmentally safe manner. The operation of terminals like Vopak's is critical to the smooth functioning of the Sydney and NSW economics as a key energy source.

6.3 Site Preparation / Pre-Construction Activities

As described in **Section 1.1.2,** Qenos received development consent for the demolition of redundant infrastructure at the Site, and to return it to NSW Ports. Primary site preparation works have since been completed by Qenos in accordance with its approval (DA_6329).

Prior to any construction works and during detailed design Vopak would undertake geotechnical site investigations in order to:

- Ground and groundwater conditions below the proposed terminal expansion;
- Geotechnical conditions and any constraints that may affect the proposed development; and
- Engineering parameters for input into design of the tanks, terminal structures and infrastructure foundations as well as establishing likely performance with respect to API 650 settlement performance criteria.

These geotechnical investigations are expected to be comprised of;

- Borehole drilling investigations
- Standpipe piezometer installation; and
- Cone penetration testing.

Specific details in regards to these site investigations would be provided to NSW Ports prior to being undertaken.

6.4 Construction

6.4.1 Program of Works

The target start date for the initial site mobilisation for the construction of the Project is Q4 2015, subject to approval. The target completion date is early 2017. The work would be executed by a number of specialist and experienced contractors to be engaged directly by Vopak.

An indicative program of works for the construction phase, relative to the main construction activities, is shown in **Table 3**. This indicative construction timeline would be applicable to both Stages B4A and B4B. It is expected that these stages may be constructed between 1 – 3years apart depending on market factors. Regardless of market factors, Vopak does not intend to build both stages concurrently. Due to the lack of space available at the site it is unlikely to be practicable to build both stages at the same time.

Table 3 Proposed Timeline for Construction Activities

Item	Description	Stage B4A		Stage B4B	
		Start (Week)	Finish (Week)	Start (Week)	Finish (Week)
Mobilisation	- Initial mobilisation of construction team to the site and establishment of construction infrastructure such as construction office, car parking laydown areas; and - Establish construction site fencing and security measures.	1	4	1	4
Civil Works (including pipe and culvert works)	- Modify site drainage to isolate and control runoff from the construction site; - VibroCompaction Works; - Tank Foundations; - Access Roads - Bund wall sub base preparation; - Construct vertical bund walls; - Prepare for and construct tank foundation; and	5	14	5	14

Item	Description	Stage B4A		Stage B4B	
		Start (Week)	Finish (Week)	Start (Week)	Finish (Week)
	- Apply asphalt to remaining hardstand areas.				
Tank Works	- Fabrication and installation of tanks in Site B4; and - Hydrostatic testing of tanks.	15	54	15	60
Fire and safety systems installation	- Piping installation for connection to fire ring main; - Installation of fire water sprays systems; and - Installation of fire detection system.	23	54	23	58
Electrical Works	- Installation of electrical control systems; - Connection to existing Vopak terminal management systems; and - Connection to utility electrical supplies.	25	56	28	59
Commissioning	- Pre-Commissioning; - Testing and commissioning of fuel import and export systems; and - Testing and commissioning of fire management systems.	57	67	60	70

6.4.2 Outline of Main Construction Activities

Specific construction activities required for the Project would include the following:

- Existing fencing on the site boundaries for security purposes would continue to be used until such time as the major earthworks and civil works are complete;
- Geotechnical assessment to determine the most appropriate form for tank foundations;
- Preliminary earthworks with a total cut of around 3,800 m^3 (down to 1 m below ground surface and fill of around 3,600 m^3 (of up to an additional 2 m above ground surface) and projected excess import of around 200 m^3;
- Tank farm foundation preparation by VibroCompaction works;
- Construction of compound floor with minimum 300 mm of aggregate overlaying geo-synthetic clay lining;
- Construction of reinforced concrete bund walls comprising foundations and vertical bund walls (reinforced concrete averaging four metres in height);
- Construction of intermediate bund walls 600 mm in height;
- Construction of stormwater management system to manage stormwater and potential spill incidents including bunding, site grading, culverts, collection pits, separation and treatment facilities;
- Tank fabrication - During the construction there would be regular deliveries of material and equipment. At all stages there would be crane activities` consistent with a project of this nature; and
- Commissioning following construction activities.

Excavation works would be to accommodate bund footings, light towers, road crossing and stormwater pits. It should be noted that geotechnical site investigations (as described in **Section 6.3**) may also be required during the construction phase subject to design team requirements.

6.4.3 Construction Traffic and Access Arrangements

All construction traffic access would access the site via Simblist Road from Bumborah point Road and Botany Road. Refer **Figure 2**. Vehicular access to the Site is available directly from Simblist Road. It is anticipated that the following traffic would be generated during the peak of the construction phase:

- Up to 84 light vehicles per day (based on 100 construction staff and 1.2 persons per vehicle) travelling into and out of the Site; and
- Up to 15 truck movements per day. Although these are likely to be spread throughout the day as equipment and materials are required onsite.

During construction the work site would be fenced with temporary fencing allowing it to be securely locked after hours. Access entry and checkpoints would be established during construction to control all traffic movements into and out of the work site.

During Stage 1 (B4A) of the construction, workers would park on the Stage 2 (B4B) site. The B4B area would be utilised for the following Stage B4A construction activities:

- Contractor Accommodation/Amenities;
- Contractor Lay-down Area;
- Contractor Construction Vehicles/Equipment parking; and
- Contractor personnel car parking.

All of these activities would be contained within the lease boundary. Vopak anticipates that 3 of the 4 Stage B4B tanks can be constructed with all of the above Contractor compounds and facilities contained within the site lease boundary (i.e. within the proposed B4B area). However, the final (4th) tank construction would require an off-site area for the above contractor activities. Such arrangements would need to be investigated in the Port Botany precinct in discussions with NSW Ports.

Indeed, any such temporary use of the B4B area would require NSW Ports approval and any site modifications (e.g. entry/exit gates, hard-standing, portable office sheds) would have to be in accordance with the NSW Ports Development Code. Should the required amount of parking not be achieved by these means Vopak would make provision for bussing in the workforce.

As detailed in **Section 6.4.6**, A Construction Environmental Management Plan would be prepared. This would include a Construction Traffic Management Plan (CTMP) that includes provisions for managing impacts to Friendship Rd. This CTMP would be reviewed and approved by NSW Ports prior to implementation.

6.4.4 Construction Workforce

Up to 100 construction-related staff may be required onsite during the peak construction period for each of the Stage 1 B4A and Stage 2 (B4B) works. Due to the nature of the construction works however a more typical number of construction staff would be approximately 60 persons per day.

6.4.5 Construction Hours

Construction activities would occur during the following standard construction hours:

- Monday to Friday 7am to – 6 pm;
- Saturday 8am – 1pm; and
- No works on Sundays and Public Holidays.

While the majority of construction activities would be undertaken during standard hours, there may be a need to undertake out of hours works for the pipe and culvert works across Friendship Road to minimise impact to traffic during business hours.

Some activities, for examples emergency works, may also be required outside of these times. Any works required outside of standard working hours would be undertaken in a manner that is inaudible at the nearest sensitive receiver. Exceptions to this may occur, for example in the case of emergency or related works being required.

6.4.6 Construction Environmental Management and Monitoring

Prior to construction activities taking place, a Construction Environmental Management Plan (CEMP) would be prepared to address the management of potential environmental impacts associated with construction activities. The CEMP would include as a minimum management measures to address the following environmental aspects during the construction phase:

- Surface Water;

- Soils and groundwater;
- Air quality and odour;
- Noise;
- Waste;
- Indigenous and Non-Indigenous Heritage; and
- Flora and fauna.

A CEMP would be prepared for the Project, and would include the management measures outlined in **Part F** of this EIS.

6.4.7 Interim Use of B4B Site

It is anticipated that Stage 2 would not be required by the market until 1-3 years after Stage 1 is in operation. Interim use of the B4B Site during this period has yet to be confirmed, but could include such uses as:

- Temporary truck parking; or
- Empty container storage services.

Any interim use of the B4B Site, whether or not it is listed above, would be required to obtain the relevant approvals for that use. In addition some stockpiling of fill excess fill material may be required on B4B following the construction of B3B. With a near neutral cut-fill balance expected for the construction of B3B however stockpiled quantities would be minimal.

6.5 Operation

The Project would allow for the following operations:

- Ship unloading/loading to/from Site B4 directly from BLB1 or BLB2 via Site B Manifolds;
- Tank to tank transfers – between tanks within Site B4 as well as between tanks in Site B with Site B Stage 1 (B4A) - Construction of three storage tanks and bunding dedicated to Combustible Fuels (generally Automotive Diesel Oil: ADO with a nominal total capacity of 105,000 m^3); and
- Tank recirculation;
- Pipeline Import /Export (via the CTP pipeline) via Site B Manifolds; and
- Direct Road Tanker loading from B4 via new pipelines from B4 to Site B.

The Project would be connected to the existing Site B Vopak Terminal truck load-out gantry. On 19 June 2015 Vopak lodged a Section 75W modification application for the Site B project approval that sought an increase in throughout that the gantry would experience as a result of the Project and improved operational efficiencies at Site B. The modification took into consideration the additional traffic generation, gantry pump noise, air quality impacts and other potential impacts associated with the increased gantry throughput. Importantly, the Site B4 storage tanks would be able to export directly to road trucks.

This application therefore seeks approval for the operation of the proposed Site B4 tanks only. Similarly, the operation of BLB1 and BLB2 is undertaken in accordance with the approvals for each berth. The following discussion however, describes how the Project would work in unison with existing approved terminal infrastructure.

The facility would be required to meet certain safety, pollution and environmental management requirements under relevant State and Federal legislation, government policy and Australian Standards. This assessment therefore also seeks approval for the ongoing maintenance, repair and replacement of terminal equipment and the like to allow the facility to continue operating in a safe and environmentally responsible manner.

There would be ongoing maintenance, replacement and minor works to the facility throughout the life of the project. Primarily, the focus of these activities is to maintain the Safety, Environmental and Operational controls that are critical in managing a Major Hazard Facility (MHF).

The B4 site would include a Maintenance/ Workshop that would be utilised for:

- Storage of spares (Safety/Electrical/Mechanical/Environmental);

- Servicing/Replacement of Mechanical equipment (Tank and Pipeline fittings);
- Servicing of Electrical equipment (instrumentation); and
- Pipe welding and fabrication.

Activities that would occur throughout the life of the project would generally include (but not limited to):

- Cranes for equipment removal/servicing/replacement;
- Grit Blasting and Painting;
- Boom-lifts and mobile elevated platforms for tower lighting and tank top maintenance;
- Electrical Equipment servicing and replacement;
- Pump and Motor maintenance and replacement;
- Piping repairs;
- Minor Modifications to pipework/manifolds for operational improvements;
- Waste Water Plant cleaning, maintenance and replacement;
- Utilities maintenance;
- Roadway repairs;
- Tank inspections and maintenance;
- Friendship Road Culvert inspections and maintenance and repairs; and
- Landscape maintenance.

6.5.1 Import and Transfer

Fuel products would continue to be delivered to Vopak in Botany Bay via tank ships berthing at either BLB1 or BLB2. Six (6) pipelines would connect the existing Site B and proposed Site B4 for the transfer of products from the berths to the Site (via Site B). These are known as the Transfer Lines (2 off), the Multipurpose Lines (2 off) and the B4B Additional Lines (2 off). Some of the pipelines may be product dedicated.

Existing pigging (pipe cleaning) would be supplied from systems on Site B, and the pigs would only need to be 'pushed' to the Site B4A or B4B. The Transfer Lines would be cleared at the end of each discharge (if necessary for product quality reasons) and the Multipurpose Lines would remain full of product at all times.

No product interfacing detecting equipment would be provided within the B4A or B4B Sites, as this would all continue to be undertaken at Site B before product is transferred to B4B or B4B. Distribution to the product tanks would be via a wharfline manifold. Wharfline and tank inlet valves would also be automated.

All bulk fuel tankers would be operated in accordance with the International Safety Guide for Oil Tankers and Terminals (ISGOTT) and AS3846-2005 "*The Handling and Transport of Dangerous Cargoes in Port Areas*".

Transfer of fuels would occur two ways between existing Site B tanks and the proposed Site B4 tanks. All fuels coming into the proposed tanks would do so from Site B. Likewise all fuels departing the proposed Site B4 tanks would move back through the existing Site B manifold prior to being exported from site regardless of whether that fuels is being exported by truck, pipeline or ship. As described in **Section 6.5.9**, all operations, including import and transfer operations could occur at any time of the day or night.

Reference is made to **Plate 1** showing the fuel transfer relationship between Site B and Site B4.

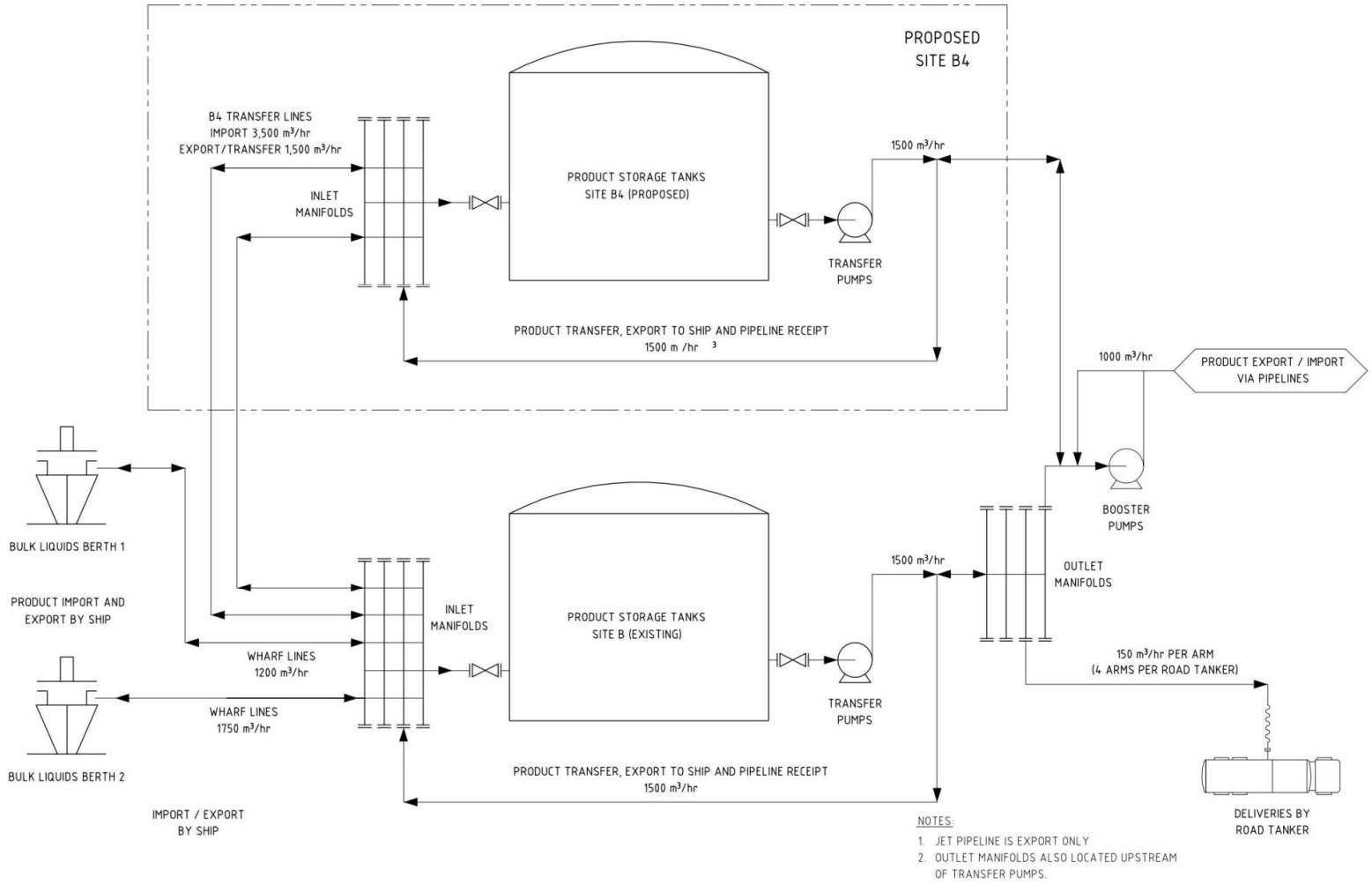

Plate 1 Process Flow Diagram

Transfer System Efficiencies

The existing and planned BLB's are rated for 270m long, 120,000 DWT or LR-type petroleum tankers which have a typical maximum total flowrate of approximately 3,500cbm/hr.

In each stage of B4 (B4A and& B4B), a 400mm and 500mm diameter transfer lines from existing Site B to B4 (a total of 4 transfer lines) are proposed. These lines allow for ship import transfer rates of nominally 1,700cbm/hr in each 400mm line and 3,500cbm/hr in each 500mm line. This combined capacity of 10,000cbm/hr flowrate to B4 is considered adequate for BLB1, BLB2 and a future BLB3 operating all simultaneously.

Functional distribution to Road Tankers, pipeline exports and ship import/re-exports requires manifolding B4 via existing Site B.

The B4 design from BLB1/2, within existing Site B and to B4 is hydraulically designed to allow through-flows to existing Berth capacities, via nominally 2,400cbm from BLB1 and 3,500cbm/hr from BLB2. Noting BLB1 is currently equipped with 250mm Marine Loading Arms (MLAs) and 300m wharf lines; whilst BLB2 is equipped with larger 300mm MLA's and 350mm wharf lines. Current transfer rate bottlenecks, which could be reduced in the future, are located on the BLBs and the current wharf lines. Therefore the Project has been designed to match or better existing transfer rates and would not act as an impediment to the efficiency of bulk liquid berth operations at Port Botany.

6.5.2 Site Water Management

Plate 2 provides an overview of the site water management proposed for the Project. The key water management activities are described below.

Tank Dewatering

All Fuel Products received from ships invariably contain some quantity of water, either entrained or dissolved in the product or as a separate phase. A critical Vopak Quality Control procedure is to ensure that after receipt of any product into a Bulk Storage Tank a process ("de-watering") of extracting this water is carried out periodically or on a daily basis. This de-watering process is effected by draining product from the very bottom of each tank where any free water will accumulate (water is heavier than all petroleum products and therefore settles to the lowest point of each tank). Each day, product is drained from the bottom of each tank into a small 1,000 Litre Quick Flush Tank which collects the water and provides separation of the product. The resulting clean product is then pumped back to the storage tank and the separated water is pumped via a new dedicated pipeline from the B4 site, through the new culvert and then inter-connects with the existing parent waste disposal system on Site B. This contaminated water is stored in dedicated slop tanks and because it cannot be processed on site it is disposed of off-site to a licenced Waste Disposal Facility.

Terminal Maintenance and Slops

Areas containing storage tanks, pipe connections, pumps and manifolds can be susceptible to spillage. Therefore stormwater from these areas would be treated via a Plate Interceptor prior to discharge to the Final Inspection Pit. This pit would normally be closed and would only be opened after inspection. Slops caused by maintenance activities including pipeline draining, spills, compound sump contamination and the interceptor pit would also be collected and pumped back to the Site B slops system.

Bundwater

In addition to providing appropriate level of bunding to accommodate the tanks size, the tanks bunds have been designed to accommodate a 1:20 year 24-hour storm, with the ability to drain such a storm event within 24 hours. Stormwater including runoff from those areas of the site outside the tanks bunds would drain to the proposed Site B4 interceptor, which allows for the collection and removal of hydrocarbons and then discharged to Botany Bay via a licenced discharge point via a Final Inspection Pit. This Pit would normally be closed and would only be opened for release after inspection. Any resulting water that cannot be discharged to Botany Bay is then transferred to the existing Site B slops system for disposal.

Central Road Stormwater

Stormwater collecting at the central process road and yard would drain to the Final Inspection Pit prior to being released into Botany Bay via a Final Inspection Pit. This Pit would normally be closed and would only be opened for release after inspection.

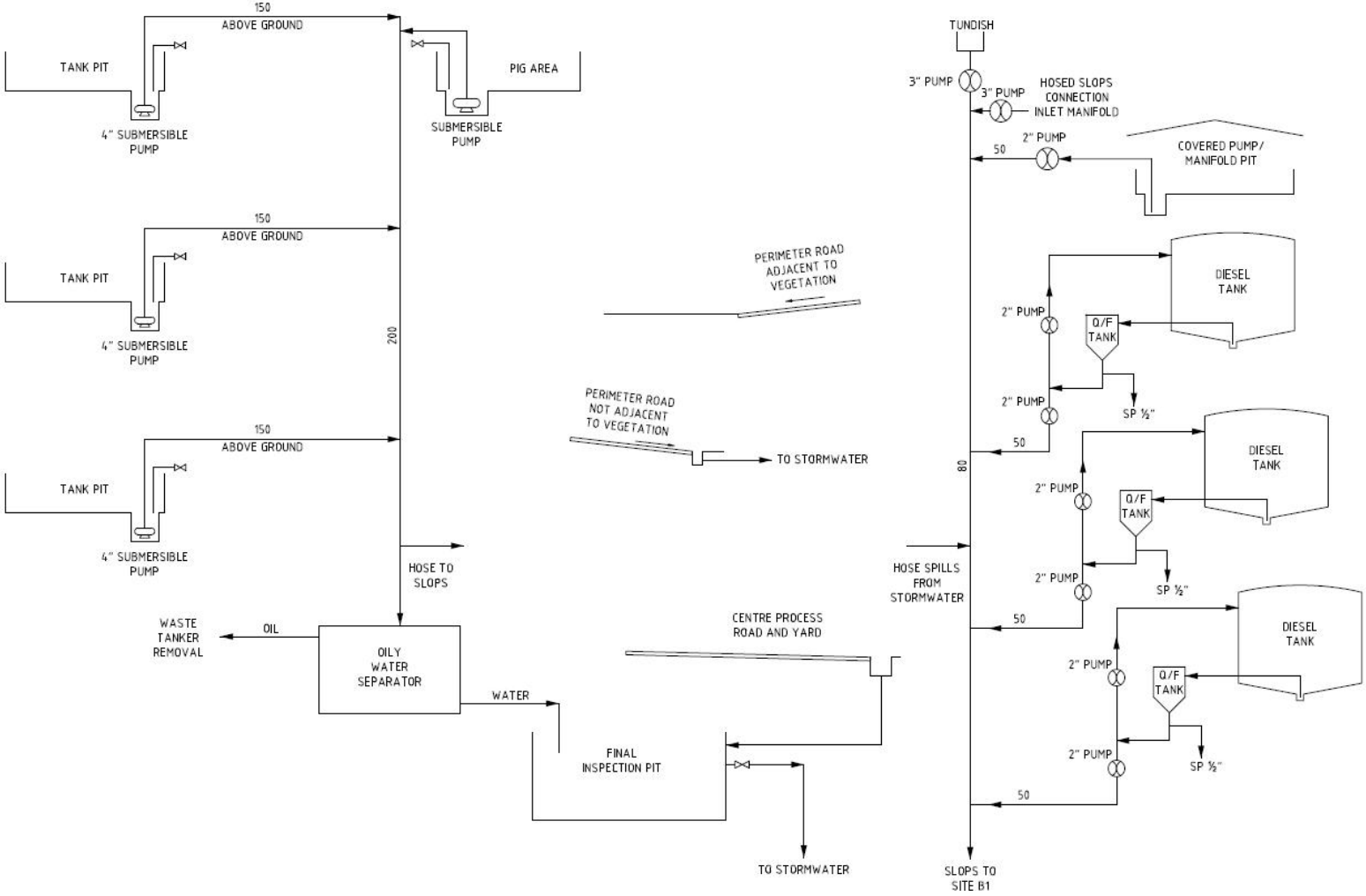

Plate 2 Proposed Site Water Management

Perimeter Roads

Perimeter roads would be clean emergency access roads. Stormwater collecting on these roads would drain either to vegetated areas at the perimeter, or in the case of the northern perimeter road, would drain to the existing stormwater system feeding into Botany Bay (to avoid flows onto neighbouring property).

B4 Final Interceptor

The B4 Final Interceptor Pit (which discharges to the existing Friendship Road municipal stormwater drainage system which then discharges to Botany Bay) is located adjacent to the Friendship Road boundary adjacent to the utility buildings.

6.5.3 Storage

The key components of the Project are the proposed storage tanks with a useable capacity of approximately 200 ML. The tanks would store combustible products only in the B4A Stage. Flammable liquids would not be stored until the B4B Stage is complete.

Anticipated tank storage capacity is outlined in **Table 4.**

Table 4 Proposed Project Fuel Storage Tanks

Stage	Product[1]	Tank No	Diameter (m)	Height (m)[2]	Shell Volume (m^3)	Fill Volume (m^3)	Operating Volume (m^3)
A	Diesel	110-01	43.5	24.7	36,700	35,200	33,700
A	Diesel	110-02	43.5	24.7	36,700	35,200	33,700
A	Diesel	110-03	43.5	24.7	36,700	35,200	33,700
				Sub Total	**110,100**	**105,600**	**101,200**
B	Gasoline	110-04	41	24	31,600	30,300	29,000
B	Gasoline	110-05	41	24	31,600	30,300	29,000
B	Gasoline	110-06	29	24	15,800	15,000	14,500
B	Gasoline	110-07	29	24	15,800	15,000	14,500
				Sub Total	**94,800**	**90,600**	**87,000**
				Total	**204,900**	**196,200**	**188,200**

1) Gasoline refers to the range of flammable products including automotive petrol of various octane grades.

2) Height to top of tank. Tanks with domed roofs have additional heights by up to 4.2m.

The proposed tanks in B4A Tank Farm would be configured for combustible product storage only, and would include the following design features:

- Carbon steel floor and walls composition;
- Geodesic Aluminium Low- Profile Roofs; and
- Free-venting.

The proposed tanks in B4B Tank Farm would be configured for flammable product storage, and would include the following design features:

- Carbon steel composition;
- Foam pourer flanges;
- Deluge cooling rings;
- Deluge and foam piping riser supports;
- Air-scoop roof flanges; and
- Internal floating roof with external geodesic aluminium low-profile dome (similar to the existing Site B tanks).

Proposed tanks would be designed, constructed and installed according to the following Standards:

- AS 1692: Steel tanks and flammable and combustible liquids;
- API[1] 650: Welded tanks for oil storage;
- API 2000: Venting atmospheric and low pressure storage tanks;
- AS 1940: The storage and handling of flammable and combustible liquids;
- AS/NZS 1170: Structural design actions;
- AS 4100: Steel structures; and
- AS 1657: Fixed platforms, walkways, stairways and ladders – design construction and installation.

All tanks and associated equipment such as wind girders, nozzles and stairways would be painted white to reduce heat gain and subsequent vapour loss. Internal coating would cover the entire floor and sump, one metre up from the base of the tank, as well as all nozzles and internal fittings.

The manner by which these tanks are connected within the Terminal is illustrated on **Figure 5** and detailed in **Appendix A.**

6.5.4 Mechanical Workings

Mechanical operations at the Site would include:

- Inter-terminal pipework between Site B4A, Site B4B and Site B;
- Pig receivers/launchers at both existing Site B Manifold and the Site;
- Incoming manifold on Site B4 as well as manifold extension at existing Site B Manifold;
- Pump manifold;
- Product pumps;
- Pump outlet manifold;
- Firewater and fire-foam solution piping connections to existing Site B Fire Pump House; and
- Slops as well as Utility Plant Air and minor service pipelines to/from existing Site B.

All new pipework would be installed above ground, except as they pass through the culvert under Friendship Road.

6.5.5 Fire Management

The fire protection system for the Site would be designed according to AS 1940 and other relevant standards, and would include:

- Fire extinguishers located throughout at the Site;
- Fire alarm system permanently connected to the fire service including the following:
    - Manual call points and activation provided at strategic locations;
    - Mimic panel at Site B4A entrance (fire response point) with detector and call point status;
    - Connection back to existing Site B4 main fire alarm panel for indication and brigade call-out; and
    - VESDA type detection for interior of switchboard container.
- Fire protection system indication panel located at the site entry, providing a layout of the Site including hydrant and other fire protection systems, as well as the status of firewater pumps;
- Additional fire safety measures for Site B4B (flammable petroleum products store) would including the following:
    - Fixed tank cooling and foam generation for each tank; and

[1] American Petroleum Institute

- The firewater distribution system would be as follows:

- Connection of Site B4A (combustible petroleum products storage only) to fire water supply on Site B4B;
- Fire Brigade boosting facilities located at the Site B4A hydrant main to facilitate Fire Brigade extra boosting if required;
- A Mutual Aid program is planned for the B4B Stage whereby the NSW Ports BLB2 Jetty Fire Protection system would be connected to the Vopak Site B Fire Protection system;
- Firewater distribution system designed to meet relevant discharge pressure and flow requirements; and
- Hydrant system with duel outlet hydrants spaced every 60 m and sufficient block valves to maintain at least 75 percent of hydrant main in the event of damage.

Prior to construction the final fire system would be reviewed and approved in consultation with Fire and Rescue NSW.

6.5.6 Automation

Site B4 would be operated through a fully automated connection to the existing Vopak terminal management systems. Both stages would have the following key systems managed through automation:

- Tank gauging;
- Tank High-Level Shutdown;
- Fire alarm;
- Emergency shut-down;
- Programmable Logic Controller to provide automated control of site systems; and
- Pump controls.

Tank Gauging

All tanks would be installed with tank gauging, consisting of individual radar units and associated multipoint temperature sensors located on each tank top. Gauges would be connected via communications. The bulk storage tank gauges would be fitted with Level Alarm High and Level Alarm Low relay output cards. Radar tank gauges would meet the minimum requirements:

- Hazardous area rated;
- Accuracy +/- 1 mm for custody tank radar gauges;
- Two relay outputs for high and low level gauges;
- Ability to connect remote readout display;
- Self-verification functionality; and
- Temperature probes with a minimum of six point averaging.

Tank High-High Level Alarm System

A tank High-High Level Alarm system would be installed on product tanks. It would be independent of the radar tank gauging system and integrated into an appropriate Safety Integrity Systems to provide a fall back tanks gauging systems. The High-High Level Alarm system would also receive back-up power from an uninterruptable power supply system in order to maintain system integrity, monitoring and alarming in the event of a mains power failure, for a period of not less than two hours.

On the detection of an unsafe tank level the relative probe would signal this condition to the Programmable Logic Controller system, initiating this alarm sequence:

- Shutdown pumps;
- Close all valves; and
- Sound alarm, back to the Central Control Room at Site B.

Activating the High-High Level Alarm system would also stop or prevent any tank to tank transfer operation, and if activated during a tanker discharge would signal the ship to shut down its pumps.

Emergency Indicators and Shut Down

A Programmable Logic Controller would be installed within the switchboard container room. This would control general site operations such as tank, pump and valve operations, and would also be responsible for control of various safety systems including:

- High-High Level Alarm System; and
- Emergency Shut-Down System.

Emergency Shut Down pushbuttons would be installed at the following locations:

- Outside Petroleum Tank Farm B4 compound, adjacent to entry and exit stairs;
- At the valve manifold areas;
- At the pump raft; and
- On exterior of switchboard container.

Pushing an Emergency Shutdown Button would activate the emergency stop system. This would initiate an alarm sequence including, but not limited to the following actions:

- Signal sent to the Programmable Logic Controller system;
- Tank filling, transfer and out-loading operations would be stopped and inhibited;
- All product pumps would be stopped and inhibited from operation; and
- All automatic tank valves would be closed and inhibited from operation.

6.5.7 Electrical Management

Electrical installations onsite would consist of a complete control and power distribution network. The Site would have one incoming power supply. Communications, data, fire alarm and CCTV Security would all connect back to existing Vopak systems at the Central Control Room at Site B.

Incoming Site Power Supply

An 11 kV supply to a single 750 kVA transformer would be required. The transformer would be located within the Site B4 boundary in close proximity to the switchboard container room, and housed in a purpose-built substation.

Emergency Power Supply System

An emergency power supply system, including an uninterruptable power supply, would be installed within the switch room. A two-hour uninterrupted power supply would provide essential power supplies to the Site Programmable Logic Controller system, tank gauging system, tank High-High Level sensing, Emergency Shut Down system, security CCTV system, data communications and other miscellaneous equipment.

Cable Reticulation

A cable reticulation system would be installed onsite. The system would utilise aluminium cable ladder with stainless steel fixings to distribute cables from control nodes such as the switch rooms/uninterrupted power supply system to the individual loads and instruments such as pumps, valves and tank gauging, etc. Generally, the cable ladder would be aboveground, following the main pipe routes by using main pipe supports. All cable ladders would be fitted with covers.

Lighting

Lighting at the Site would comprise both security lighting and general task lighting. General lighting would be installed to illuminate the Site perimeter, Site B4, and other areas that operators need access to at night, and as required to provide a minimum level of security as per the *Port Botany Development Code 2013*. This would include:

- Five 30 m light poles carrying energy efficient LED floodlights;
- One conventional street lighting pole and light (interceptor area);
- Cabling around the site boundary for supply of power to lighting;
- Daylight sensor control for automatic operation; and

- On/off/auto switch on for master lighting control and testing purposes.

Where a higher level of lighting is required to perform operational tasks, additional task lighting would be installed. These areas would include:

- Pump raft and valve manifold areas; and
- Tank sump areas inside bund walls.

Where required, this lighting would be suitably hazardous area rated.

Lighting would also be designed to be in accordance with the *CASA Manual of Standards* Part 139 – Aerodromes (specifically Section 9.21 – Lighting in the Vicinity of Aerodromes).

CCTV System

CCTV equipment would be installed to monitor site security at the following areas:

- Perimeter fencing;
- Entry and exit gates;
- Pump raft and valve manifold areas; and
- Petroleum Tank Farm B4 bund walls.

6.5.8 Security and Access

As has been detailed above under the description of electrical management a CCTV system would be installed to provide 24 hour surveillance capability to Site B4. In addition, the following elements would be incorporated into the Project to control or provide access as necessary:

- A main vehicle entry and exit through manual swing style security gates along Friendship Road;
- Appropriate security fencing with chain wire to a maximum height of 3.5 m;
- A gate for fire appliance access to the booster points;
- A centre process road (between Site B4A and Site B4B), plus a perimeter road with a sprayed seal finish suitable for light truck access and emergency vehicles;
- High level personnel steel access ways with concrete foundations from outside of the compound to the tank stairways, and with access down into the tanks bund areas;
- Intermediate steel access ways with concrete foundations to provide compound to compound access;
- Steel platforms to provide access to the pump bays, pig receivers and tank inlet/outlet locations; and
- Emergency compound access ladders.

As there would be a level difference between Site B4 and the remaining Qenos Site, Vopak would also install an appropriate retaining structure at the Site B4 boundary. Appropriate fencing and any other boundary features, such as emergency access, would be considered in consultation with Qenos. All gated points would be lockable. Access to Site B4 would be controlled by Vopak at all times with only approved and appropriately inducted personnel allowed access.

6.5.9 Hours of Operation

The Project would operate 24 hours a day, 7 days a week, which is consistent with the existing approved Site B terminal.

\Projects\603441694 - Tech work area\4.5 Graphics\FIGURES\EIS\603441694 F5 Proposed VOPAK Terminal Layout 13 08 2015 TO Rev A

AECOM

PROPOSED VOPAK TERMINAL LAYOUT

Environmental Impact Statement
Vopak Terimnals, Port Botany, New South Wales

FIGURE 5

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7.0 Statutory Planning

7.1 Commonwealth Matters

7.1.1 Environment Protection and Biodiversity Conservation Act 1999

Actions that may significantly affect matters of National Environmental Significance (NES) require assessment and/or approval from the Commonwealth Department of Environment (DoE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act lists nine matters of NES that must be addressed when assessing the environmental impacts of a proposal. Actions likely to impact on matters of NES require approval from the Commonwealth Minister under Part 6 of the EPBC Act.

A Protected Matters Search of NES Matters within a 10km radius of the Site was undertaken to determine what NES features may be present. The results of the search are contained in **Appendix B** and summarised in **Table 5**.

Table 5 Consideration of Matters of National Environmental Significance

***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	
NES Matters	**Comment**
Australia's World Heritage properties	There are no properties currently on the DoE Heritage Register on the Site or adjoining properties.
National Heritage Places	There are no National Heritage Places on the Site or in the study area.
Ramsar wetlands of international importance	There closest wetland of international importance to the Site – the Towra Point Nature Reserve - is around 3 km south-west of the Site. Erosion and sedimentation control works would be undertaken during earthworks to minimise any potential impacts to water quality.
Nationally threatened species and ecological communities	It is unlikely that there would be any impact on Commonwealth-listed threatened species or ecological communities, as the Site does not support any threatened species habitats.
Migratory species listed under the EPBC Act	It is unlikely that there would be any impact on Commonwealth listed migratory species or migratory species protected under international agreements.
Commonwealth marine areas	The Project is not located within or adjacent to a Commonwealth marine area. There would be no direct or indirect impact upon a Commonwealth marine area.
Great Barrier Reef Marine Park	The Project is not located within or adjacent to the Great Barrier Reef Marine Park. There would be no direct or indirect impact upon the Great Barrier Reef Marine Park.
Nuclear actions, including uranium mining	The Project would not involve a nuclear action.
Coal seam gas and/or large coal mining development impacting water resources	The Project does not involve coal seam gas or coal mining.

As shown in **Table 5,** it is anticipated that the Project would not have a significant impact on any of these matters of NES. Accordingly, a referral to the DoE is not necessary.

7.1.2 Airports Act 1996

Part 12 of the *Airports Act 1996* protects the airspace surrounding airports (i.e. prescribed airspace), by deeming intrusions into prescribed airspaces as controlled activities. Approval for such controlled activities can be applied for under the *Airports (Protection of Airspace) Regulations 1996*. The Airports Act and associated Regulations also prohibit the carrying out of other activities on non-Airport land which could otherwise affect the environment of the airport or its operations (e.g. distractive night lighting, offsite migration of pollutants onto Airport land, etc.).

In order to manage projects which have the potential to impact on prescribed airspaces Section 182(1) of the Airports Act defines controlled activities under the act that required approval.

The B4 Site is located around 1.6 km to the east of the closest runway at Sydney Airport, and lies within the area impacted on by Sydney Airport's Obstacle Limitation Surface (OLS) which sits at 51m AHD over Port Botany. While cranes would be required to construct the new tanks their exact crane height is not currently know and would be confirmed by the awarded contractor. If the proposed crane heights extend above the 51m AHD limit above the site, an approval would be required. Vopak would consult with Sydney Airports and gain their approval for cranes operations as necessary.

7.1.3 Civil Aviation Act 1988

The main purpose of the *Civil Aviation Act 1988* is to prevent aviation accidents and incidents. Section 21 of the Act empowers the Civil Aviation Safety Authority to enter premises and test or inspect any installation which it believes to be either actively or passively interfering with the communications to or from aircraft, or communications to or from centres established for air traffic control, or with navigation aids or with surveillance systems. The Project would not involve the commissioning of any infrastructure which would endanger the safety of aircraft in this manner, and as such, no further consideration of the Civil Aviation Act 1988 is required.

The *Civil Aviation (Building Control) Regulations 1988* prohibit the construction of buildings in certain areas, as well as buildings above a certain height in other areas. As the age of the mapping provided in Schedule 5 of the Regulation predates the reclamation of Port Botany the site is not identified as requiring approval under the regulation. Despite this land surrounding Port Botany is identified as requiring approval under the regulation for works 50 feet or greater in height. As this surrounding land is identified as requiring approval for such works, additional consultation would be required with Sydney Airport Corporation Limited prior to any works to confirm is any approvals are required.

7.2 State Matters

7.2.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

Development in NSW is carried out under the EP&A Act. Environmental planning instruments, including State Environmental Planning Policies and Local Environmental Plans, are legal documents enacted under Part 3 of the EP&A Act that regulate land use and development.

Specifically, environmental planning instruments determine the permissibility of the proposed development and the environmental assessment pathway for the proposed development.

Permissibility

As outlined in **Section 6.1**, Vopak is seeking approval for the construction and operation of Petroleum Tank Farm known as Site B4 in Port Botany. The Project includes seven fuel storage tanks with a total capacity of 200 ML. The Project is defined as a port facility in accordance with the provision of the Three Ports SEPP. Under the Three Ports SEPP, the Site is located within the SP1 Special Activities zone in which the proposed land use as a port facility is permissible with consent.

The Project is located in Randwick Local Government Area however the *Randwick Local Environmental Plan 2012* (Randwick LEP 2012) does not apply to the Site by virtue of *State Environmental Planning Policy (Three Ports) 2013* (Three Ports SEPP).

State Significant Development

The Project is situated within the Port Botany Port Lease Area as defined by the Three Ports SEPP. By virtue of clause 27(1) of the Three Ports SEPP the Project is SSD as:

- Pursuant to clause 27(1)(a) would be carried out on land with the Lease Area; and
- Pursuant to clause 27(1)(c):
    - Has a capital investment value of greater than $100million ($116million); and
    - Would otherwise be classified as a Designated Development under Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* due to its classification as a Major Hazard Facility (MHF).

Full discussion in relation to the SRD SEPP in is provided in **Section 7.2.4.**

Section 79C of the EP&A Act also requires the following matters to be taken into consideration by a consent authority in determining a development application under Part 4 of the EP&A Act, as outlined in **Table 6**.

Table 6 EP&A Act Section 79C Matters for Consideration

79C Evaluation under the *Environmental Planning and Assessment Act 1979*	
(1) Matters for consideration - general	
(a) The provisions of: (i) Any environmental planning instrument; and (ii) Any proposed instrument that is or has been the subject of public consultation under the EP&A Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved); (iii) Any development control plan; (iv) Any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F; (v) The regulations (to the extent that they prescribe matters for the purposes of this paragraph); (vi) Any coastal zone management plan (within the meaning of the Coastal Protection Act 1979; that apply to the land to which the development application relates;	**Section 7.2** NA NA NA There are no relevant matters prescribed NA
(b) The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; (c) The suitability of the site for the development; (d) Any submissions made in accordance with this Act or the regulations; (e) The public interest.	**Sections 11.0** to **19.0** **Sections 6.2** and **7.2.4** **Section 9.3** **Sections 24.3** to **24.4**

7.2.2 Environmental Planning and Assessment Regulation 2000

The EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) provide the framework for environmental planning in NSW and include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and provide opportunity for public involvement.

Form and Content of an EIS

This EIS has been prepared pursuant to Schedule 2 of the EP&A Regulation. Specifically clauses 6 and 7 of Schedule 2 provide requirements in relation to the form and content of an EIS. The requirements of clauses 6 and 7 and where they are addressed in this document are outlined in **Table 7** and **Table 8** respectively.

Table 7 EP&A Regulation – Schedule 2, Clause 6

Form of Environmental Impact Statement **An environmental impact statement must contain the following information:**	**Addressed in this EIS**
(a) The name, address and professional qualifications of the person by whom the statement is prepared;	Certification page
(b) The name and address of the responsible person;	Certification page
(c) The address of the land: (i) In respect of which the development application is to be made, or (ii) On which the activity or infrastructure to which the statement relates is to be carried out.	**Section 1.3**
(d) A description of the development, activity or infrastructure to which the statement relates;	**Section 6.1**
(e) An assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which	This table and **Part F**

Form of Environmental Impact Statement An environmental impact statement must contain the following information:	Addressed in this EIS
the statement relates, dealing with the matters referred to in this Schedule;	
(f) A declaration by the person by whom the statement is prepared to the effect that: (i) The statement has been prepared in accordance with this Schedule, (ii) The statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and (iii) That the information contained in the statement is neither false nor misleading.	Certification page

Table 8 EP&A Regulation – Schedule 2, Clause 7

Content of Environmental Impact Statement An environmental impact statement must also include each of the following:	Addressed in this EIS
(1) An Environmental Impact Statement must contain the following: (a) A summary of the environmental impact statement,	Executive Summary
(b) A statement of the objectives of the development, activity or infrastructure,	**Section 4.1**
(c) An analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure,	**Section 5.1**
(d) An analysis of the development, activity or infrastructure, including: (i) A full description of the development, activity or infrastructure, and (ii) A general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and (iii) The likely impact on the environment of the development, activity or infrastructure, and (iv) A full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and (v) A list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,	**Section 6.1** to **6.5** **Part F** **Part F** **Section 23.0** **Section 7.6**
(e) A compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),	**Section 23.0**
(f) The reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).	**Section 24.1**
(2) Subclause (1) is subject to the environmental assessment requirements that relate to the environmental impact statement.	**Section 9.1**
(3) Subclause (1) does not apply if: (a) The Director-General has waived (under clause 3 (9)) the need for an application for environmental assessment requirements in relation to an environmental impact statement in respect of State significant development, and (b) The conditions of that waiver specify that the environmental impact statement must instead comply with requirements set out or referred to in those conditions.	N/A This EIS has been prepared in accordance with Project specific SEAR's.
(4) The principles of ecologically sustainable development are as follows: (a) The ***precautionary principle***, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private	**Section 24.2.1**

Content of Environmental Impact Statement An environmental impact statement must also include each of the following:	Addressed in this EIS
decisions should be guided by: (i) Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and (ii) An assessment of the risk-weighted consequences of various options, (b) ***Inter-generational equity***, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations, (c) ***Conservation of biological diversity and ecological integrity***, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration, (d) ***Improved valuation, pricing and incentive mechanisms***, namely, that environmental factors should be included in the valuation of assets and services, such as: (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement, (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste, (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.	**Section 24.2.2** **Section 24.2.3** **Section 24.2.4**

7.2.3 State Significant Development Application and Assessment Process

Following this consultation with the DP&E, the Secretary's Environmental Assessment Requirements (SEARs) were issued. DP&E consulted with relevant government agencies and stakeholders during the preparation of the SEARs. A copy of the SEARs is attached at **Appendix C**. This EIS has been prepared in accordance with the Project SEARs in support of a SSD application to the Minister for Planning and Environment. The Project has application number SSD 7000.

This EIS has been prepared in accordance with Part 4, Division 4.1 of the EP&A Act and is therefore subject to assessment and determination by the Minister for Planning and Environment (or the Minister's delegate).

7.2.4 State Environmental Planning Polices

The following environmental planning instruments include provisions relating to issues that are relevant to the environmental impact assessment of the Project:

- *State Environmental Planning Policy (Three Ports) 2013;*
- *State Environmental Planning Policy (State and Regional Development) 2011;*
- *State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP);*
- *State Environmental Planning Policy No. 33 — Hazardous and Offensive Development;* and
- *State Environmental Planning Policy No. 55 – Remediation of Land*.

State Environmental Planning Policy (Three Ports) 2013 (Three Ports SEPP)

The Three Ports SEPP provides a consistent approach to the land use planning and management of the development of NSW's three main ports, Port Botany, Port Kembla and the Port of Newcastle. As described in **Section 7.2.1**, the Project is permissible as a port facility under the SP1 Special Activities zoning provided by the Three Ports SEPP.

State Environmental Planning Policy (State and Regional Development) 2011

The SRD SEPP declares that certain development projects or infrastructure is of regional or state significance. As described above, pursuant to Clause 27 of the Three Ports SEPP, the Project is declared to be SSD. Clause

27(2) of the Three Port SEPP indicates that SRD SEPP is to apply to development if declared as SSD. Therefore, the State and Regional Development SEPP applies to the Project.

State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP)

The aim of this Policy is to facilitate the effective delivery of infrastructure across the State. Schedule 3 lists development which requires referral to the Roads and Maritime Service (RMS) including:

> *Transport terminals, bulk stores, container depots or liquid fuel depots with a capacity of 8,000m^2 with site access to any road.*

Under section 104 Infrastructure SEPP, the Minister is required to forward the SSD application to the RMS for comment before making a determination.

A Project specific Traffic Impact Assessment (TIA) has been prepared to assess potential impacts of the Project. This TIA concluded the Project would not have a significant impact on the operation of the road network. Details are provided in **Section 12.0**.

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

SEPP 33 was designed to ensure that sufficient information is provided to consent authorities to examine potential land use safety risks associated with a potentially hazardous industry/ storage establishment. Any development application for a potentially hazardous development must be supported by a Preliminary Hazard Analysis (PHA).

The PHA presented in **Section 11.0**, shows that the Hazardous Industry Planning Advisory Papers No.4 criteria are met for the Project and that the cumulative risk from Site B plus the Project does not have a significant effect on the risk contour presented in the Port Botany Land Use safety Study (1996).

State Environmental Planning Policy 55 – Remediation of Land (SEPP 55)

SEPP 55 promotes the remediation of contaminated land to reduce the risk of harm to human health or other environmental systems. Clause 7 of SEPP 55 requires a consent authority to consider whether the land the subject of a development application is contaminated and whether it is suitable (or can be made suitable) for the proposed development (with or without remediation). As detailed in **Section 15.0**, a recent contamination assessment was undertaken which concluded that the Site is suitable for commercial and industrial development. This contamination assessment was reviewed and endorsed by an EPA accredited Site Auditor.

7.2.5 Other Acts

Approvals / Legislation that does not apply

Under section 89J of the EP&A Act, certain separate environmental approvals are not required for SSD. These approvals are listed in **Table 9**. Although these separate approvals are not required for the Project, an equivalent level of assessment has nonetheless been conducted and presented in the EIS.

Table 9 Legislation that does not apply

Act	Comment
Coastal Protection Act 1979	The Project would not significantly impact on coastal areas or the ecological or social qualities of other significant aspects of the area.
Fisheries Management act 1994	No works are proposed that would require a permit under the *Fisheries Management Act 1994*.
Heritage Act 1977	No historic items listed under the *Heritage Act 1977* would be impacted by the Project. Refer **Section 19.3**
National Parks and Wildlife Act 1974	No indigenous heritage items would be impacted by the Project. Refer **Section 19.3** No National Parks or estates would be impacted by the Project.
Native Vegetation Act 2003	The Project is located within an urban area as defined by Part 3, Schedule 1 of the *Native Vegetation Act 2003*, therefore this legislation does not apply to the Project. Regardless the Site does not contain any native vegetation.
Rural Fires Act 1997	The Project is not situated within bushfire prone land therefore the *Rural Fire Act 1997* does not apply to the Project.
Water Management Act 2000	Existing Port Botany and Vopak groundwater monitoring bores would be used for the Project. Additional perimeter bores are also likely to be required under the new EPL for

Act	Comment
	the Site. However, there is a general exemption for water monitoring bores constructed in accordance with the *Minimum Construction Requirements for Water Bores in Australia* that are required by a condition of an EPL under the *Protection of the Environment Operations Act 1997*. Therefore, additional licencing under the *Water Management Act 2000* is unlikely to be required where EPL monitoring bores are constructed in accordance with the *Minimum Construction Requirements for Water Bores in Australia*. Nevertheless, Vopak would consult with the NSW Office of Water to confirm no interim approvals, for instance, are required under the *Water Management Act 2000* before this EPL monitoring program is underway.

Approvals / Legislation that must be applied consistently

Under section 89K of the EP&A Act, certain approvals as required by the legislation must be applied consistently to SSD as it would if it was not State Significant but otherwise assessed under Part 4 of the EP&A Act. This legislation is listed in **Table 10**.

Table 10 Legislation that must be applied consistently

Act	Comment
Fisheries Management Act 1994	Not applicable. No aquaculture permit is required by the Project.
Mine Subsidence Compensation Act 1961	Not applicable. The Site is not located within a mine subsidence area.
Mining Act 1992	Not applicable. The Project does not constitute mining as defined by the *Mining Act 1992.*
Petroleum (Onshore) Act 1991	Not applicable. No onshore petroleum lease would be required as part of the Project.
Protection of the Environment Operations Act 1997	The *Protection of the Environment Operations Act 1997* (POEO Act) prohibits any person from causing pollution of waters or air, and provides penalties for pollution offences relating to water, air and noise. Operations at Vopak's decommissioned Site A were authorised under EPL 6581. Site B operates under EPL 6007. EPL 6581 facilitated Site A's operations as a chemical storage and waste storage facility as defined by Sections 9 and 42, Schedule 1 of the Act. EPL 6007 facilitates Site B's operations as a chemical storage and bulk shipping facility as defined by Sections 9 and 37. To operate under licence, the Project would therefore require the issuing of a new EPL under the POEO Act. An application to obtain a new stand-alone EPL to facilitate the Project would be obtained from the EPA prior to construction works commencing for the scheduled activity.
Roads Act 1993	Not applicable. The Project does not require works that would need consent under section 138 of the Roads Act 1993.
Pipelines Act 1967	Not applicable. No pipelines are proposed as part of the Project that would require licencing under the *Pipelines Act 1967*.

7.3 Strategic Policy Initiatives

7.3.1 NSW 2021: A Plan to Make NSW Number One

NSW 2021: A Plan to Make NSW Number One (The Plan) was prepared by the NSW Government in 2011 to provide a 10-year plan that includes goals and targets aimed at improving the competitiveness of the NSW economy and the liveability of the State for the NSW community. The Plan replaced the document known as the State Plan.

The Plan has at its core 32 goals under each of which there are several targets which are aimed at meeting that goal. The Project provides support, particularly for economic goals as detailed in **Table 11**.

Table 11 NSW 2012 Goals Relevant to the Project

Goal	Comment
Goal 4 – Increasing the competitiveness of doing business in NSW.	NSW's fuel demand was historically met by two Sydney-based refineries. With the cessation of fuel refining in NSW, there is an increased demand for imported refined fuel products. As a result, the fuel market in NSW is increasingly competitive. Vopak's existing Port Botany infrastructure allows it access to fuel products from around the world. The Project would allow existing Vopak customers to improve their competitiveness as larger vessels would be able to unload larger volumes in one berthing. This would facilitate new customers entering the refined fuels market, allowing for a more competitive fuel market.
Goal 5 – Place downward pressure on the cost of living	The Project would contribute to the security of fuel supply in the greater Sydney area and NSW generally. Security of fuel supply may have a stabilising effect on this substantial living cost.
Goal 19 – Invest in critical infrastructure	Population and GDP growth lead to a natural increase in market demand for refined fuels. Since the cessation of fuel refining in NSW, there is likewise an increased demand for refined fuel products storage to meet the needs of NSW consumers. The Project would add to the critical infrastructure, which is needed to meet these growing demands.
Goal 22 – Protect our natural environment	By utilising an existing industrial site as the Project location, the Project avoids the need to disturb a parcel of land in a more environmentally sensitive locale of Port Botany or Sydney Harbour. The Project avoids this level of environmental impact whilst at the same time meeting increased demand for refined fuel products.

7.3.2 Eastern Sydney and Inner West Regional Action Plan

The NSW Government has produced the *Eastern Sydney and Inner West Regional Action Plan* (Regional Action Plan) which applies to the local government areas of Ashfield, City of Botany Bay, Burwood, Canada Bay, Canterbury, City of Sydney, Leichhardt, Marrickville, Randwick, Strathfield, Waverley and Woollahra (Department of Premier and Cabinet, 2012). The NSW Government's vision for Eastern Sydney and the Inner West is a region which:

- Is well connected with efficient transport;
- Provides more housing options;
- Is globally competitive;
- Is more liveable and safer; and
- Supports vulnerable members of the community.

The Regional Action Plan facilitates the implementation of The Plan (refer **Section 7.3.1**) in the Eastern and Inner West parts of Sydney (Department of Premier and Cabinet, 2012). The key methods of implementing The Plan via the Regional Action Plan include:

- *Rebuild the economy*;
- *Return quality services*;
- *Renovate infrastructure*; and
- *Protect our local environment and community*.

The Eastern Sydney and Inner West region is famous for its natural and built features, and is a critical financial and commercial hub. It incorporates the Global Economic Corridor (from Macquarie Park to Northern Sydney, the City and Sydney Airport). Port Botany, Australia's second largest container port and Sydney Airport, Australia's largest airport, are key transport infrastructure in this global economic link. As one of the State's major centres for economic activity, the Eastern and Inner West region has a high demand for fuels and this demand continues to increase (Department of Premier and Cabinet, 2012).

The Project would help secure the availability of refined fuel supplies for the region as well as providing economic and employment benefits consistent with the objectives of the Regional Action Plan.

7.3.3 A Plan for Growing Sydney

The importance of Port Botany for the Sydney Region was further ratified in *A Plan for Growing Sydney* (Planning and Environment, 2014) which identifies Port Botany as being one of the economic drivers for the South subregion. To implement the directions in *A Plan for Growing Sydney,* the following priorities have been outlined for Port Botany and its role as one of Sydney's Transport Gateways:

- Identify and protect strategically important industrial zoned land in and near Port Botany Precinct;
- Protect Port Botany's function as an international gateway for freight and support port-related land uses and infrastructure in the area around the port;
- Facilitate good employment and transport connections and an efficient freight network to Sydney Airport and Port Botany; and
- Investigate pinch-points associated with growth in the vicinity of Sydney Airport and Port Botany.

The Project is consistent with these priorities as it would:

- Capitalise on existing industrial zoned land with minimal additional environmental impact;
- Make efficient use of existing port infrastructure by providing storage space for increased freight (refined fuels); and
- Despite construction employment potentially peaking at 100 workers per day, on average across the3 construction period it is expected that approximately 50 equivalent full-time or jobs during construction.

7.4 Local Matters

7.4.1 Randwick City Local Environmental Plan

The Site is located within the Randwick City LGA where the relevant local Environmental Planning Instrument (EPI) is the Randwick LEP 2012. However, as the Site is identified as being within the boundaries of the Port Botany Port Lease Area and falls under the provisions of the Three Ports SEPP, the provisions of the LEP 2012 do not apply to the Site.

7.4.2 Randwick Development Control Plan

As described in **Section 7.2.4**, SSD's and also land within Three Ports SEPP are excluded from the applications of DCPs. Therefore no further consideration of the Randwick DCP is required.

7.5 Port Botany Development Codes

Port Botany Development Code

The Port Botany Development Code was prepared by NSW Ports to provide an overarching strategic framework to manage the development of the port and related infrastructure in a safe, secure and environmentally responsible manner. The Port Botany Development Code aims to:

- Facilitate the future development of Port Botany in an efficient manner;
- Minimise the impacts of activities at Port Botany on the surrounding environment and community;
- Ensure the ongoing security of Port Botany;
- Minimise risks associated with both construction and operations at Port Botany; and
- Enhance the visual amenity of Port Botany through a consistent and coordinated approach to development.

A review of the Port Botany Development Code was undertaken by Vopak to demonstrate the Project's consistency with Code. A copy of this consistency review is attached at **Appendix D.**

NSW Ports Green Port Guidelines

The Green Port Guidelines have been prepared by NSW Ports to encourage developers in incorporate strategies into developments, which reduce resource consumption, energy use and waste generation while providing improved environmental outcomes through reduced emissions to the environment.

As a requirement when submitting project applications proponents are required to provide a completed Green Port Guidelines checklist to demonstrate how the Project meets the aims and objectives of the guidelines. A copy of this table is attached at **Appendix D.**

7.6 Licencing and Other Approvals

To operate under licence, the Site would require the issuing of a new EPL under the POEO Act (refer **Table 10** for more detail). The Site would also require authorisations from WorkCover under the *Work Health and Safety Act 2011* and *Work Health and Safety Regulations 2011* such as the following:

- WorkCover approval for the Friendship Road pipelines/culverts; and
- Notification to WorkCover prior to Dangerous Goods being onsite.

8.0 Environmental Commitment

8.1 Environmental Policy Statement

Sustainability is at the core of Vopak's strategy of growth leadership, operational leadership and customer leadership. To embed sustainability across its operation it has defined values, standards, procedures and a Code of Conduct under which the company operates. The sustainability policy has been established around four main themes that underpin our social, environmental and economic efforts as shown in **Table 12.**

Table 12 Vopak Sustainability Strategy

Health and Safety	Environmental Care	Responsible Partner	Excellent People
- Occupational health and safety management - Reduction of energy consumption	- Reduction of energy consumption - Prevention of spills - Prevention of soil contamination - Prevention of water contamination - Prevention of stench and odours	- Customer relationship management - Corporate governance - Local community engagement - Risk and crisis management	- Talent attraction and retention (including training)

In relation to environmental care, Vopak's overarching objectives are to be energy and water efficient and to reduce emissions and waste. In pursuing these objectives, Vopak's aims to comply with guidelines as set out in operating licenses, legislation and its own global standards. Care for the environment is an integrated part of Vopak's corporate 'License to Operate', which means that Vopak aims to minimise its impact on its surroundings and areas of biodiversity. This includes energy consumption, emissions, treatment of contaminated water, use of the surface area, and care for areas of high biodiversity.

In order to track its sustainability, Vopak records and measures its performance against its environmental objectives. Vopak commenced publishing sustainability reports in 2009. Vopak follows the GRI (Global Reporting Initiative) G4 Sustainability Reporting Guidelines. Annual Reports are available on Vopak's website: https://www.vopak.com/sustainability

8.2 Environmental Management Program

8.2.1 Operational Environmental Management Plan

Vopak currently operates its existing facilities at Port Botany in accordance with its Site B Operational Environmental Management Plan (OEMP). The existing OEMP includes a range of measures aimed at mitigating and managing potential impacts to the environment and community in relation to the following key areas:

- Air Quality;
- Stormwater and surface water;
- Groundwater and soils;
- Waste; and
- Traffic.

The OEMP was developed in consultation with a range of stakeholders including relevant government agencies and NSW Ports. Vopak would amend and update its OEMP to accommodate the changes required by the Project to minimise impacts to the environment and community, including but not limited to including noise management measures. This update would also be undertaken in further consultation with the appropriate agency stakeholders and incorporate the relevant outcomes and recommendations from the environmental assessment contained in this EIS.

All revisions/updates of the OEMP and sub-management plans are the responsibility of the Vopak National Safety Health, Environment, Quality & Sustainability Manager.

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Part E – Issues Identification

This Part identifies the stakeholder consultation that was undertaken during the project planning and environmental assessment and how this consultation was used to identify the key matters for consideration in this EIS.

9.0 Stakeholder Engagement

9.1 Consultation with Department of Planning and Environment

Representatives of Vopak met with representatives of DP&E, the EPA and other agencies on 2 April 2015 to undertake a Planning Focus Meeting for the Project. Following that meeting, Vopak submitted a Preliminary Environment Assessment (PEA) (Vopak, April 2015) and a request for Project SEARs.

In preparing this EIS, the SEARs have been addressed as required by section 89G of the EP&A Act. Each of the matters raised by the Secretary-General for consideration in the EIS is outlined in **Table 13**, together with the relevant sections of the EIS where each matter is addressed.

Table 13 Secretary's Environmental Assessment Requirements

Matter	Section of EIS
General Requirements	
The EIS must include: - The minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000; and Notwithstanding the key issues specified below, the EIS must include: - A description of the proposed development, including: • need for the proposed development; • justification for the proposed development; • likely scope and sequence or stage/s of the development during construction, and operation; • likely interactions between the development and other existing, approved and proposed port and industrial operations in the vicinity of the site; and • plans of any proposed building works; - Consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments; - A risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment; - A detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: • A description of the existing environment, using sufficient baseline data; • An assessment of the potential impacts of all stages of the proposed development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and • A description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the proposed development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment; and - A consolidated summary of all the proposed environmental mitigation, management and monitoring measures, highlighting commitments included in the EIS; - The EIS must also be accompanied by a report from a qualified quantity surveyor providing: - A detailed calculation of the capital investment value (as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000) of the proposal, including details of all assumptions and components from which the CIV calculation is derived;	**Section 7.2.2** **Section 4.2** **Section 0** **Section 10.0** **Part F** **Section 23.0**

Matter	Section of EIS
- A close estimate of the jobs that would be created by the development during the construction and operational phases of the proposed development; and - Certification that the information provided is accurate at the date of preparation.	
Strategic Context	
- Justification for the proposed development and suitability of the site; and - Demonstration that the proposed development is generally consistent with all relevant planning strategies and environmental planning instruments, and justification for any inconsistencies.	**Section 6.2** **Section 0**
Hazards and Risks	
- Identify the hazards associated with the proposed development, as well as any external hazards, to determine the potential for off-site impacts; - Estimate the risks from the existing Vopak Terminal Site 8 operations and the proposed development; - Include proposed safeguards to ensure risks are minimised; - Demonstrate that the site is suitable for its purpose. The PHA should estimate the risks posed by neighbouring facilities, including domino effects, and demonstrate that these risks are acceptable; - Address all relevant recommendations arising from the Buncefield accident; - Demonstrate that the proposed development complies with the risk criteria set out in Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning; and - Demonstrate that the proposed development would comply with all relevant recommendations of the Department's Port Botany Land Use Safety Study (1996).	**Section 11.0**
Traffic and Access	
- Accurate predictions of the traffic volumes likely to be; generated during construction and operation; - A detailed traffic impact study of the proposed development; - Traffic management arrangements for the pipeline construction; works on Friendship Road; and - Proposed car parking and access arrangements for the proposed development.	**Section 12.0**
Soil and Water	
- A detailed assessment of potential soil, surface, flooding; and groundwater impacts; - Soil and groundwater contamination arising from previous uses on the site and any proposed management measures; - Description of the water demands and a breakdown of water; supplies; - Description of proposed erosion and sediment controls during construction and operation; and - Description of the surface and stormwater management; and System, including on-site detention, and measures to use and reuse water.	**Section 15.0**
Air Quality	
- A quantitative assessment of the air quality and odour impacts; of the proposed development on surrounding receivers; and - Details of mitigation, management and monitoring measures; for preventing and/or minimising emissions.	**Section 13.0**
Noise and Vibration	
- A quantitative assessment of construction and operation noise; (including road traffic noise) and vibration impacts to surrounding receivers from on-site activities in accordance with the relevant EPA Guidelines.	**Section 14.0**

Matter	Section of EIS
Waste Management	
- Details of all the quantities and classification of all waste; - Streams to be generated on site; - Details of waste storage, handling and disposal; and - Details of measures that would be implemented for treatment and disposal in accordance with the relevant guidelines.	**Section 16.0**
Greenhouse Gas	
- An assessment of the potential greenhouse gas emissions of the proposed development.	**Section 17.0**
Visual Amenity	
- An assessment of the potential visual impacts of the proposed development on the amenity of the surrounding area.	**Section 18.0**
Cumulative Impacts	
- The existing on-site operations, all existing industrial facilities in the area and other nearby approved and proposed developments, particularly in relation to traffic, air and noise.	**Section 20.0**
Plans and Documents	
The EIS must include all relevant plans, architectural .drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. These documents should be included as part of the EIS rather than as separate documents.	**Figures 1 - 8**
Consultation	
During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: - Randwick City Council; - Environment Protection Authority ; - Roads and Maritime Services; - Office of Environment and Heritage; - NSW Fire and Rescue; - WorkCover ; - NSW Ports; - NSW Department of Primary Industries; and - the local community and stakeholders.	**Section 9.2** **Section 9.3**

9.2 Agency Consultation

As required by the SEARs consultation with a number of agencies was undertaken during the preparation of the EIS. A number of these agencies, notably NSW Ports, the EPA and WorkCover NSW have been in ongoing discussions with Vopak regarding the Project. The outcomes of this consultation are detailed in **Table 14**.

Table 14 Agency Consultation Summary

Agency / Comment	Response / Section of EIS
Randwick City Council	
No response received	NA
Environment Protection Authority	
No response received	NA
Roads and Maritime Services	
No response received	NA

Agency / Comment	Response / Section of EIS
Office of Environment and Heritage	
No response received	NA
NSW Fire and Rescue	
No response received	NA
WorkCover	
The Site is an MHF and a whole of site safety case has been submitted to WorkCover as an addition to Vopak's existing Site B. Vopak will need to revise the current safety case for Site A after the Project is approved, and submit the same to WorkCover. Quantitative hazard and risk assessment undertaken as part of the EIS should: - Include both onsite and offsite cumulative risk; - Detail how the Project will comply with requirements of *Work Health and Safety Act 2011* and *Work Health and Safety Regulations 2011*; - Detail how the Project will comply with the requirements of Chapter 9 MHF's, how the risks related to hazards and safety will be minimised so far as is reasonably practicable; and - Include a clear statement on the risk criteria adopted for the Project and the basis for adopting such criteria. On this point it is recommended that reference is made to the relevant publications by the UK health and safety executive (SHE) and the Australian National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).	**Section 11.2.6** **Section 11.3** **Section 11.3** **Section 11.2.1**
NSW Ports	
Meeting held between Vopak and NSW Ports on 11 February 2015. The following environmental assessment matters were raised for consideration by Vopak in this EIS: - An assessment of all construction works that would be undertaken including construction staging and likely impacts; - An assessment of any construction and operational impacts as required and how the Project would be managed to mitigate any impacts on the environment, including in relation to noise, vibration, risk management, and spill management; - A traffic impact assessment should be prepared which includes: • An assessment of traffic impacts from the construction of the Project including numbers of vehicles required during construction (i.e. maximum vehicle numbers/movements per day and hour) and management measures, particularly during Stage 2; • An assessment of traffic impacts from the operation of the Project (or reference to where the associated truck movements are otherwise approved); • Assessment of the likely impact of construction on public roads including at the intersection of Friendship and Simblist Roads; and • Details of access and egress points including the types of vehicles which would access the Site during construction and operations. Details of onsite parking areas are also to be identified. - The EIS is to include a Preliminary Hazard Assessment, including a risk assessment prepared in accordance with the *Port Botany Land Use Safety Study* including demonstrating that the Project: • Would not contribute to any increase in cumulative risk as shown in Figure 2 of the Overview Report; • Would not result in any propagation of risks to neighbouring facilities; • Would not result in a significant increase in the number of people (including both construction and operational staff) exposed to risk inside the residential contour as shown in Figure 2 of the Overview Report; and	**Section 6.4, Table 3** and **Part F** **Section 6.4, Table 3** and **Part F** **Section 12.2**and **Appendix G** **Section 12.2**and **Appendix G** **Section 12.2**and **Appendix G** **Figure 5**, **Sections 6.4.3** and **12.2** **Section 11.0** and **Appendix F** **Section 11.2.6** **Section 11.2.5** **Appendix F**

Agency / Comment	Response / Section of EIS
• Would identify and implement risk reduction and safety management measures as required.	**Sections 11.2.2** and **11.3**
- An assessment of any other relevant construction and operational impacts, including any temporary operational impacts while construction works are being undertaken;	**Section 6.4.7**
- An assessment of impacts on Sydney Airport operations such as lighting and cranes that might be required for construction works;	**Section 7.1.2**
- Any cumulative impacts with approved developments in proximity to the Site;	**Section 20.0** **Section 6.4.7**
- An assessment of any potential temporary uses on the undeveloped part of the Site prior to Stage 2;	
- The *Environmental Planning and Assessment Act 1979* (including an assessment against Section 79C in accordance with Section 89H of Division 4.1);	**Table 6**
- The *Airports Act 1996* (specifically Section 182 and 183 of Division 4 – Protection of Prescribed Airspace);	**Section 7.1.2**
- *Airports (Protection of Airspace) Regulations 1996* (to determine if the proposed development, including construction activities, is a 'controlled activity' and any necessary approvals/referrals required in regards to lighting;	**Section 7.1.2**
- *Civil Aviation Act 1988 and Civil Aviation (Building Control) Regulations 1988*;	**Section 7.1.3**
- *CASA Manual of Standards* Part 139 – Aerodromes (specifically Section 9.21 – Lighting in the Vicinity of Aerodromes);	**Section 6.5.7**
- *Protection of the Environment Operations Act 1997;*	**Table 11**
- *State Environmental Planning Policy (Three Ports) 2013*;	**Sections 7.2.1** and **7.2.4**
- *State Environmental Planning Policy (State and Regional Development) 2011*;	**Section 7.2.4**
- *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)*;	**Section 7.2.4**
- *State Environmental Planning Policy No. 55 (Remediation of Land)*;	**Section 7.2.4**
- *Port Botany Land Use Safety Study Overview Report 1996*; and	**Section 11.2.6** and **Appendix F**
- SPC's *Port Botany Development Code October 2013* (including Green Port Checklist).	**Section 7.5**
Vopak to provide the EIS to NSW Ports for review prior to lodgement with DP&E for approval.	This consultation was finalised in July 2015.
NSW Department of Primary Industries	
No response received	NA

Consultation responses that were received from agencies are attached at **Appendix E**.

9.3 Community Consultation

As described in **Section 1.6.3**, this EIS would be placed on public exhibition during which time the community would have the opportunity to review the Project documentation and make formal submission to DP&E regarding the Project.

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10.0 Identification of Key Environmental Issues

10.1 Approach to Identification of Key Environmental Issues

An initial screening of potential issues for consideration in the EIS was undertaken as part of the environmental assessment process. The initial screening process has been re-evaluated in this EIS to include additional information regarding the key environmental and social issues associated with the Project, and to also include additional issues of concern that have been identified as part of the EIS and associated stakeholder consultation process.

The risk screening process has determined the likely level of assessment required to adequately and appropriately address each issue identified. The risk screening considered the significance of each potential environmental impact, and also the likely level of stakeholder interest in each issue. Including stakeholder perception of potential environmental impacts is an important part of determining the level of assessment that should be applied, given that key stakeholder concerns may not necessarily align with a purely technical analysis of environmental risks.

The overall environmental assessment significance was determined by selecting the highest result from both the environmental assessment screening process and the expected stakeholder interest. The overall environmental assessment score enabled the determination of the sensitivity of each issue for the Project, and whether a detailed specialist investigation or desktop analysis would be appropriate. Where a high level of stakeholder interest is expected, a potential environmental impact has been determined to be a key issue requiring a detailed assessment irrespective of the outcomes of environmental risk screening.

10.1.1 Environmental Risk Screening

The preliminary environmental risk screening for the Project was undertaken using an ordinal (comparative measurement) scale to consider the likelihood of an environmental impact occurring and the consequence of that impact should it not be mitigated. The likelihood and consequence of each impact have been combined through the significance screening matrix (refer to **Table 15**) to establish the likely significance of the issue for the environmental assessment of the Project.

Table 15 Significance Screening Matrix

Likelihood of Effect	**Consequence of Unmitigated Effect**		
	Minor	Moderate	Major
Improbable	Very Low	Low	Medium
Possible	Low	Medium	High
Probable	Medium	High	Very High

The allocation of risk is based upon the following considerations:

Likelihood of effect

1) Improbable: imperceptible or short term cumulative impacts;

2) Possible: modest or medium term cumulative impacts; and

3) Probable: serious or long term cumulative impacts.

Consequences of unmitigated effect

1) Minor: minor environmental change;

2) Moderate: moderate adverse environmental change; and

3) Major: important adverse environmental change.

The ranking of issues aims to prioritise the issues for assessment and does not consider the application of mitigation measures to manage the environmental effects. In all cases, appropriate and proven mitigation measures would be used to minimise potential impacts. These mitigation measures are summarised in **Section 23.0** of this EIS.

10.1.2 Review of Expected Stakeholder Interest

The expected level of stakeholder interest in each potential environmental issue identified has been considered, based on a broad review of key issues raised in meetings that have occurred between Vopak and local stakeholders (refer **Section 9.0**). Potential environmental impacts have been assigned an expected level of stakeholder interest as shown in **Table 16**.

Table 16 Screening Levels – Expected Stakeholder Interest

Level of Interest	Environmental Aspects
High level of interest	Hazards and risk Traffic and transport Air quality Noise
Medium level of interest	Visual amenity Greenhouse gas Soil and water Waste Social and economic
Low level of interest	Heritage Ecology

10.2 Issues Prioritisation

This environmental risk analysis prioritises environmental issues in the absence of appropriate safeguard measures to manage environmental effects. This analysis was then used to inform the environmental assessment and the engineering and environmental design of the Project and in the identification of appropriate safeguards. The prioritisation of environmental issues related to the Project is provided in **Table 17**.

Table 17 Prioritisation of Environmental Issues

Issue	Likelihood	Consequence	Priority
Hazard and Risk	2	3	High
Traffic	2	2	Medium
Air Quality	2	2	Medium
Noise and Vibration	2	2	Medium
Soils and Water	1	2	Low
Waste Management	1	2	Low
Greenhouse Gas	1	1	Low
Visual Amenity	2	1	Low
Social and Economic	1	2	Low
Ecology	1	1	Low
Heritage	1	1	Low

In summary, the environmental risks ranked as the highest priority for the Project include hazard and risk, traffic, air quality and noise and vibration. Technical specialist studies have been undertaken to assess the potential impacts associated with these key issues. An assessment of these issues based on a summary of technical specialist findings is provided in **Part F**.

Other environmental considerations, ranked as a low risk have also been assessed but to a lesser degree of scrutiny.

Based on this risk ranking process and the impact assessments carried out for the EIS, a number of reasonable and feasible mitigation measures have been identified for the Project to minimise identified risks. Mitigation measures developed during the assessment process are presented in detail in **Part F** and summarised in **Section 23.0**. A residual risk assessment was undertaken to assess the significance of environmental effects of the Project after the application of mitigation measures to manage those effects. The results of the residual risk assessment are provided in **Section 21.0**.

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Part F – Environmental Impact Assessment

This Part details the environmental assessment that has been undertaken for the Project by describing the site's existing environmental conditions, the methodologies of the assessment undertaken, potential impacts of the Project identified by these assessments, and measures recommended to minimise these impacts.

11.0 Hazards and Risk

A Preliminary Hazard Assessment (PHA) for the Project was prepared by Sherpa Consulting and is provided in **Appendix F**. The PHA covers the cumulative risk of the projected future operation (mid Case 2030) as per the Site B modification application as well as the Project (i.e. both stages B4A and B4B).

11.1 Existing Environment

Vopak's existing Site B is a Major Hazard Facility (MHF), with the first Safety Case prepared in 2012. The site was initially developed in 1995 and has expanded in stages, with the last major expansion project completed in 2010. Quantitative Risk Assessment studies (QRAs) have been prepared for the various expansions on the site.

Vopak is proposing to provide additional storage capacity at port Botany by utilising the recently vacated area of the Qenos site to provide satellite storage of up to 200 ML for their Site B operations. The additional storage would accommodate the anticipated growth in future fuel demand in the Region.

The Project on the former Qenos land would be split into 2 development stages, Stage 1 (B4A) with a total diesel or other combustibles storage capacity of 105,000 m^3, and Stage 2 (B4B) for all fuel products (flammable and combustible) including gasoline with 91,000 m^3.

The Vopak Site B terminal is located at 20 Friendship Road and 1-9 Friendship Road, Port Botany and is contained within the Port Botany Ports Precinct. The Site is located in the same precinct as the nearby Major Hazard Facilities (MHF) operated by Elgas, Qenos and Origin.

The Site location is across Friendship Rd from Site B on land recently relinquished by Qenos. An aerial photo showing the location of the Site B and the Project is provided in **Figure 2**.

The surrounding area is primarily characterised by industrial activity neighbours. There are no significant commercial spaces, no retail centres or similar developments that routinely have a large number of people occupying them (e.g. commercial office space, retail centres). There is a café at the Australian Container Freight Services site, however this services personnel associated with the operation of Port Botany, such as drivers and other operators, and does not attract large numbers of the general public. The nearest residential area is located at Phillip Bay approximately 1400 metres to the east of the site across Yarra Bay. Other residential areas, slightly further away (~2 kilometres), are Matraville/Chifley to the north-east, Little Bay to the east, La Perouse to the south-east and Botany to the north-west. Botany cemetery is located 800 metres to the east.

11.2 Potential Impacts

The PHA was carried out in accordance with the *Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 Guidelines for Hazard Analysis* (NSW Department of Planning 2011). It covered hydrocarbon loss of containment scenarios for operations within the Project boundary as follows:

- Storage tanks, manifolds, pumps, piping within the B4 area and piping in a future culvert connecting Site B to B4.

Note that all road tanker loading and pipeline import / export activities are associated with Site B and are covered in the hazard analysis for the Site B modification application.

The PHA was undertaken in the form of a Quantitative Risk Assessment (QRA) and included fully quantified consequence and frequency analyses. Hazard identification is the process of establishing the scenarios that could result in an adverse impact, together with their causes, consequences and existing safeguards. The main aims are to:

- Show an understanding of the underlying causes of the hazards;
- Demonstrate that there are adequate safeguards in place; and
- Identify the hazards that have the potential for offsite impact.

As part of the hazard identification process, the following were reviewed:

1) The properties of petroleum products and their hazards; and

2) Major Accident Risk Register for Site B (Appendix M of the 2012 Safety Case).

A hazard identification table was developed to list all potentially hazardous scenarios and identify the ones with the potential for offsite impact requiring quantification. The majority of hazardous scenarios involve loss of containment of hydrocarbons from equipment.

Consequence modelling of identified scenarios was undertaken using commercially available software TNO Effects to determine the impact area (as heat radiation or area within a flammable cloud) and the resulting extent of injury or fatality effects.

Figure 6 shows the general event tree showing the possible outcomes following loss of containment of a flammable or combustible liquid.

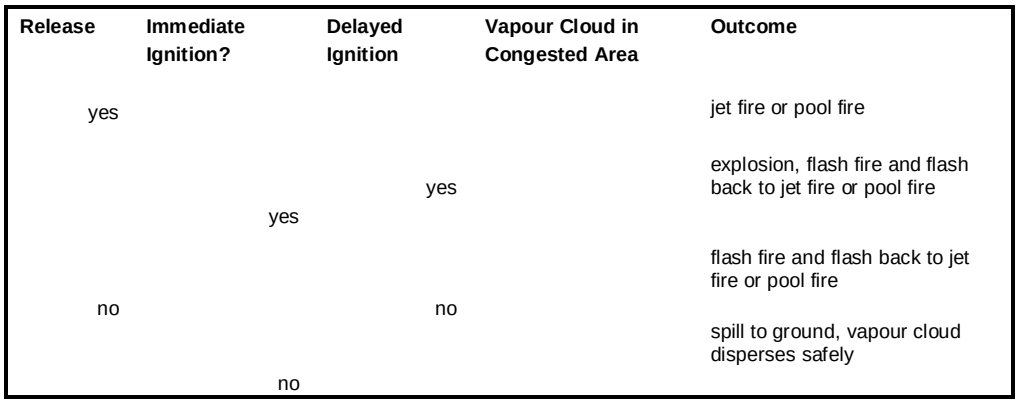

Figure 6 Event Tree for Loss of Containment

Based on the above the following scenarios were considered as part of the PHA were:

- Tank top fires;
- Spray fires (pumped liquid systems);
- Bund or other pool fires; and
- Flashfires resulting from large overfills of gasoline from storage tanks (“the Buncefield scenario”).

Ongoing, routine maintenance tasks such as inspections, pump replacements and tank inspections would also be undertaken at the B4 Site during the operation of the Project. As such activities are dealt with by Vopak’s Management of Change process and have minimal effect on offsite risk, such activities can be considered to have been sufficiently covered off within the scope of the PHA.

11.2.1 Risk Assessment Criteria

Table 18 summarises the risk criteria against which the hazards from the Project were assessed and where relevant where and what land uses the criteria apply. These criteria are consistent with the *HIPAP 4 Risk Criteria for Land Use Planning*. Additionally, the risk contours generated for the cumulative Site B (mid 2030 case) and proposed Project (B4 facility) were also compared against the Port Botany Land Use Safety Study (NSW Department of Planning (1996).

Table 18 Risk Assessment Criteria

Description and Land Use	Criteria (per year)
Individual fatality risk	
Hospitals, child-care facilities and old age housing (sensitive land uses).	5×10^{-7}
Residential developments and places of continuous occupancy such as hotels and tourist resorts (residential land use).	1×10^{-6}
Commercial developments, including offices, retail centres and entertainment centres (commercial land use).	5×10^{-6}
Sporting complexes and active open space areas (recreational land use).	1×10^{-5}
Target for site boundary (boundary limit).	5×10^{-5}
Injury risk – heat radiation exceeding 4.7 kW/m^2	
Residential and sensitive use.	5×10^{-5}
Injury risk – explosion overpressure exceeding 7 kPa.	
Residential and sensitive use.	5×10^{-5}
Risk of property damage and accident propagation – 23 kW/m^2 heat flux	
Neighbouring potentially hazardous installations or at land zoned to accommodate such installations.	5×10^{-5}
Risk of property damage and accident propagation – 14 kPa explosion overpressure	
Neighbouring potentially hazardous installations, at land zoned to accommodate such installations or at nearest public buildings.	5×10^{-5}
Notes: 1. Criteria specific to toxic injury and irritation are also provided in HIPAP4. These are not included as there are no significant acute toxicity impacts from Site B operations.	

11.2.2 Effects of Safeguards

Appendix E of the PHA (**Appendix F**) describes how safeguards have been accounted for in the QRA. In summary:

- The frequencies of tank overfill take into account failure of the independent high level shutdown (SIL 2 equivalent failure rate), which initiates Terminal emergency shutdown. This is applied to Site B as it is currently installed, and also the proposed B4 area which would have similar high level shutdown arrangements;
- Operator initiated emergency shutdown for loss of containment has been assumed to occur at:
  - BLB1/BLB2 (maximum event contained within wharf bunded area) – relevant to Site B only;
  - Road tanker gantries (maximum event contained within gantry area - relevant to Site B only; and
  - Tank overfill during ship import (i.e. additional to the high level shutdown). – Site B and B4.
- For Site B, activation by operator (10% probability of failure assumed) of the tank top foam pourers has been included on detection of a rim seal fire to prevent progression to a full surface tank top fire. Other types of fire protection have not been explicitly included as safeguard since these are after-event mitigation rather than a preventative safeguard; and
- The tank top fire protection for B4 gasoline tanks may not be identical in design to that at Site B, however it assumed that the same factor (0.1) can be applied to estimate the likelihood that a rim seal fire progresses to a full tank surface roof fire. This would be verified as part of the design phase. No other fire protection is factored into the QRA for the B4 area.

11.2.3 Risk Assessment

Risk contours for individual fatality and property damage and propagation are presented in the following sections.

Injury risks from heat radiation and/or explosion overpressure were not evaluated in this study as this criterion is applicable only for residential and sensitive use areas only. No such developments are present in the NSW Ports Port Botany precinct.

11.2.4 Individual Fatality Risk from the Project

The risk contours for individual fatality risk for the Project are shown in **Figure 7**. **Figure 7** shows that the risk criteria for offsite land uses are met for the Project as the 50×10^{-6} per year remains within the Site. Other notable risk contours remain well within the port area and do not reach recreational, commercial, residential or sensitive land uses as can be seen on **Figure 7** showing the 0.5×10^{-6} per year occurring with the port area. These land uses are well outside the worst case consequence impact area as identified in the QRA. The risk from the Project is considered acceptable in accordance with the individual fatality risk criteria set out in *HIPAP 4 Risk Criteria for Land Use Planning*.

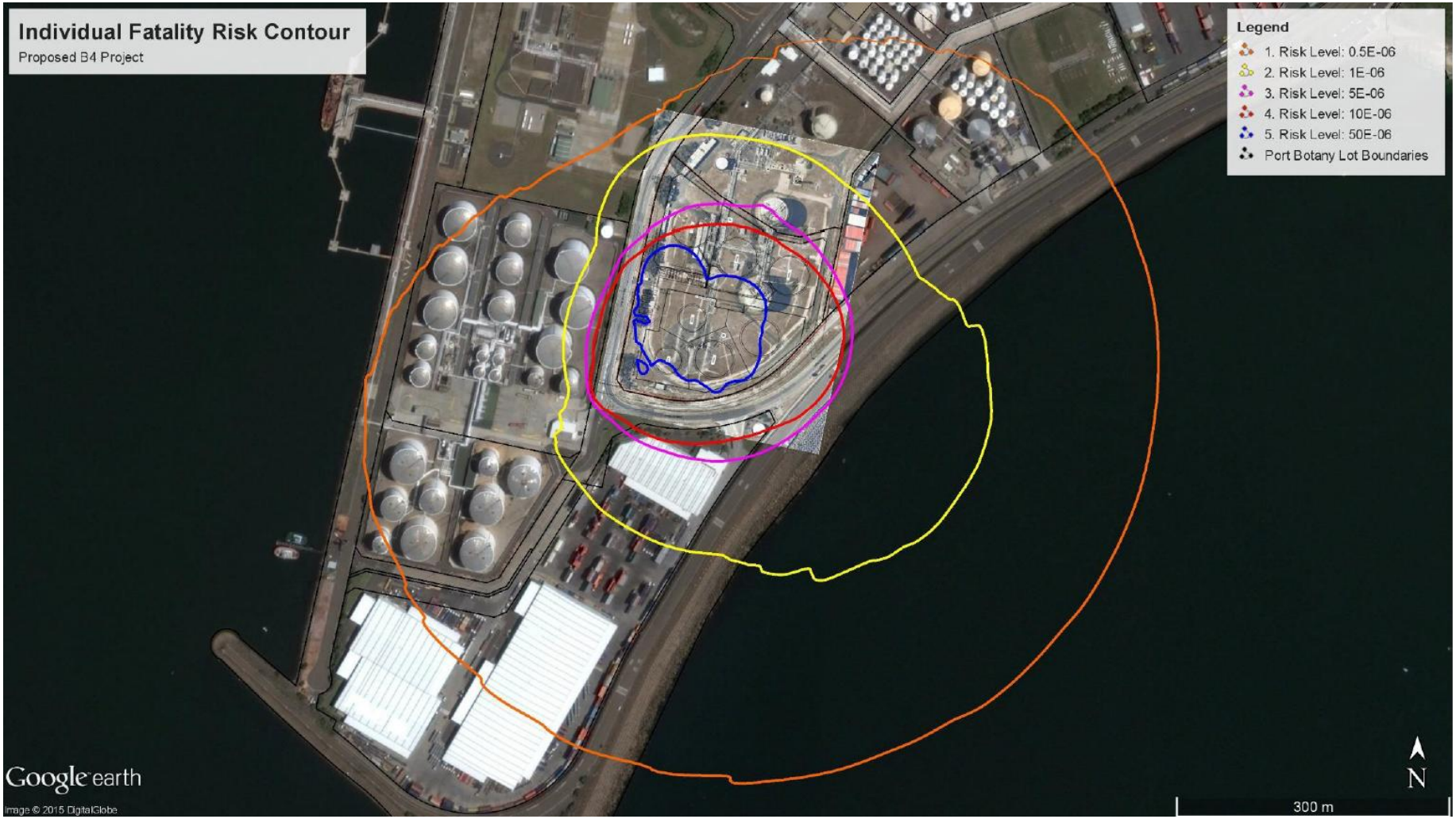

Figure 7 Individual Risk Contour (Project only)

11.2.5 Damage and propagation risk

The risk criterion for damage and propagation risk is also complied with for the Project. Risk of incident heat radiation (23 kW/m^2) from the Project does not exceed a risk of 50 x 10^{-6} per year at the boundaries of neighbouring potentially hazardous installations or land zoned to accommodate such installations. This is clearly shown in **Figure 8**.

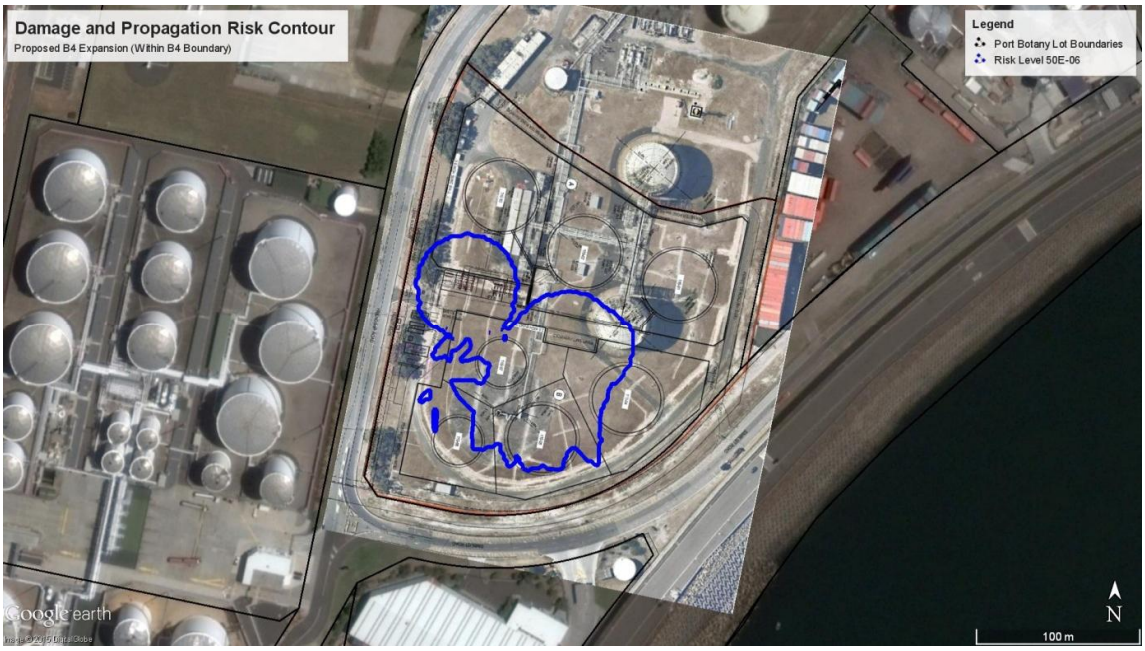

Figure 8 Damage and Propagation Risk Contour (Project only)

The closest neighbouring site with significant quantities of hazardous materials to the Project site is the adjacent ethylene storage to the north of the Project on the remaining area of the Qenos site. The Elgas site has greater separation distances and the inventories of LPG are in underground caverns hence the risk to the Project is considered to be very low.

The previous risk assessment study that is publicly available for the Qenos site is a PHA for ethylene liquefaction plant (SHE Pacific, 1999). This PHA includes the two hydrocarbon storages that have been demolished (i.e. the area which the B4 storage area is proposed to occupy), as well as the ethylene storage and liquefaction area in the northern part of the Qenos site which would remain.

The individual fatality risk and injury risk contours from the Qenos PHA have been reproduced in **Appendix F**. The individual fatality risk contours for the remaining equipment at the Qenos site have been overlaid onto an aerial photo showing the approximate location of the new boundary between Qenos and the Project site (See **Figure 9**). It can be seen from this that the individual fatality risk from the Qenos site at the new Project boundary is less than 10x10^{-6} per year hence it can be concluded that the boundary risk is acceptable as it is well below the industrial risk criterion of 50 x10-6 per year.

There are no escalation risk contours (exceedance of 23 kW/m^2 or 14kPa) in the Qenos PHA. However it can be inferred from the injury risk contours (exceedance of 4.7 kW/m^2 or 7kPa) which show a very small 50x10^{-6} per year contour well to the north of the new site boundary that the escalation risk is well below the industrial risk criterion of 50 x10^{-6} per year at the site boundary.

There is also a flare on the Qenos site. This has been relocated in accordance with American Petroleum Institute requirements and the final site boundary has been set accordingly to ensure that radiant heat from a flaring case does not impact the diesel tanks (roof or shell) in the Project site.

Hence the separation distances between Qenos process equipment and Project storages are adequate to allow risk boundary criteria to be met, and the Project is therefore regarded as an appropriate use for this land.

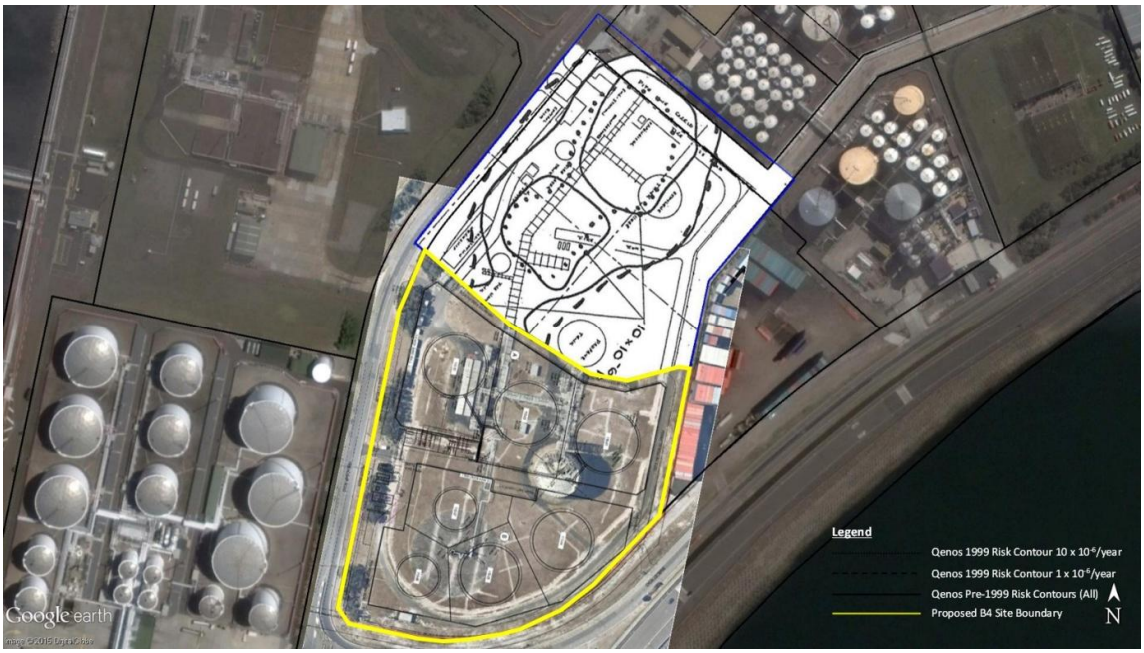

Figure 9 Qenos PHA Individual Fatality Risk Contours

11.2.6 Cumulative Risk Contours Comparison with the Vopak Site B (75W application)

The QRA report for the Site B increased throughput (75W application) presented the most recent risk contours for the Site B operations. **Figure 10** shows the cumulative risk of Site B operations plus the Project. As discussed in **Section 11.2.5**, the cumulative risk associated with the neighbouring sites (namely Qenos and Elgas) was shown to be within the prescribed criteria. As such the cumulative risk impacts have been limited to the existing Site B and Project.

It can be seen on **Figure 10** that whilst the cumulative $50x10^{-6}$ per year contour remains within the relevant Site B and Project boundaries in most areas and directions, the cumulative $50x10^{-6}$ per year contour extends across Friendship Rd between the two sites. It should also be noted that this is not a complete picture of cumulative risk in the area as there are numerous other MHF's in the vicinity However, given that the boundary risk target is 50 $x10^{-6}$ per year for each source of risk individually, it is not possible to also apply this target cumulatively outside the site boundaries, and there are no published cumulative individual fatality risk targets that can be applied to offsite risks from multiple sites. There is no permanent population on the road and no fixed facilities between Site B and Site B4 hence this risk is regarded as acceptable.

Despite this, given that there is no permanent population on any adjoining boundary to the proposed Site B4 and that there are no fixed facilities buildings or other infrastructure apart from Friendship Road between Site B and Site B4 this risk is regarded as acceptable (Sherpa, 2015).

Other notable risk contours remain well within the port area and do not reach recreational, commercial, residential or sensitive land uses as can be seen on **Figure 10** showing the 0.5×10^{-6} per year occurring with the port area. The maximum extent of the worst case vapour cloud scenario from a gasoline tank overfill is approximately 620m This does not extend outside the port area, i.e. the worst case consequences do not extend to any sensitive, residential or commercial land uses as defined in the HIPAP4 risk criteria, hence there is no identified risk from the development to land uses outside the Port area.

Figure 10 Individual risk contour (cumulative site B terminal including B4 project)

Risk contours comparison with the Port Botany Land Use Study

To determine the potential impact on the Port Botany area, the risk contours reported in the Port Botany Land Use Safety Study (Department of Planning, 1996) have been reviewed. **Figure 11** (reproduced from the Port Botany Land Use Safety Study) shows risk contours for residential (1 x 10^{-6} per year) and industrial land use criteria (50 x 10^{-6} per year).

Visual comparison of the Port Botany Land Use Safety Study against the QRA results for cumulative operations (i.e. including both the Site B modification and the Project) shows that:

- The 1 x 10^{-6} per year risk contour for proposed cumulative Site B operations (would be within the projected future case use overall risk contour (1 x 10^{-6} per year as shown on **Figure 11**, Port Botany Land Use Safety Study); and
- The 50 x 10^{-6} per year risk contour for proposed cumulative Site B operations (is contained within the Project boundary and hence, it would be within the projected Port Botany future case use overall risk contour (50 x 10^{-6} per year).

Hence, there it is unlikely that there would be a significant effect on the cumulative risk as shown in the Port Botany Land Use Safety Study future use case when both the Site B modification application and the Project are accounted for.

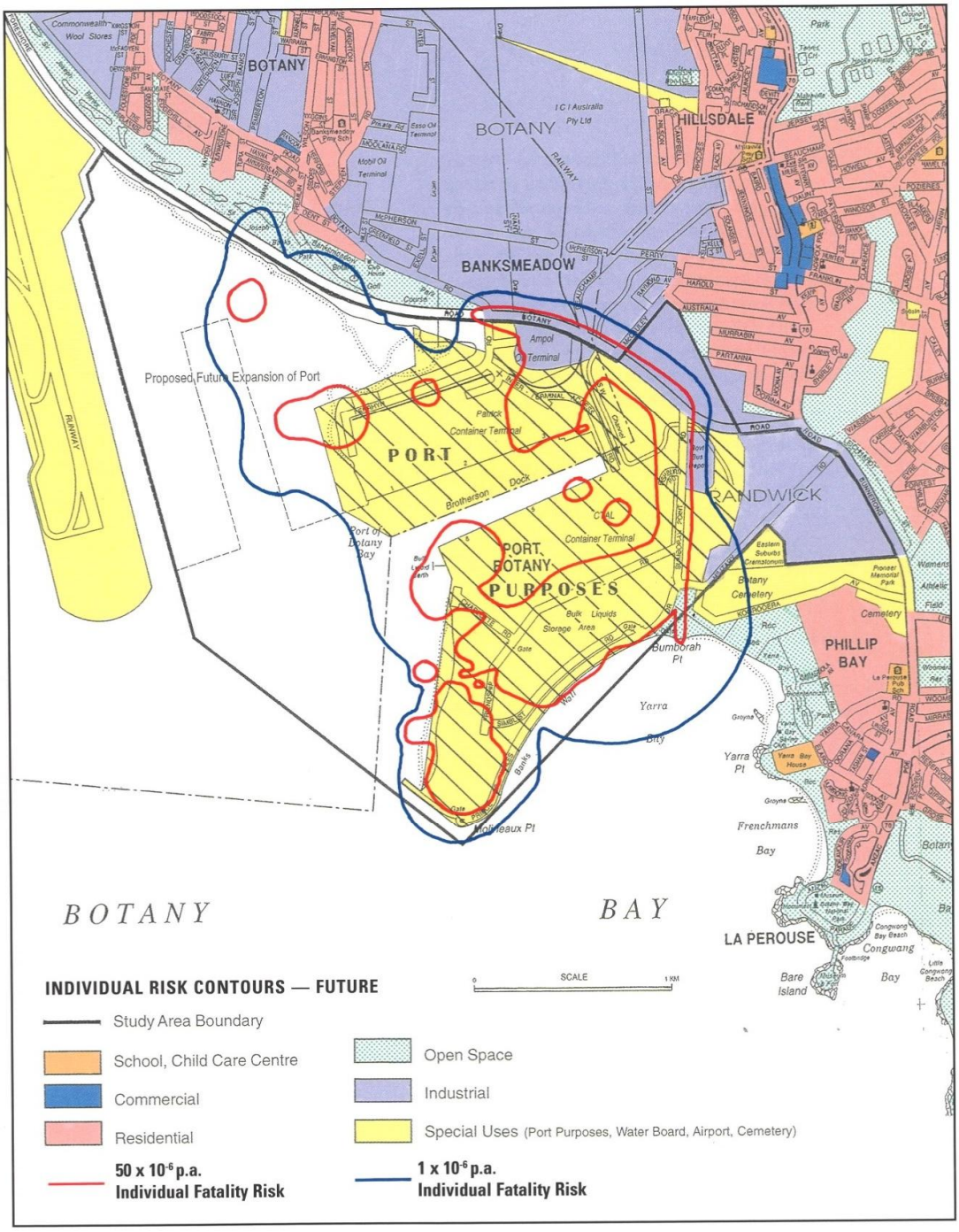

Figure 11 Port Botany Land Use Study – Cumulative Individual Risk Contours including postulated Future Development (1996)

11.3 Management and Mitigation Measures

The PHA shows that the HIPAP 4 criteria are met for the Project and that the cumulative risk from Site B plus the Project does not have a significant effect on the risk contour presented in the Port Botany Land Use.

While the PHA identifies existing risk control measures and safeguards, it does not provide a detailed demonstration of the adequacy of the control measures in place to control risks to levels considered So Far As Reasonably Practicable (SFARP). The Project's risk control measures and safeguards would be further considered as part of detailed design and Vopak's MHF Safety Case review (as per the requirements of the *Work*

Health and Safety Regulation 2011 (Section 9.3, Division 4). Review and demonstration of SFARP would be done as part of the Safety Case update). As the PHA for the Project is based on preliminary design information the following commitments are made:

- The effectiveness of the safeguards assumed to be in place and accounted for in the QRA would be verified as part of the design process and risk profile updated if required;
- As part of the B4B design process Vopak would include a review of emerging engineering measures (for example modification to tank top design) that may be able to be implemented to eliminate formation of large flammable clouds due to tank overfill scenarios;
- As part of the review of the emergency response plan (ERP) for the Project Vopak with input from adjacent facilities, undertake a review of access/egress arrangements to determine if any additional emergency access or exit provisions are required in the event of an incident at the B4 site; and
- As part of the Final Hazard Analysis (which would be prepared prior to operations commencing), checklists identifying the key assumptions and constraints in the QRA at the final design stage of the Project would be developed. These would be an update to the checklists prepared for Site B as part of the current Section 75W QRA, and would simplify the hazard analysis update requirements for future changes should they arise.

The Site B Safety Case Review that the Project would initiate would also trigger, amongst other things the following safety requirements which Vopak would comply with:

- Mutual Aid improvement project (connection of the NSW Ports BLB2 Fire Protection system to the Site B Fire Protection system) to provide unlimited volumes of water; and
- Reconsideration and re-verification of Buncefield Report Recommendations.

12.0 Traffic and Transport

A Construction Traffic Impact Assessment (TIA) for the Project was prepared by AECOM and is provided in **Appendix G**.

12.1 Existing Environment

The Vopak site is served by the Port Botany road network, which provides access to the Sydney's arterial road network. Vehicular access between the site and the surrounding major road network is via the one-way loop of Simblist Road / Friendship Road. This connects to Bumborah Point Road at priority controlled T-junctions. This road network is shown of **Figure 2**.

Bumborah Point Road connects to Botany Road at a signalised junction. Botany Road extends east to Bunnerong Road and west to Foreshore Road, past Beauchamp Road. Foreshore Road provides the main route to Sydney's arterial road network at General Holmes Drive / Southern Cross Drive (part of the major M1 route serving Sydney) while the Beauchamp Road / Denison Street route (north off Botany Road) provides a secondary route for travel to/from the north.

Bumborah Point Road, Simblist Road and Friendship Road are purpose-built roads serving heavy vehicles accessing the port area. They all have wide carriageways to allow multiple heavy vehicle movements and allow for adequate swept turning paths. They all have a 60 km/h speed limit and suitable street lighting.

Botany Road distributes port traffic to the east and west. Eastbound travel towards Bunnerong Road is restricted for Vopak road tanker traffic unless there is a local destination in the eastern suburbs. Between Bunnerong Road and the Penrhyn Road / Foreshore Road intersection, Botany Road is a six-lane divided road with additional turning lanes at the signalised intersections with Bumborah Point Road, Gate 2 container holding yard, McCauley Street, Beauchamp Road, and Penrhyn Road / Foreshore Road.

Although Botany Road continues to the north from the Penrhyn Road / Foreshore Road intersection, this section has vehicle restrictions necessitating Vopak road tanker traffic to continue west onto Foreshore Road.

Foreshore Road is a controlled access route functioning primarily as a high-volume and dedicated heavy vehicle link between the Port Botany precinct and General Holmes Drive / Southern Cross Drive (part of Sydney's M1 arterial route). Foreshore Road is a four-lane divided road with limited access points. The most significant access is the signalised intersection to the recently constructed third container terminal.

From the General Holmes Drive / Southern Cross Drive junction, road tankers carrying bulk liquids are restricted from travelling via the Airport and M5 tunnels due to dangerous goods (DG) restrictions. Therefore, they need to turn north and travel around the northern airport perimeter to access areas to the west and south of Sydney.

The section of Botany Road / Foreshore Road between Bunnerong Road and Penrhyn Road has a 70 km/h speed limit, which increases to 80 km/h west to General Holmes Drive.

Existing Traffic Volumes

Traffic volume data has been obtained for the surrounding road network. **Table 19** shows historical Average Annual Daily Traffic (AADT) two-way volumes from 2005 and projections to 2013. This indicates a significant decrease in traffic on Botany Road, east of the Beauchamp Road intersection.

Table 19 Average Annual Daily Traffic (AADT) on the Adjacent Road Network

Road	Location	AADT Volumes - 2005	AADT Volumes – 2013 (projected)[2]
Foreshore Road	South of General Holmes Drive	33,454	39,000
Botany Road	West of Beauchamp Road	39,342	43,500
Botany Road	East of Beauchamp Road	24,266	27,500
Beauchamp Road	North of Botany Road	20,848	23,000

Table 20 provides a summary of the intersection analysis for both AM and PM peak.

[2] From Hyder "*Banksmeadow Waste Transfer Terminal: Traffic and Transport Impact Assessment*", November 2013

Table 20 SIDRA Results for Existing Traffic Volumes

Intersection	AM Peak				PM Peak			
	Vehicles Per Hour	Deg. of Satn.	Avg. Delay	Level of Service	Vehicles Per Hour	Deg. of Satn.	Avg. Delay	Level of Service
Botany Road / Bumborah Point Road	1,962	0.80	22.6	B	2,070	0.83	25.1	B

The analysis indicates that the intersection operates at LoS B during the AM peak and PM peak hour periods.

12.2 Potential Impacts

Construction Traffic Generation

Light vehicles would arrive prior to 6am and leave after 5pm from Monday to Saturday. Based on 100 staff at peak construction, and anticipated vehicle occupancy of 1.2 workers per car, it is expected that 84 light vehicles would arrive at the site per day in the morning and leave in the evening. Even though the morning arrivals would be before the AM peak hour on the surrounding road network, it has been tested in the AM peak hour as a worst case scenario.

Heavy vehicles would mostly avoid the traffic peak hours, where possible. About 15 heavy vehicles are forecast to arrive on site per day at the peak construction period. Assuming 20 per cent of the daily movements occur during the AM and PM peak hours which are based on Vopak's existing operations, it is estimated that three heavy vehicles would both arrive and leave the site in each peak hour. The likely site access route for the majority of vehicles would be via Botany Road, Bumborah Road, Simblist Road and finally Friendship Road.

For trip distribution, it was assumed that 90 per cent of light traffic would arrive and leave from/to the northwest direction and 10 per cent of traffic from/to the southeast. While for heavy vehicles, it was assumed that they would all arrive and leave from the northwest.

Table 21 summarises the distribution of the construction traffic generated.

Table 21 Distribution of Light Vehicle for Construction Traffic

Directional Split	Light Vehicles				Heavy Vehicles			
	AM Peak		PM Peak		AM Peak		PM Peak	
	In	Out	In	Out	In	Out	In	Out
From/to northwest	76	0	0	76	3	3	3	3
From/to southeast	8	0	0	8	0	0	0	0
Total	**84**	**0**	**0**	**84**	**0**	**0**	**0**	**0**

Table 22 SIDRA results for Traffic Volumes with Construction Traffic

Intersection	AM Peak				PM Peak			
	Vehicles Per Hour	Deg. of Satn.	Avg. Delay	Level of Service	Vehicles Per Hour	Deg. of Satn.	Avg. Delay	Level of Service
Botany Road / Bumborah Point Road	2,052	0.88	26.3	B	2,160	0.83	25.2	B

The construction trips generated (**Table 21**) were added onto the existing traffic volumes (**Table 19**) at the key intersection of Botany Road and Bumborah Point Road and SIDRA analysis performed to ascertain the impact on the intersection. The analysis shows (**Table 22**) that overall the proposed construction traffic is likely to have a minor impact on the operation of the Botany Road / Bumborah Point Road intersection, the main access

intersection from the strategic road network. In both the morning and evening peak hours, the intersection is likely to experience a small increase in average delay – the level of service experienced remains at LoS B.

Mid-block Impact

The main traffic impact in the AM peak hour occurs southbound on Bumborah Point Road and eastbound on Botany Road (west of Bumborah Point Road), where the mid-block volumes increase by about seven and five per cent respectively (see Section 3.2.2 of **Appendix G**). The volume to capacity ratios of the roadways has a similar increase at these locations. In the PM peak hour, the reverse movements apply, but the change is not as great due to the larger volume of background traffic at this time. The volume to capacity ratios in the PM peak hour would also experience a smaller increase.

Construction traffic is therefore not having a significant impact on mid-block capacity. The increase in traffic during construction is relatively minor, especially considering the temporary nature of the construction activities. The additional construction volumes would be within any daily variations along the surrounding road network.

Operational Traffic Generation

No operational traffic would be generated from Site B4 rather the fuels from the Project would be connected to the load out gantry on the existing Vopak Site B facility. The Site B 75W modification application is currently seeking approval to increase the operational traffic generated by its existing truck gantry. As the proposed Site B4 tanks would be connected to the existing gantry the section modification was undertaken to accommodate the additional throughput and operational traffic generation from the Project.

With the operational traffic that Site B generates which are currently being considered under the section 75W submission for modification to the existing Vopak Site B project approval (which includes the dispatch of fuel from the Project), no further assessment of operational traffic is considered necessary. It is noted that the modification application found that the traffic impacts from Vopak's future expanded operations at Site B are considered to be minimal and would have an insignificant effect on road network and intersection operations.

It should be noted that the operation of the Project may generate occasional maintenance and inspection trips from light vehicles during operation. These are expected to be infrequent and not to a level that would have a material impact on the operation of the road network. Operation traffic for the Site B facility, which would include the occasional maintenance vehicles for the Project, would be managed in accordance the Site B traffic management plan, which forma part of the Site B OEMP. The Site B traffic management would include aspects such as site access, driver code of conduct and parking restrictions.

Internal Access and Parking Criteria

During Stage 1 (B4A) of the construction, workers would park on the Stage 2 (B4B) site. The B4B area would be utilised for the following Stage B4A construction activities:

- Contractor Accommodation/Amenities;
- Contractor Lay-down Area;
- Contractor Construction Vehicles/Equipment parking; and
- Contractor personnel car parking.

All of these activities would be contained within the lease boundary. Vopak anticipates that 3 of the 4 Stage B4B tanks can be constructed with all of the above Contractor compounds and facilities contained within the site lease boundary (i.e. within the proposed B4B area). However, the final (4^{th}) tank construction would require an off-site area for the above contractor activities. Such arrangements would need to be investigated in the Port Botany precinct in discussions with NSW Ports.

Indeed, any such temporary use of the B4B area would require NSW Ports approval and any site modifications (e.g. entry/exit gates, hard-standing, portable office sheds) would have to be in accordance with the NSW Ports Development Code. Should the required amount of parking not be achieved by these means Vopak would make provision for bussing in the workforce.

No public vehicular access would be available to the Site B4 site. In accordance with safety requirements a 6m perimeter access track would be provided around the entire Site B4 site. An access track would also run between Site B4A and B4B to provide access for maintenance and fire-fighting as detailed in **Appendix A**.

Pipeline Culvert Construction – Friendship Road

Construction of the culvert under Friendship Road is necessary to connect the Project to Vopak's existing storage facilities, the Port Botany Bulk Liquid Berths and Vopak's truck loading gantry. Without connection to these facilities via the proposed culvert the Project would be inoperable.

As a result of construction of the culvert, traffic utilising Friendship Road would be impacted as the excavation of the trafficable area would be required. Vopak are aware of the importance of maintaining traffic flows along Friendship Road in order to prevent impacts to the operation of the Port and the businesses is contains.

At the location where the pipeline culvert is proposed to cross under Friendship Road, Friendship Road has two lanes for northbound traffic and a third slip lane for traffic merging onto Friendship Road, from Simblist Road. While there is usually two fully operational lanes, this provides a total of three trafficable lanes on which to manage traffic on Friendship Road during construction. In this location all lanes on Friendship Road provide for northbound traffic only. Reference is made to **Appendix A** which shows the location of the proposed pipeline culvert across Friendship Road.

The new Friendship Road Culvert would be built in 2 stages to ensure Friendship Road remains open at all times. Stage 1 would require the eastern and middle lanes to be closed to enable construction works to take place. Once complete the eastern lane would be reopened. Stage 2 of the culvert construction would then see the middle and western lanes closed to enable construction works to be finalised. Each stage is expected to take approximately 2 weeks for construction resulting in a total of one month during which culvert construction traffic impacts may occur.

During the culvert construction period, traffic controls would be implemented at the Simblist Rd Intersection to direct traffic entering Friendship Road into the appropriate lane. Directional and speed zone signage would be implemented to control traffic flows. On Simblist Road, the northbound and southbound lanes would continue to remain open to unimpeded traffic flow.

Details of the traffic controls to be implemented during both stages the one month construction period would be detailed in a Construction Traffic Management Plan. This plan would be prepared in consultation with NSW Ports to such that impacts on the operation of Port Botany can be minimised. Due to the short nature of the culvert construction period, the ability to allow continuous traffic flow along Friendship Road during construction and the coordination of traffic control with NSW Ports, overall impacts to traffic flows are expected to be minor.

12.3 Management and Mitigation Measures

A Construction Traffic Management Plan would be prepared for the construction of Site B4 as part of the CEMP to manage potential traffic impacts during the construction phase. This plan would include details of parking arrangements vehicle movements, lay-down areas and road safety instructions for construction staff.

The Construction Traffic Management Plan would also provide details regarding the staged traffic controls to be implemented at the Simblist Ro – Friendship Road intersection, and along Friendship Road while culvert construction works take place. Culvert construction impacts would be managed in a manner which provides constant traffic flows along Friendship Road for the during of the construction activities

Although operation traffic is subject to a separate approval for the existing Vopak terminal it should be noted that this operational traffic would operate in accordance with Vopak's transport contractor requirements as contained in its existing OEMP.

13.0 Air Quality

An Air Quality Impact Assessment (AQIA) for the proposed Project has been prepared by AECOM and is provided in **Appendix H**.

13.1 Existing Environment

The pollutants of prime interest in NSW are ozone and particulates, with levels of these pollutants approaching or exceeding the national standards prescribed in the National Environment Protection Measure for Ambient Air Quality (NEPM) on occasion. The Vopak facility is not expected to generate significant levels of ozone or particulates but has the potential to emit volatile organic compounds or VOC's.

Port Botany is the major NSW port for the handling of containers, bulk liquids and petrochemicals. The international and domestic airport terminals are located nearby, as are major arterial roads and the Botany Freight Rail Line. Industrial uses dominate the surrounding area, including the sections of Banksmeadow and Matraville abutting Port Botany.

No local monitoring of VOCs was identified at the time of preparation of this report. It should be noted that VOC assessments are to consider project contributions only; that is, cumulative assessment, which requires the consideration of background pollutant concentrations, is not required (DEC, 2005).

The Bureau of Meteorology (BOM) records long-term meteorological data at a number of automatic weather stations around the country. The station that best represents the Site is located at Sydney Airport, approximately 4.5 kilometres northwest of the Vopak B4 site, across Botany Bay. A summary of the long-term data recorded at this station is provided in **Appendix H**.

The warmest temperatures occur between November and March, with the warmest average maximum temperatures occurring in January (26.5ºC). The coldest temperatures are recorded in the winter months, with the lowest average minimum temperature occurring in July (7.2ºC).

The highest average rainfall is recorded in June (122.8 mm), while September is the driest month (60.2 mm). Humidity in the area is typically between 50 and 74 %. Average wind speeds range from 12.6 – 25.3 kilometres per hour, and are typically higher at 3 pm compared to 9 am. Winds are predominantly from the northwest at 9 am, with also frequent winds from the western direction. At 3 pm, the winds swing around to predominantly blow from the northeast and southeast. Southerly winds are common both in the morning and afternoon.

13.2 Potential Impacts

13.2.1 Methodology

The main emissions of interest for fuel storage activities are VOCs. VOCs are organic compounds with a vapour pressure exceeding 0.13 kPa at a temperature of 20°C. In this, VOCs can be emitted from storage tanks, filling stations vents, pipelines and process equipment leaks at plant associated with fuel storage. The primary emission sources are storage tank and pipeline losses.

Full details on the methodology, model inputs and dispersion modelling undertaken for the Project are contained in **Appendix H**. Emission rates for the fuel storage tanks were generated using the TANKS program. Dispersion modelling was conducted using CALPUFF; meteorological data used in the modelling included prognostic upper air data from TAPM and surface station data from Sydney Airport (hybrid mode).

A single scenario was assessed, which considered emissions from all tanks associated with the Project; that is, the three diesel tanks proposed for Stage 4A, and the gasoline tanks, associated with the proposed Stage 4B. The assessment was conducted for continuous operation of the facility, assuming constant emissions occurring 24 hours per day, 7 days per week, 365 days per year. This approach provides a conservative assessment as in reality the terminal would not operate continuously over this assessment period.

The EPA considers sensitive receivers to be areas where people are likely to either live or work, or engage in recreational activities. The nearest sensitive receivers are located approximately 1.4 km to the east.

The EPA specifies impact assessment criteria for a range of pollutants (DEC, 2005). The pollutants modelled represent those included in the NPI TANKS database as being constituents of diesel and gasoline fuel for which the EPA has impact assessment criteria. These are:

- Benzene;
- Cumene;
- Cyclohexane;
- Ethylbenzene;
- n-Hexane;
- Toluene; and
- Xylenes.

As indicated in Section 4.0 of **Appendix H**, the impact assessment criteria for the pollutants assessed are applied either at the site boundary and beyond or at the closest existing or future sensitive receptor. To provide a thorough assessment of pollutant concentrations surrounding the Project, a grid 4 km x 4 km, centred on the site, was assessed. Additionally, receivers were placed along the approximate boundary of the Project. Concentrations predicted at on-site locations were excluded from the results.

The AQIA included relevant pollutants from the NSW EPA *Approved Methods for Modelling and Assessment of Air Pollutants in NSW* (DEC 2005) for individual odorous air pollutants listed in Table 7.4a of the NSW EPA Approved Methods. It compared these against the stated criteria, including cumene, cyclohexane, toluene and xylenes. The odorous pollutant criteria presented have been selected based on the stricter value of the either the toxicity level or odour nuisance level for each of these specific pollutants. As odours associated with the operations would be as a result of the VOC emissions, and the VOCs assessed included those from the NSW EPA Approved Methods for odorous pollutants, the VOC assessment was considered to adequately address both air quality and potential odour impacts.

13.2.2 Potential Impacts

Construction Impact

Construction works have the potential to result in the generation of dust or particulate matter as a result of disturbance to the soils. As soils would only be exposed for a short period during the initial construction phase prior to the establishment of tanks foundations and bund areas the potential for dust generation is considered minimal. Stockpiles may be used during construction works, and these would be managed as per the mitigation measures detailed in **Section 13.3** to minimise excess dust generation. The construction cut fill balance indicates that some fill may need to be imported therefore it is unlikely that there would be large amounts of soil that need to be stockpiled on site following the construction of either stages. The current plan is to avoid stockpiling is possible therefore there are no planned stockpile locations at this time. If stockpiles are required they would be located in consultation with NSW Ports.

With the staged nature of the development, the undeveloped portion of the site has the potential to generate dust if left unmanaged. If any stockpiles are required no Stage B4B following the construction of B4A they would be grass stabilised to minimise dust generation. Remaining areas would be maintained as compacted hardstand area and potentially sealed subject to Vopak's requirements.

Operational Impact

Dispersion modelling of the Project was undertaken as described above. Dispersion modelling predicts ground level concentrations of pollutants potentially released during the operation of the Project. The modelling results for the worst case receiver are detailed in **Table 23**. These are shown against the relevant EPA criteria for the pollutants modelled.

Table 23 Predicted Maximum Ground Level Concentrations 99.9th Percentile (µg/m³)

Pollutant	Maximum Predicted 99.9th Percentile Concentration (µg/m³)	Criteria (µg/m³)
Benzene	4.4	29
Cumene	6.1	21
Cyclohexane	1.5	19,000
Ethylbenzene	1.5	8,000
n-Hexane	2.8	3,200
Toluene	4.1	360
Xylenes	4.0	190

As shown, the predicted pollutant concentrations are all well below their respective assessment criteria. The predicted cumene concentrations were the closest to the criteria, representing 29 % of the criterion value (6.1 µg/m³ against a criteria of 29 µg/m³). As shown on the cumene contour plot (**Figure 12**), the predicted concentrations of cumene decreased with increasing distance from the Site, with concentrations at very low levels at the closest residential areas (less than 1.0 µg/m³). As the behaviours of cumene are representative of those other pollutants modelled, a similar dispersion pattern is predicted to occur for the other pollutants.

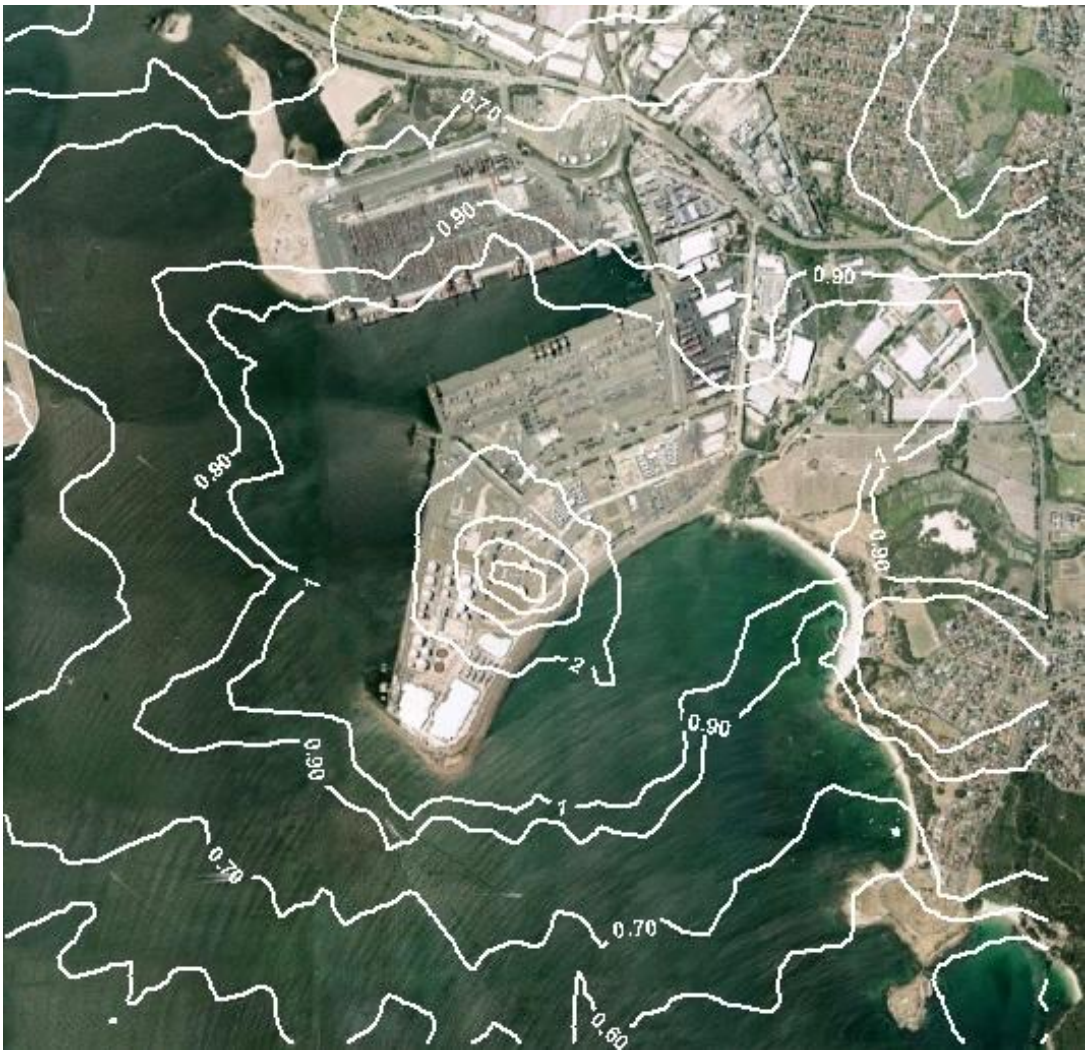

Figure 12 Predicted 1 hour Cumene Concentrations

The Project is not expected to adversely affect the air environment or the amenity of sensitive receptors.

In regards to cumulative assessment of VOC's NSW Approved Methods only requires the incremental impact (predicted impacts due to the pollutant source alone) for each pollutant be reported. As the Project has demonstrated that it meets criteria within the site no additional assessment is necessary. Despite this it is noted that the primary source of other VOC's entering the immediate air shed is Vopak's truck loading gantry located on Site B. Emissions from this source are directed through a Vapour Recovery Unit thereby capturing the majority of any emissions prior to entering the atmosphere.

13.3 Management and Mitigation Measures

Construction Mitigation Measures

Mitigation of air quality impacts relating to construction works essentially relates to management of dust for such works with a focus on implementing a strict dust and air quality management regime. Mitigation measures for the Project are to be detailed in the Construction Environmental Management Plan (CEMP). All reasonable and feasible management measures should be documented and employed where practicable to do so. Management plans and monitoring programs should be suitably documented for easy reference throughout the process.

The mitigation measures recommended for inclusion in the CEMP for the construction period are as follows:

- All vehicles and plant/equipment should be fitted with appropriate emission control equipment and be serviced and maintained in accordance with the manufacturers' specifications. Smoke from vehicles/plant should not be visible for more than ten seconds;
- Trucks entering and leaving the premises that are carrying loads of dust-generating materials must have their loads covered at all times, except during loading and unloading;
- Hard surfaces or paving should be used where possible, as unpaved routes can account for a significant proportion of fugitive dust emissions, particularly during dry/windy conditions. Routes should be inspected regularly and repaired when necessary, and roads should be swept and watered as required to limit dirt/dust build up and potential dust generation during windy conditions;
- Any areas on site that are not covered with hard surfaces should be vegetated wherever possible to minimise wind erosion and associated dust generation, including stockpiles if required between the construction of the two stages;
- All vehicles should be switched off when not in use for extended periods;
- Water carts and/or road sweeping would be used to minimise dust generation. The frequency of these management measures would be increased during dry windy conditions;
- Stockpiles where hazardous material has been encountered would be wetted and covered;
- Active excavation area works would be wetted down with hoses; and
- Housekeeping would be maintained to keep exposed areas to a minimum.

Operational Mitigation Measures

The Site B4 terminal has been designed to minimise the potential for vapours to be released from the tanks and pipe network. This includes the provision for internal floating roofs to minimise tank headspace and therefore areas for potential vapour generation. Despite this operational air quality management measures would be implemented to minimise the potential for air quality impact to result from the operation of the Project.

The existing Vopak Site B OEMP would be updated and applied to the operation of Site B4. The OEMP includes a range of measures that would be implemented to the operation of the site and includes the following information:

- Sensitive receivers in proximity to the site;
- The legislative framework and standards applicable to the operation;
- Potential contributors to off-site pollutant impacts, including the pollutants that are of concern;
- Mitigation measures required to minimise the operation's effects on local air quality, including;
    - Vapours from the filling of road tankers treated through a Vapour Recovery Unit (VRU), preventative maintenance undertaken on the VRU to maintain functionality and a monitoring program in place to annually assess the effectiveness of the VRU in accordance with the requirements of its EPL;

- Tanks fitted with Internal Floating Roofs (IFR) and periodically inspected to confirm IFR seal is functioning correctly;
- Performance management and reporting system in place to continuously monitor performance of VRU and identify and report any faults with the goal of zero incidents from air quality impacts. Reporting to DP&E, NSW Ports and potentially impacted stakeholders as appropriate.

- Contingency plans for complaints and pollution incidents; and
- Review and reporting protocols.

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14.0 Noise and Vibration

A Noise Impact Assessment (NIA) for the proposed Project has been prepared by AECOM and is provided in **Appendix I**.

14.1 Existing Environment

In order to establish the existing noise environment adjacent to the B4 Site, ambient noise monitoring results presented in a noise assessment that incorporates the B4 Site has been reviewed. The following noise assessments were referenced:

- *Noise And Vibration Impact Assessment Vopak Petroleum Storage Site A, 49 Friendship Road. Port Botany*, by Atkins Acoustics and Associates Pty Ltd., reference as 41.6697.R2:GA/DESKTOP/2011, Rev 03, dated September 2011 (Atkins Report); and
- *Vopak Terminals, Report for Bulk Liquids Storage Terminal Expansion, Noise Report*, by GHD, reference as 22/12642/69547, dated June 2006 (GHD Report).

As the original background noise logging used for the existing Site B approval assessment (GHD Report) relied on noise measurements undertaken in 1996, and as such more recent noise logging data from the Atkins Report has been adopted for this assessment as it is more recent (2011) and representative of the current noise environment.

Background noise levels have been established in a manner to be consistent with previous site assessments for consistency, and to assist with a review of the cumulative noise impacts from the current site.

The nearest residential areas to the site are located to the east of the Project site in the suburb of Phillip Bay, with the closest receivers, approximately 1,400 m from the proposed terminal site (receiver R2). The representative receiver locations and the associated receiver areas for assessment purposes, along with the land use classification (as defined in the INP) of each receiver are presented in **Table 24**.

Table 24 Representative Sensitive Receiver Locations

Receiver Number	Address	Land Use Classification	Approximate distance from site (m)
R1	26 Moorina Avenue, Matraville	Residential - Suburban	1,750
R2	2 Baragoola Avenue, Philip Bay	Residential - Suburban	1,400
R3	61 Yarra Road, Philip Bay	Residential - Suburban	1,470
R4	18 Murrong Place, Philip Bay	Residential - Suburban	1,520
R5	36 Yarra Rd, Phillip Bay	Residential - Suburban	1,550
R6	La Perouse Aboriginal Community Health Centre	Hospital	1,450
R7	Botany Lawn Cemetery	Passive Recreation	1,000
R8	Elgas Industrial Site, Friendship Rd, Port Botany	Industrial	80

The location of these receivers is shown in **Figure 13.**

In addition to these receivers the Elgas LPG Storage Caverns are located approximately 140m below Port Botany. Consideration of site activities, specifically vibration intensive construction works would be required in relation to the Elgas Caverns.

Vopak B4 Terminal - State Significant Development

Project site location, noise assessment locations, and noise measurement locations

May 2015

60344169

0 500 1,000 2,000 m

Figure13

14.2 Potential Impacts

14.2.1 Construction

Construction works are proposed to take place over an approximate 17 month period for each stage with each stage to be constructed separately. As the stages would not be built concurrently and as each stage is expected to have similar noise impacts this construction assessment has been undertaken to be representative of the worst case noise scenario that would result during each stage. Details of the proposed construction staging are detailed in **Section 6.4**.

It is noted that the section 75W application for Vopak's Site B may result in works occurring simultaneously on both sites. The Site B works however primarily relate to the addition, replacement or upgrade of plant and equipment and is not expected to result in significant noise levels. Cumulative impacts are therefore expected to be negligible.

Construction works are proposed to occur during:

- Monday to Friday – 7:00 am to 6:00 pm; and
- Saturday to be 8:00 am to 1:00 pm,

consistent with the EPA's Interim Construction Noise Guidelines (ICNG) (OEH, 2008) standard working hours.

While the majority of construction activities would be undertaken during standard hours, there may be a need to undertake out of hours works for the pipe and culvert works across Friendship Road to minimise impact to traffic during business hours.

Potential construction noise impacts where assessed in accordance with the requirements of the ICNG. Construction noise management levels against which the Project was assessed are derived from the ICNG as presented in Section 3.0 of **Appendix I.**

An assessment of the likely set of construction plant and equipment utilised during the main stages of constructions provided the construction scenarios, which formed the basis of the construction noise assessment. Using SoundPLAN 7.3 software, an assessment of the construction noise impacts at each of the identified sensitive receivers was undertaken. Other modelling inputs are described in detail in Section 5 of **Appendix I.**

The noise from the construction of the Project has been predicted at the nearest receivers. Predicted noise levels at these receivers for the proposed construction activities associated with the Project are provided in **Table 25**. Note that the scenarios assessed in **Table 25** represent the potentially nosiest stages of construction as detailed further in **Section 6.4**.

Table 25 Predicted Construction Noise Levels

Receiver[1]	Predicted (external)[2]	Standard hours		Out of Hours Work	
		NML	Exceedance	NML	Exceedance
Scenario 1 – Site construction (Civil Works) (Site works/drainage)					
R1	34	51	-	46	-
R2	40	51	-	46	-
R3	40	51	-	46	-
R4	39	51	-	46	-
R5	39	51	-	46	-
R6[3]	40	55[3]	-	55[3]	-
R7	42	60	-	60	-
R8	62	75	-	75	-
Scenario 2 – (Civil Works) (Bund and foundation construction)					
R1	28	51	-	N/A	
R2	36	51	-		
R3	36	51	-		
R4	35	51	-		

Receiver[1]	Predicted (external)[2]	Standard hours		Out of Hours Work	
		NML	Exceedance	NML	Exceedance
R5	35	51	-		
R6[3]	36	55[3]	-		
R7	38	60	-		
R8	60	75	-		
Scenario 3 – Tank installation, mechanical, piping, electrical & fire works					
R1	28	51	-	N/A	
R2	35	51	-		
R3	35	51	-		
R4	34	51	-		
R5	33	51	-		
R6	35	55[3]	-		
R7	37	60	-		
R8	59	75	-		

Notes:

1) All the representative sensitive receiver locations are presented in Table 24.

2) Predicted noise levels have been assessed against neutral meteorological conditions.

3) In the EPA ICNG Hospital wards and operating theatres criteria is an internal noise level, with a recommended internal noise level of 45 dB(A). A 10 dB reduction has been assumed between external and internal noise levels based on a window being open for adequate natural ventilation.

Predicted noise levels at the nearest affected receivers are presented in **Table 25.** The construction activities are predicted to comply with the recommended construction NMLs at all nearby sensitive receiver locations during both standard hours and out of hours works.

Due to the offset distances between the Project and sensitive receivers, it is highly unlikely there would be any construction vibration impacts as a result of the Project. Similarly construction traffic would be restricted to the Port Botany and arterial road networks which have been specifically designed for heavy vehicles. Therefore construction traffic is expected to have a negligible impact in regard to vibration.

Vibration

The construction method for the B4 Project that involves vibration generating equipment would be the Vibro-Compaction of parts of the B4 site where the storage tank foundations are located. Other construction methods that create vibration would be the use of vibrating rollers for other foundations for road base and structures.

The nearest vibration receiver locations along with the PPV limits are presented in **Table 26**.

Table 26 Vibration Receiver Locations

Address	Receiver Type	Approximate distance from site (m)	Peak Particle Velocity Limit (PPV), mm/s
Elgas Site	Industrial	40[1]	10
Elgas Office Building	Commercial	300	10
Elgas LPG Storage Caverns	Sensitive	140[2]	2.5

Notes:

1) This distance is based upon the closest locations between the two sites. Vibration intensive works are likely to occur at distances further than this, and as such this is a conservative approach.

2) The approximate distance to the Elgas LPG Storage Caverns has been assumed at 140m, as this is their approximate depth. No horizontal distance was added, and as such the actual distance from the vibration generating equipment would be further, and so this assessment is conservative.

A review of this equipment was undertaken having consideration of the Elgas Groundwater Management Zone Deed. This assessment concluded that the peak particle velocities expected to be generated by the required construction equipment are unlikely to exceed the vibration limits at the Elgas Storage Caverns.

14.2.2 Operation

Background

As the only significant noise producing items proposed as part of the Project are the proposed fuel pumps of which there are six in total. The approach of this assessment was to assess their impact separately from the rest of the Vopak Site B. This approach was undertaken to see if the noise emissions associated with these pumps would increase the noise levels from the overall Site B, from those already approved.

In the case that the noise levels are not predicted to increase from the existing levels due to the pumps associated with the Project, then the noise impacts from Site B would remain as currently approved at all nearby noise sensitive receivers.

The GHD Report is the noise report that was submitted and approved as part of the existing Site B approval.

- *Vopak Terminals, Report for Bulk Liquids Storage Terminal Expansion, Noise Report*, by GHD, reference as 22/12642/69547, dated June 2006 (GHD Report).

The rest of the Site's operations are included in the GHD Report, and include the noise contributions from the existing operations of forklifts, tanker truck operations, fans, pumps (Sump, HSE, booster, truck), air compressors, and water treatment facility.

The noise impacts for the existing usage of the approved Site B are presented in this report are reproduced in **Table 27.**

Table 27 Existing Site B Noise Impacts, (GHD Report, 2007)

Receiver Location	Assessed Meteorological Condition	Predicted noise level, $L_{Aeq\ (15\ min)}$, dB(A)
R5 - 36 Yarra Rd, Phillip Bay	Neutral	28
	Temperature inversion (F-Class, 3˚C/100 m) and 2 m/s source to receiver wind	34

Noise Generating Equipment

The Project would see the addition of six pumps to be installed on the southern side of Site B4, in a dedicated pump bay. Sound power levels for the pump motors was based on a 143 kW Goulds Pumps *(Model: 3196 i-17 Size: 6x8)*. The provided manufacturers pump sound power level spectrum use in the assessment is presented in **Table 28**. The assessment was conducted assuming the pumps have not benefitted from any mitigation or acoustic enclosure.

Table 28 Fuel Pump/Motor Sound Power Levels

Unit	Sound Power Level (SWL), Octave Band Sound Power Level, dB								Overall SWL
	63	125	250	500	1000	2000	4000	8000	dB(A)
Goulds Pumps Model: 3196 i-17 Size: 6x8	94	97	97	96	95	94	91	93	**101**

For the assessment it has been assumed that all six pumps would operate simultaneously and continuously during each assessment period. Due to the nature of how such terminal operate however it is unlikely that all six pumps would be operating simultaneously. Therefore assessing the impacts of all pumps operating simultaneously would result in a conservative assessment of potential impacts.

Predicted Operational Noise Impacts

The results of the environmental noise emissions assessment during normal operations, temperature inversion and prevailing wind conditions from the facility have been predicted at nearby receiver locations. The predicted noise levels as a result of the operation of Site B4 are presented in **Table 29**. Full details regarding the derivation of the assessment criteria and a description of term used in **Table 29** may be found in **Appendix I.**

Table 29 Reasonable Worst case Operational Scenario Predicted Noise Levels

Receiver	Predicted noise level, $L_{Aeq\ (15\ min)}$, dB(A)	Intrusive Assessment Period ($L_{Aeq\ 15\ minute}$), dB(A)	Amenity Assessment Period ($L_{Aeq\ Period}$), dB(A)			Exceedance, dB(A)
		Day, Evening and Night Criteria	Day Criteria	Evening Criteria	Night Criteria	
Assessed Meteorological Condition - Neutral						
R1	10	46	52	39	38	-
R2	10	46	52	39	38	-
R3	16	46	52	39	38	-
R4	18	46	52	39	38	-
R5	8	46	52	39	38	-
R6	19	50	50	50	50	-
R7	13	50	50	50	50	-
R8	49	70	70	70	70	-
Assessed Meteorological Condition - 3 m/s source to receiver wind						
R1	16	46	52	39	38	-
R2	15	46	52	39	38	-
R3	22	46	52	39	38	-
R4	24	46	52	39	38	-
R5	14	46	52	39	38	-
R6	25	50	50	50	50	-
R7	19	50	50	50	50	-
R8	53	70	70	70	70	-
Assessed Meteorological Condition - Temperature inversion (F-Class, 3˚C/100 m) and 2 m/s source to						
R1	16	46	-	-	38	-
R2	15	46	-	-	38	-
R3	22	46	-	-	38	-
R4	24	46	-	-	38	-
R5	14	46	-	-	38	-
R6	25	50	-	-	50	-
R7	19	50	-	-	50	-
R8	53	70	-	-	70	-

The predicted noise levels presented in **Table 29** have been assessed against the INP intrusive and amenity criteria. The operational noise impact assessment indicates that the for all meteorological conditions and assessment periods the predicted noise levels from the Project are significantly below the existing approved Site B noise levels. Additionally, the predicted noise levels all representative receiver locations are significantly below the existing ambient noise levels at all non-industrial receiver locations. As such the noise impacts from Vopak Site B4 operations are not predicted to increase at any of the non-industrial receiver locations as a result of the Project.

Sleep Disturbance Criteria

The application notes for the EPA *Industrial Noise Policy* (2000) recommend that sleep disturbance is assessed based on the emergence of the $L_{A1\ (1\ minute)}$ noise level over the corresponding $L_{A90\ (15\ minute)}$ noise level. The following screening criterion for sleep disturbance is recommended for the assessment of sleep disturbance:

$$L_{A1\ (1\ minute)} < L_{A90\ (15\ minute)} + 15\ dB(A)$$

Due to the continuous nature of the noise source at Site B, the $L_{A1\ (1\ minute)}$ noise levels would be very similar to the $L_{Aeq\ (15\ minute)}$, and as such the noise impacts would not emerge from the ambient noise levels, so further assessment of the potential for sleep disturbance is not required.

Traffic Noise

Site B4 would not itself generate operational traffic, rather Site B4 would be connected the Site B Road Tanker loading gantry. All operational traffic noise for Site B have been assessed under Project Approval 06_0089.

14.3 Management and Mitigation Measures

The Noise and Vibration Impact Assessment for the Project made the following conclusions in relation to development phases and noise criteria.

Construction Noise

The construction noise and vibration assessment was conducted in accordance with NSW Environment Protection Authority (EPA) '*Interim Construction Noise Guidelines' (ICNG, 2009)*.

The construction noise assessment indicates compliance with EPA's ICNG acoustic requirements at all assessment locations during the daytime (i.e. during EPA's standard construction hours).

The construction vibration assessment indicates that due to the large buffer distance between the Project and nearby residential receivers, the risk of discomfort, regenerated noise and structural damage impacting on receivers is very low. Regardless, construction activities would be undertaken in accordance with a Construction Environment Management Plan that would include reasonable and feasible noise management and mitigation measures in accordance with the ICNG.

Operational Noise and Vibration

The operational environmental noise emission criteria for the development quantified **Appendix I** have been established to comply with the EPA's Industrial Noise Policy (INP, 2000).

The operational noise impact assessment indicates that the for all meteorological conditions and assessment periods the predicted noise levels from the Project are significantly below the existing approved Site B noise levels. Additionally, the predicted noise levels at all representative receiver locations are significantly below the existing ambient noise levels at all non-industrial receiver locations. As such the noise impacts from the Project operations are not predicted to increase at any of the non-industrial receiver locations as a result of the Project.

No items of plant and equipment used in operation of the Project site are expected to generate significant levels of vibration and the nearest residential (vibration sensitive) receivers are located approximately 1,400 m from the Facility, therefore, operational vibration impacts are consequently expected to be negligible.

Sleep Disturbance

A sleep disturbance assessment has been conducted, which indicates compliance at all assessment locations during the night-time period.

Cumulative Noise Impacts

As the noise impacts from Vopak Site B operations are not predicted to increase at any of the non-industrial receiver locations as a result of the Project, cumulatively the noise levels at receiver locations would not increase as a result of the Project.

As described previously Vopak has proposed amendments to its existing Site B terminal. There is potential for works to be undertaken on both sites concurrently. Despite this it is noted that the proposed Site B works relate primarily to the upgrade or replacement of plant and equipment and does not include significant construction works or activities that would result in significant noise. Accordingly the SEAR's for the section 75W modification to Site B did not require a quantitative noise assessment for the Project. As the works on Site B would result in minimal noise generation and due to the industrial nature of the area, cumulative noise impacts are expected to be negligible. Additionally there are no other major construction works planned for the area that might result in a significant cumulative noise impact.

Summary

Noise impacts associated with the Project would be within the relevant project environmental noise criteria.

Subject to approval, the existing noise management practices included in Vopak's OEMP would be implemented across the Project site.

15.0 Soil and Water

15.1 Existing Environment

Surface Water

The topography of the Site is relatively flat. It is separated by roadways (Prince of Wales Drive and Simblist Road) from Yarra Bay, which lies due east and forms part of the larger Botany Bay. Botany Bay is a major estuarine embayment with the overall Botany Bay catchment managed by the Sydney Metropolitan Catchment Management Authority. Two major waterways feed into the catchment: Georges River which enters Botany Bay from the southwest and Cooks River which enters Botany Bay from the northwest (DoE, 2015).

Water quality within Botany Bay is heavily influenced by the tidal regime and the flow of freshwater into the bay, especially after large rainfall events. Much of Botany Bay catchment is highly developed, and almost 40 percent of the 1,165 km^2 area of the catchment is used for urban, industrial or commercial purposes (DoE, 2015). The catchment is subject to ongoing threats caused by nutrient and sediment-laden run-offs from various non-agricultural uses. Contaminants enter Botany Bay via several pathways, including discharge through the stormwater network, groundwater inflows, surface runoff from foreshore catchments or via the major and minor tributaries that feed Georges River and Cooks River. Pollutants of particular concern include nitrogen, phosphorous and total suspended solids (DoE, 2015).

Surface water at the Site and its surrounds falls under the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2011* (Office of Water, 2011c and d). Surface water at the Site is therefore managed under the provisions of the WM Act (refer **Table 9**).

Groundwater

The Site is located above two aquifer systems (Qenos, 2013). The Botany Sands aquifer comprises a large volume of unconfined ground water within the sandy grounds surrounding Port Botany (Office of Water, 2015). A further, underlying confined aquifer lies within the Hawkesbury Sandstone, which is itself divided into upper and lower systems divided by a shale band. There is some connectivity between the upper Hawkesbury aquifer and the overlying Botany Sands aquifer (Qenos, 2013).

Previous investigations at the site encountered groundwater at a depth of approximately three to four metres below ground level (Jacobs 2015).

The Botany Sands groundwater and all groundwater contained within aquifers beneath this resource are governed by the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011* (Office of Water, 2011b). This groundwater is therefore managed by the provisions of the WM Act (refer **Table 9**). Groundwater management in NSW is also to be undertaken in accordance with the *NSW Groundwater Quality Protection Policy* (DPI 1998) in which the objectives are to protect the groundwater resource in NSW.

Soils

Port Botany was subject to land reclamation works in the 1970's. Soils at the Site are therefore highly disturbed. The Site is located within the central coastal portion of the Sydney Basin, comprising a sequence of Permo Triassic sandstone and shales, overlain in part by Cainozoic sediments. Diatremes, dolerite dykes and dolerite sills varying in age from Jurassic to Tertiary intrude the gently deformed sedimentary sequence (SKM, 2007). According to LEP 2012, the Site is not located in an area classified as having acid sulfate soils.

A search of the EPA contaminated land register was conducted for the Randwick local government area and no sites were identified within the Port Botany area (EPA 2015). Consultation with NSW Ports confirmed that asbestos fragments have been previously discovered onsite.

While no site-specific geotechnical information is available at present, Douglas Partners and Aurecon have carried out geotechnical investigations on adjacent sites in Port Botany for Vopak. Relevant investigations near to the Site include:

- Proposed Storage Tanks 49 Friendship Road Vopak Site A - Geotechnical Investigation carried out by Douglas Partners in November 2011 (Provided by Vopak);
- Proposed Fuel Storage Facility at Port Botany – Geotechnical Investigation carried out by Douglas Partners in October 1994 (Provided by Vopak);

- New Bulk Storage Tanks Friendship Road, Port Botany – Geotechnical Assessment carried out by Douglas Partners in November 2005 inside the Vopak Bulk Liquid Storage Terminal (Provided by Vopak); and
- Proposed Storage Tanks Vopak Site B – Stage 3A Expansion Corner Fishburn Road and Friendship Road Port Botany – Geotechnical Investigation carried out by Douglas Partners in November 2007 (Provided by Vopak).

Initial designs for Project have been undertaken on the basis of the information with detailed design to be finalised following site geotechnical investigations. Existing information indicated there are no geotechnical constraints to the Project.

Contamination

In order to satisfy a conditions of consent for a development application (DA 6329), for the demolition of the previous site infrastructure, former site tenants Qenos engaged Jacobs to undertake a contamination assessment for the subject site. This contamination assessment (Jacobs, 2015) concluded that no indications of contamination were observed. Similarly laboratory analysis indicated that soil and groundwater met the relevant contamination criteria for commercial and industrial land uses. The results of Jacobs (2015) were reviewed in a Site Audit Report prepared by Environ (2015) which supported Jacobs's findings. A copy of the Site Audit Report is attached at **Appendix L.**

15.2 Potential Impacts

Surface Water

Water quality within Botany Bay is heavily influenced by the tidal regime and the flow of freshwater into the bay, especially after large rainfall events. Any impacts to water quality during construction are likely to be localised and it is not anticipated that impacts would have a significant impact on sensitive habitats/communities within Botany Bay. The Project would not directly impact surface waters but there is potential for sediment or contaminated runoff to enter the nearby Yarra Bay water and potentially affect water quality. The potential construction and operational impacts are therefore summarised as:

Construction

Impacts to local water quality could occur during construction as a result of:

- Sediment laden runoff from spoil stockpiles (resulting from excavation) entering the waterway;
- Potentially contaminated fill material brought onsite entering the waterway; and
- Uncontained hydrocarbon spills entering the waterway.

Significant impacts to surface water quality are not anticipated as a result of the Project. However, best practice measures for the management of runoff from the Site would be put in place as part of standard site management. Contingency measures would be identified in the event that contaminated soils, including materials potentially containing asbestos, are encountered.

Operation

The primary source of potential surface water impacts from a result of the operation of the Project would be from the release of hydrocarbons from the site to local receiving waters, specifically Botany Bay. Fugitive hydrocarbons may result from leaks and spills from pipes and pumps, spills from loaded trucks and leaks form the storage tanks themselves. For the following reasons however it is considered that the potential for the release of hydrocarbons to occur to stormwater and wastewater is unlikely:

- Stormwater generated onsite is collected at the central process road and yard would drain to the Final Inspection Pit prior to being released into Botany Bay. This Pit would normally be closed and would only be opened for release after inspection;
- Stormwater collected on the perimeter roads would drain either to vegetated areas at the perimeter, or in the case of the northern perimeter road, would drain to the existing stormwater system feeding into Botany Bay (to avoid flows onto neighbouring property). This minimises clean water flowing through the fuel storage areas thereby limiting the potential for this water to come in contact with, and transport offsite, any fugitive hydrocarbons present;
- Bundwater for proposed tanks have been designed to accommodate a 1:20 year 24-hour storm, with the ability to drain such a storm event within 12 hours. Stormwater including runoff from those areas of the site

outside the tanks bunds would drain to the proposed Site B4 interceptor, which allows for the collection and removal of hydrocarbons prior to discharged to Botany Bay via the licenced discharge point. The discharge Pit would normally be closed and would only be opened for release after inspection. Any resulting wastewater that cannot be discharged to Botany Bay is then transferred to the existing Site B slops system for disposal;

- Each product tank would have a dewatering system comprised of a quick flush tank with dedicated diaphragm pumps. Water drained from the storage tanks to the quick flush tank would be transferred via piping to the existing slops system in Site B. Clean product in the quick flush tank would be pumped back to the product tank. Disposal of bulk water would be by Vopak's existing disposal arrangements; and
- Areas containing storage tanks, pipe connections, pumps and manifolds can be susceptible to spillage, therefore stormwater from these areas would be treated via a Plate Interceptor prior to discharge to the Final Inspection Pit. This pit would normally be closed and would only be opened after inspection. Slops caused by maintenance activities including pipeline draining, spills, compound sump contamination and the interceptor pit would also be collected and pumped back to the Site B slops system.

Groundwater

The risk of impacting groundwater is restricted to excavation works of levelling the site, footings and foundations for structures to be constructed. The tank foundations to be constructed are approximately one metre thick while footings for the bund walls would be approximately one metre deep.

Impacts on groundwater are unlikely during construction due to the shallow (approx. 1 m) depth to which excavations are required compared to local groundwater levels which are typically around three to four metres (Jacobs, 2015) below ground level.

Due to the permeability of the Botany sands and the shallow table of this aquifer, the Botany Sands aquifer is vulnerable to contamination. Contamination from any escaped or spilled substance at the site is therefore likely to accumulate in soils and eventually leach into the Botany Sands aquifer.

Potential operational impacts to groundwater would be managed through the implementation of surface water management controls as detailed above to minimise the potential for hydrocarbons to enter soils and then groundwater.

In addition to the surface water controls, Vopak would continue to implement its existing groundwater monitoring program which, in accordance with its EPL requirements. The groundwater monitoring network would be modified to cover the Project area and require Vopak to undertake regular groundwater monitoring events to examine for the presence of contaminants. If contaminants are identified they would be reported to the EPA and investigations undertaken to determine the source of pollution and establish appropriate corrective actions to minimise any environmental impacts and avoid further occurrences.

Soils

Soil disturbance would occur during excavation for tank foundations, bund walls, stormwater drainage systems and pipe culverts. In general, excavation is minimal for the size of the Project as the design intent is to keep all services, such as pipework and cabling, above ground. The risk of erosion during construction is low given the flat topography.

The risk of encountering acid sulfate soils is low given all excavation would be undertaken in soils laid down as part of the land reclamation works in the 1970s. In addition, there are no EPA records of declared contaminated soil sites near the B4 Site. However, contingency measures would be identified to manage works in case either acid sulfate soils or contaminated soils are encountered.

15.3 Management and Mitigation Measures

Management of soils during construction, including sediment and erosion controls, would be detailed in the revised Site B CEMP.

The existing Site B OEMP, prepared for the Terminal, provides a framework to effectively manage the potential pollution of receiving waters from onsite stormwater through effective design of stormwater controls, appropriate staff training and suitable water quality monitoring and testing. These Plans for the existing Site B would be updated, where relevant and in consultation with DP&E, to incorporate the Project.

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16.0 Waste

16.1 Existing Environment

The Site is not currently operational, and therefore does not currently produce waste. Existing Vopak operations in adjoining stages that fall outside of the Project would operate a single waste management system incorporating the Project subject to approval. Any waste from Project would be similar to Site B with the primary source of wastes being from the generation of slops from draining water from the storage tanks. Waste parts and materials are generated during maintenance to plant and equipment as necessary. Small amounts of general wastes are also generated from the existing Vopak office employees on Site B.

16.2 Potential Impacts

Construction

Waste products and waste generating processes employed during the construction works are likely to include the following:

- Surplus materials;
- Excess cut from excavation works;
- Equipment and vehicle fluids (e.g., fuel and oil); and
- Sewage and other waste, such as food scraps, as a result of the presence of the construction workforce.

The handling and final disposal of these wastes has been determined based on regulatory guidelines and industry standards. Waste management would be in line with the operation of the existing Terminal, and in accordance with the relevant management plans.

Wastes that would be generated during the construction of the Project would be primarily associated with materials used in the packaging of plant and equipment to the Site. The sources of waste and indicative quantities are provided in **Table 30**.

Table 30 Construction Waste

Source	Estimated Quantity (tonnes)
Surplus construction waste such as: - Scrap metal; - Asphalt; - Timber formwork; - Spent Erosion and Sediment control materials; - Fencing; and - Soil. **Approx. Total**	 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 **<0.6**
Excess cut	~1.3
Wastes from toilets and bathrooms[1].	8
Office waste such as paper, ink cartridges, toner and cardboard.	1
Waste from construction personnel including putrescibles and recyclable wastes.	1
Packaging Waste including: - Plastics; - Timber pallets; - Metal wires; and - Cardboard.	3

1. *Projected waste water quantity is based on NSW Department of Health's general allowance of 200L of water per person per day*

Operation

The Project would not generate a significant volume of waste as a consequence of the proposed storage of fuel products. The Project in addition to the existing Site B would not result in a significant increase in operational waste.

Wastewater in the form of slops would be generated when water is drained form the storage tanks of if leaks or spills occur. Where possible fuels from wastewater would be recovered and returned to the relevant storage tank. As required, waste water would be removed from storage tanks by licenced contractors for treatment and disposal at a licenced facility.

16.3 Management and Mitigation Measures

The waste strategies during the construction phase of the Project would be detailed in the CEMP. Construction waste management strategies can be summarised as the application of the waste hierarchy where the following would be employed, in order of preference:

Avoidance – The generation of wastes from the Project would be avoided where possible.

Reduce – Reduce resource consumption, procure materials with less packaging and implement practices to reduce waste.

Reuse – Where feasible, materials would be reused onsite. However, due to the limited waste streams generated onsite, reuse options may be limited.

Recycling – Paper, cardboard, glass and plastics would be available for recycling. A bin would be placed adjacent to the office which would be collected by a waste management contractor on a regular basis.

Disposal – Disposal of wastes would be minimised where possible. Putrescibles wastes from the office would be sent to landfill, with other wastes generally diverted for recycling.

Waste strategies would be met through the extension of the waste measures in the OEMP, which would be incorporated into the operation of Project and includes the following key measures:

- A sufficient number of suitable receptacles for general waste and recyclable materials would be provided for waste disposal on site, including sufficient bins to allow separation of wastes for recycling and conform with OEH guidelines for construction waste;
- All waste would be securely stored to ensure that any pollutants are prevented from escaping; and
- All waste would be managed in accordance with *Environmental Guideline: Assessment, Classification and Management of Liquid and Non-Liquid Waste (1998)*.

17.0 Greenhouse Gas Emissions and Climate Change

17.1 Existing Environment

Greenhouse gases (GHGs) are gases found in the atmosphere that absorb outgoing heat reflected from the sun. The primary GHG is carbon dioxide (CO_2). Different GHGs have different heat absorbing capacities. In order to achieve a basic unit of measurement, each GHG is compared to the absorptive capacity of CO_2, and measurements and estimates of GHG levels are reported in terms of CO_2 equivalent emissions (CO_2-e).

Estimation of the GHG emissions associated with the Projects operations was undertaken using the emission factors and methods outlined in the National Greenhouse Accounts (NGA) Factors. The NGA Factors provide three types of assessment categories:

- **Scope 1**, which covers direct emissions from sources within the boundary of an organisation, such as fuel combustion and manufacturing processes;
- **Scope 2**, which covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation; and
- **Scope 3**, which includes all other indirect emissions that are a consequence of an organisation's activities but are not from sources owned or controlled by the organisation; that is, emissions associated with the production of fuels, and emissions associated with the transmission and distribution of purchased electricity.

In terms of climate change, guidance was taken from the *NSW Sea Level Rise Policy Statement* (NSW Government, 2099), which cites the predicted sea level rise along the NSW coast relative to 1990 mean sea levels as 40 cm by 2050 and 90 cm by 2100. However, higher rates of sea level rise are possible, as noted by the Intergovernmental Panel on Climate Change. The B4 Site and its adjoining lands are topographically flat and lie around 3.8m AHD. While climate change is anticipated to alter a range of natural phenomena such as increased temperatures, natural hazards and rainfall, the greatest risk related to climate change for the Randwick local government area has been identified as potential flooding from more frequent extreme weather events including high intensity rainfall and storms, as opposed to predicted sea level rises facing other coastal areas (Randwick City Council, 2015).

17.2 Potential Impacts

The main operations likely to generate GHGs as a result of the Project are:

- Electricity to run plant operations such as administration buildings, fuel pumps, and plant lighting (Scopes 2 and 3);
- Delivery and distribution of fuels via road and ship tanker (Scope 3);
- Passenger vehicles transporting staff to and from site (Scope 3); and
- Combustion of fuel distributed from the Facility (Scope 3).

An assessment of the potential Scope 1, 2 and 3 emissions generated by the Project was undertaken as part of the Air Quality Impact Assessment contained in **Appendix H**. The total estimated GHG emissions associated with operation of the Project are summarised in **Table 31**.

Table 31 Greenhouse Gas Emissions Summary

Activity	Estimated GHG Emissions (t CO_2-e/year)
Electricity consumption	594
Fuel consumption – delivery and dispatch (truck)	9,201
Fuel consumption – delivery (ship)	75,328
Fuel consumption – staff commuting	33
Fuel consumption by end users	926,204
Total GHG emissions	**1,011,360**

The total estimated GHG emissions associated with operation of the Project are shown in **Table 31**. The scale of these emissions in the broader context of GHG emissions from the transport and storage sector and from Australia as a whole is not considered significant. As shown, the total emissions of the proposed expansion were estimated at 1 Mt CO_2-e per year, equating to approximately 0.18 percent of the total Australian emissions (554.57 Mt CO_2-e) and 3.8 percent of the total transport, postal and warehousing emissions (26.8 Mt CO_2-e) in Australia in 2012. The greatest contributor to emissions would be the consumption of the fuel supplied by Vopak end users (91.6 percent of Vopak's estimated emissions).

The relationship between GHG concentrations and climate change is very complex and nonlinear. As such, the effect of the emission of this amount of GHGs on the environment or climate change cannot be estimated. The proposed development represents a minor source of GHG emissions, both in terms of the economic sector emissions and Australia's national emissions. As such, the GHG emissions associated with the proposed expansion are not expected to significantly adversely affect the environment.

A qualitative climate change risk assessment was undertaken for the Project, according to the *Guide to Climate Change Risk Assessment for NSW Local Government* (OEH, 2011). This risk assessment is outlined in **Table 32,** and demonstrates that the climate change risk for the operational B4 Site would be low.

Table 32 Qualitative Climate Change Risk Assessment

Risk	Existing Control	Effectiveness of Control	Consequence	Likelihood	Risk Rating
Flooding and inundation/ Changes to rainfall intensities	Existing and proposed structures / emergency access and egress are above sea level / flooding levels.	Good	Low	Possible	Low
	Proposed tank bunds to accommodate 1:20 year 24-hour storm with ability to drain within 12 hours.	Good	Low	Possible	Low
Increased frequency and intensity of heatwaves/ increased temperatures	Site infrastructure engineered to withstand temperature extremes and ensure hazards from both flammable and combustible products are managed appropriately.	Good	High	Negligible	Negligible
Increased occurrence of extreme weather events, causing natural hazards such as bushfire, erosion, salinity and droughts	Infrastructure situated on hardstand so erosion and salinity not high risk. Also not in bushfire risk zone. Use of drinking quality water onsite is minimal, and would therefore not be significantly impacted by drought conditions and resulting water restrictions. Fire water for managing incidents onsite could be replenished from nearby seawater if drought restrictions so necessitate this.	Good	High	Negligible	Negligible
Falling trees due to extreme weather events	No trees of height located so as to damage infrastructure if they were to fall	Good	Low	Negligible	Negligible

17.3 Management and Mitigation Measures

The existing Site B OEMP would be updated to include an Energy Efficiency Plan. This plan would include measures for the recording of energy use and benchmarking this against throughput. If discrepancies between levels of operation and energy use are identified more detailed investigations can then be undertaken, for example to identify plant or equipment that may not be functioning correctly which needs maintenance or replacement.

Should the Project be approved, an Energy Efficiency Plan would be prepared as part of the existing Site B OEMP to include key elements of the Project and to describe how the plan would be applied across the entire terminal and a timeframe for this to occur.

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18.0 Visual Amenity

18.1 Existing Environment

The existing urban environment of Port Botany is a working port environment, dedicated to servicing import and export operations. Ongoing development of the port and related landside industries has occurred over several decades. In the vicinity of the existing Vopak terminal the visual catchment is dominated by a combination of tank farms and container import and distribution activities. Quay cranes at the Port are up to 110 m AHD when the boom is extended to its vertical limit.

Topographically the suburbs the surrounding the port are flat with little variation of terrain that would afford views to the Site. The nearest residential land use can be found approximately 1.4 km to the southeast at Phillip Bay. The suburbs of La Perouse, Phillip Bay and Henry Head, located to the southeast along the shoreline from Port Botany, provide recreational users along the shoreline with a viewing vista towards Molineux Point.

On a local scale, the site of the Project is generally flat and cleared of vegetation and has low amenity value due to existing local associated with the former Qenos operation and the scenic dominance of the container terminals and Sydney Airport.

The nearby surrounding storage tanks to the east of the Site B Terminal include the Qenos Ethylene storage facility and Vopak's Bulk Liquids Storage Terminal. These facilities have approximate tank heights of up to 26.9m. Container cranes in the locality exceed 55m in height. These developments provide a context upon which the Project can be assessed.

18.2 Potential Impacts

Copies of an artist's impressions of the Project from an aerial view and a visual montage of what the Project may look like from Yarra Bay are contained in **Appendix J**.

The locations of the tanks proposed as part of the Project are within an area bounded on all sides with operations or features which provide a visual shield from receives in the local area, including:

- North – Qenos operations to the immediate north and the Port Botany container terminals beyond that;
- South – Australian Container Freight Services (including café located at this site);
- East – the Port Botany sea wall which raised to a height of approximately 24m; and
- West – the existing Vopak terminal and Bulk Liquid Berths then Botany Bay.

The largest proposed tanks would reach a height of approximately 30m above ground level when incorporating the roof domes. This height is similar to the height of tanks on neighbouring sites (approximately 30m) as the tanks design is similar to the existing Vopak Terminal tanks. Tanks would be white in colour as a white colour attracts less heat and therefore leads to lower vaporisation of the fuels in the tanks.

Given the offset distances to the nearest sensitive receivers would be approximately 1.4km, the tanks being similar heights with surrounding tanks on surrounding sites and given the industrial nature of the area, the Site is expected to have a minor impact on the visual amenity of the area.

Security and safety lighting would be provided across the entire Project to ensure visual access would be available at all times to monitor the tanks. Lighting would be downward directed to minimise light spill from the site. The lights proposed for Site B4 would shield existing visual access of the lighting on the existing Site B site from the nearest receivers to the east making overall impacts negligible. Furthermore due to the offset distances light spill impacting sensitive receivers is highly unlikely.

It is noted that the Port Botany Development Code includes visual amenity provisions for projects within Port Botany. As detailed in **Section 7.5**, an assessment was undertaken for the Project, which concluded that it would be consistent with the requirements of the Port Botany Development Code.

Once operational, the finished Site B4 would be levelled to around 3.86 AHD (currently 3.8 AHD). The tallest tanks onsite would be around 33.11 m AHD. Tank elevation drawings are contained in **Appendix A**.

18.3 Management and Mitigation Measures

A Landscape Plan would be prepared to manage the visual amenity of the Project. It is noted that other management practices such as the appropriate separation, storage and removal of waste would maintain the Project in a tidy working order. The management of waste is detailed in **Section 16.0**.

19.0 Other Environmental Considerations

19.1 Social and Economic

The Project would generate positive economic benefits for Sydney and NSW through:

- The capital investment required for the construction of the Project. The current estimated cost of the Project is approximately $116million (refer **Appendix K**);
- Employment:
  - Construction - at the peak of construction, 100 jobs would be generated with construction estimated to take 17 months;
  - Operation - for the terminal staff, contractors and road tankers drivers who would service the Project; and
- Through the provision of liquid fuels to drive the economy of NSW. Importantly the Project would help meet expected future growth in demand.

In addition to the direct positive economic benefits of the Project, the construction and operation of Site B4 would see currently underutilised port land being used for an improved land-use and therefore an improved economic use.

The potential negative impacts associated with the Project and potential to impact the community include traffic, noise, air quality, odour and potential hazards and risks associated with the storage of combustible and flammable fuels. Each of these key areas has been assessed in this EIS and appropriate mitigation measures have been recommended to minimise impacts and risk to acceptable levels.

Ongoing community consultation would be undertaken by Vopak through its existing community consultation activities.

19.2 Ecology

The Port Botany site on which the Project is proposed was originally created as part of a land reclamation program. The Site lies within a heavily industrialised area which following reclamation has undergone significant land modification and development. The Site forms part of the former Qenos site, which formerly housed a number of chemical storage tanks and associated pipe gantries and control systems.

Flora is limited to maintained open grassed areas within the undeveloped portions of the site and several clusters of trees, which exist along the western boundary of the site adjoining Friendship Road. These trees are identified as a mix of Eucalyptus, Casuarina and Acacias which were planted as part of landscaping works following the completion of the reclamation of this area of the Port. Due to the isolated nature of these trees within a heavily industrialised area with no other significant or connective vegetation in the vicinity, these trees are of marginal ecological value, and do not support habitat for any threatened fauna species. While consideration would be given to the retention of individual trees where feasible, existing tree species are incompatible with the preferred landscape tree species identified in the Port Botany Development Code for use in landscape plantings in the Port, and are also incompatible with NSW Port's landscaping requirements for potential fire risk facilities. Approval, however, is sought in this EIS to remove all trees currently onsite.

To facilitate the development of the Project, the entire grassed area would need to be reformed to a hardstand area to house the proposed tanks and bunds. To allow room for access, pumps transformers switch room and other logistical elements the trees along the western boundary would need to be removed. Given the limited amount of vegetation or habitat on the site or adjoining sites, impacts on biodiversity would be negligible. This include impact on those EPBC listed species as discussed in **Section 7.1.1**.

No weeds have been identified on the Site. In the event of any future weed infestation, these would be managed in accordance with Vopak's OEMP.

19.3 Heritage

Searches were conducted of the following heritage listings/databases in May 2015:

- Aboriginal Heritage Information Management System (AHIMS);
- Randwick LEP 2012 (for reference only as it does not apply to the site);
- NSW State Heritage Inventory; and
- Australian Heritage Database.

These searches did not reveal any known European or Aboriginal heritage items in the vicinity of the Site.

The nearest heritage item to the Site is the Port Botany Revetment Wall (sea wall) which is listed on the Port Botany, Port Lessor Section 170 Heritage Register. The Port Botany Revetment wall, also known as Banks Wall, is approximately 80m to the east of the subject site (Refer **Figure 2**) and separated by both Simblist Road and Prince of Wales Drive. No direct impacts are expected to occur to the Revetment Wall as a result of the Project.

Given the relatively recent history of land reclamation to develop Port Botany and the recent demolition activities associated with the demolition of the Qenos Propane and Butane tanks, the presence of unknown Aboriginal or European artefacts that could be disturbed during the Project is considered negligible.

No specific management measures are considered necessary to manage potential impacts to heritage items.

20.0 Cumulative Impacts

The environmental assessment for the Project has taken into consideration background environmental data, where appropriate, to incorporate a cumulative assessment of potential environmental impacts into the EIS. The results of this assessment concluded that it is likely that the Project would result in insignificants impacts to the community and environment.

It is recognised that the Project would operate as part of the larger and existing Vopak terminal. The Project would be a satellite tank farm providing additional storage capacity only to the existing Vopak terminal Site B. The Project would not in itself generate additional impacts such as operational traffic or truck gantry emissions typically associated with terminal operations. Instead environmental assessments undertaken for Site B have incorporated the additional throughput capacity the Project would provide (including but limited to air quality, noise, hazard and risk and traffic impacts). As these assessments for Site B concluded there would be no significant environmental or community impacts, the Project is similarly unlikely to have such impacts.

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21.0 Residual Risk Analysis

21.1 Methodology

This risk analysis for the Project is based on a process adapted from the Australian Standard *AS/NZS ISO31000:2009 Risk management – principles and guidelines*. The process is qualitative and based on the residual risk matrix. Residual environmental risk is assessed on the basis of the significance of environmental effects of the Project and the ability to confidently manage those effects to minimise the risk of harm to the environment.

The significance of environmental effects is given a numerical value between one and five, based on:

- The receiving environment (its sensitivity and values);
- The level of understanding of the type and extent of impacts; and
- Likely community response to the environmental consequences of the Project (refer to **Table 33**).

The manageability of environmental effects is similarly given a numerical value between one and five based on the complexity of mitigation measures, the known level of performance of the safeguards proposed, and the opportunity for adaptive management (refer to **Table 34).**

The chosen numbers are added together to yield a result which provides a ranking of potential residual effects of the Project when the mitigation measures identified in this EIS are implemented (refer **Table 35**).

Table 33 Significance of Effects

Significance	Receiving Environment
Extreme	Undisturbed receiving environment, type or extent of impacts unknown, substantial community concern.
High	Sensitive receiving environment, type or extent of impacts not well understood; high level of community concern.
Moderate	Resilient receiving environment, type and extent of impacts understood; community interest.
Minor	Disturbed receiving environment; type and extent of impacts well understood; some local community interest.
Low	Degraded receiving environment; type and extent of impacts fully understood; uncontroversial project.

Table 34 Manageability of Effects

Significance	Mitigation Measures
Complex	Complicated array of mitigation measures required; safeguards or technology are unproven; adaptive management inappropriate.
Substantial	Significant mix of mitigation measures required; past performance of safeguards is understood; adaptive management feasible.
Straightforward	Straightforward range of mitigation measures required; past performance of safeguards is understood; adaptive management feasible.
Standard	Simple suite of mitigation measures required; substantial track record of effectiveness of safeguards; adaptive management unlikely to be required.
Minimal	Little or no mitigation measures required; safeguards are standard practice; adaptive management not required.

Table 35 Residual Risk Matrix

Significance of Effects	Manageability of Effects				
	Complex	Substantial	Straightforward	Standard	Minimal
Low	Medium	Low/Medium	Low/Medium	**Low**	**Low**
Minor	High/Medium	Medium	Low/Medium	Low/Medium	**Low**
Moderate	High/Medium	High/Medium	Medium	Low/Medium	Low/Medium
High	**High**	High/Medium	High/Medium	Medium	Low/Medium
Extreme	**High**	**High**	High/Medium	High/Medium	Medium

21.2 Analysis

The analysis of residual environmental risks for issues related to the Project is shown in **Table 36**.

This analysis indicates the environmental risk profile of the Project based on the assessment of environmental effects, the identification of appropriate mitigation measures and the Summary of Mitigation Measures provided in **Section 23.0**.

Table 36 Residual Risk Profile

Issue	Initial Risk Rating (No Controls)			Residual Risk Rating (Controls in Place)
	Significance of Effects	Manageability of Effects	Risk Score	Residual Risk
Hazard and Risk	Minor	Standard	Low/Medium	Low/Medium
Traffic	Low	Standard	Low	Low
Air Quality	Moderate	Standard	Low/Medium	Low/Medium
Noise and Vibration	Minor	Minimal	Low	Low
Soils and Water	Low	Minimal	Low	Low
Waste Management	Low	Standard	Low	Low
Greenhouse Gas	Low	Minimal	Low	Low
Visual Amenity	Minor	Minimal	Low	Low
Social and Economic	Minor	Minimal	Low	Low
Ecology	Low	Minimal	Low	Low
Heritage	Low	Minimal	Low	Low

21.3 Conclusion

The above residual risk analysis indicates that the Project, including appropriate mitigation measures as outlined in this EIS, would give rise to predominately low and low/medium residual risks in relation to the identified environmental issues.

Part G – Environmental Management and Monitoring

This Part provides a description of the environmental management and monitoring measures that would be implemented during the Project, and the environmental management frameworks within which these measures would be implemented.

22.0 Environmental Management

22.1 Environmental Management and Monitoring Plan

22.1.1 Objectives

The key objectives of the environmental monitoring and management of the Project are to:

- Prevent, reduce and effectively manage potential impacts to the environment resulting from operations and maintenance of the Vopak Site B4 Terminal (the Project);
- Promote environmental awareness amongst Vopak employees and contractors to ensure that operations and maintenance of the Site B4 Terminal are conducted with due diligence to the environment; and
- Include information covering those controls established to minimise environmental impacts from operations.

22.1.2 Outline Construction Environmental Management Plan

Prior to undertaking construction activities, Vopak or its construction contractor would prepare a Construction Environmental Management Plan (CEMP) to guide the implementation of environmental controls, management and reporting through the constructing phase of the Project. The CEMP would include the following key elements:

- Environmental policy;
- Environmental management structure;
- Communication and responsibility;
- An environmental risk assessment;
- Environmental incident / complaint management procedure;
- Emergency contacts and response;
- A reference list of applicable project environmental documentation including client and contractor environmental plans and procedures (for monitoring, reporting and corrective actions);
- Environmental management controls in relation to:
    - Air quality;
    - Water – stormwater / surface water;
    - Soil and groundwater;
    - Waste
    - Noise; and
    - Traffic and transport.
- An Audit and Update Schedule; and
- Environmental management plan review.

The CEMP would be prepared in consultation with key agency stakeholders including the EPA, NSW Ports and Randwick Council, with evidence of consultation provided to DP&E.

It is expected that the commencement of construction works, would not commence until DP&E has issued its approval.

22.1.3 Outline Operation Environmental Management Plan

In accordance with the Project Approval requirements for the existing Site B Facility, Vopak has implemented an Operational Environmental Management Plan (OEMP) (Sherpa December 2013) which includes a range of

management plans for the control of various operational systems and environmental aspects. This suite of documents includes:

- Environment, Health and Safety Management System (including legislative framework and standards applicable to operations);
- Safety, health, environment and quality policies;
- Emergency, accident and incident reporting system;
- Sensitive receptors in proximity to the Site;
- Potential contributors to offsite pollution impacts;
- Environmental management controls and mitigation measures in relation to:
    - Air quality;
    - Water – stormwater / surface water;
    - Soil and groundwater;
    - Waste;
    - Noise; and
    - Traffic and transport.
- Reporting and auditing mechanisms; and
- Contingency plans for complaints and pollution incidents.

The OEMP was prepared in consultation with the DP&E. These plans would be reviewed and updated for the Project in consultation with DP&E and other relevant stakeholders.

22.1.4 Environmental Auditing and Reporting

Vopak would undertake regular environmental audits to provide DP&E with resulting audit reports regarding the environmental performance of the Project. Proposed Audit frequencies are:

- An annual review of operations and consistency against the conditions of approval one year from the commencement of operations;
- An independent environmental audit one year from the commencement of operations and every 3 years thereafter; and
- Annual environmental reporting to the EPA in accordance with the EPL requirements.

The proposed Audit frequencies would be as above or as otherwise specified or agreed with DP&E. Pending the outcomes of these audits, Vopak would undertake necessary corrective actions to address matters identified by the audits. Details of audits, there outcomes, the corrective actions recommended and the effectiveness of these actions would be reported to DP&E within an agreed timeframe.

23.0 Summary of Mitigation Measures

The following summary of mitigation measures provides a summary of the environmental management and monitoring that would be undertaken as part of the Project.

Vopak commits to updating its existing Operational Environment Management Plan as currently in operation for Site B, incorporating Site B4 and relevant management measures for the Project as detailed in **Table 37**.

Table 37 Summary of Management Measures

Environmental Aspect	Commitments and Mitigations
Management Plan	- Construction Environmental Management Plan will be prepared for the construction of the Project. The CEMP will be prepared in consultation with DP&E; and - Vopak will undertake review and update to their existing OEMP in consultation with DP&E as required by the Project.
Hazards and Risks	- The effectiveness of the safeguards assumed to be in place and accounted for in the QRA should be verified as part of the design process; - Vopak undertake a review of emerging engineering measures (for example modification to tank top design) that may be able to be implemented to eliminate formation of large flammable clouds due to tank overfill scenarios; - As part of the review of the emergency response plan (ERP) that will be required for the Project, Vopak with input from Australian Container Freight Services undertake a review of access/egress from the Australian Container Freight Services site to determine if any additional emergency access or exit provisions are required in the event of an incident at the B4 site; and - As part of the Final Hazard Analysis (which will be prepared prior to operations commencing), checklists identifying the key assumptions and constraints in the QRA at the final design stage of the Project will be developed. These will be an update to the checklists prepared for Site B as part of the current Section 75W QRA, and will simplify the hazard analysis update requirements for future changes should they arise.
Traffic and Transport	- A Construction Traffic Management Plan will be prepared for the construction of the Project to manage construction traffic impacts. This will be incorporated into the Project CEMP; - A Traffic Management Plan was prepared for the existing Site B Facility, in accordance with the Site B project approval, and was prepared in consultation with the now DP&E. this will be reviewed and updated to include the Project; - Measures identified to manage potential traffic impacts include: • An induction process for drivers; • Entry and exit conditions and requirements; • Site traffic movements; and • Approved operational access and egress routes.
Air Quality	- A Construction Air Quality Management Plan will be prepared for the construction of the Project to manage construction air quality impacts (notably dust). This will be incorporated into the Project CEMP. - The existing OEMP currently in place for the operating Site B Facility will be reviewed and updated to ensure all reasonable and feasible air quality management measures have been incorporated into the operation of the Project. - All vehicles and plant/equipment should be fitted with appropriate emission control equipment and be serviced and maintained in accordance with the manufacturers' specifications. Smoke from vehicles/plant should not be visible for more than ten seconds; - Trucks entering and leaving the premises that are carrying loads of dust-generating materials must have their loads covered at all times, except during loading and unloading; - Hard surfaces or paving should be used where possible, as unpaved routes can account for a significant proportion of fugitive dust emissions, particularly during dry/windy conditions. Routes should be inspected regularly and repaired when necessary, and roads should be swept and watered as required to limit dirt/dust

Environmental Aspect	Commitments and Mitigations
	build up and potential dust generation during windy conditions; - Any areas on site that are not covered with hard surfaces should be vegetated wherever possible to minimise wind erosion and associated dust generation; - All vehicles should be switched off when not in use for extended periods; - Water carts and/or road sweeping will be used to minimise dust generation. The frequency of these management measures will be increased during dry windy conditions; - Stockpiles where hazardous material has been encountered will be wetted and covered; - Active excavation area works will be wetted down with hoses; and - Housekeeping will be maintained to keep exposed areas to a minimum.
Noise and Vibration	- A Construction Noise Management Plan will be prepared for the construction of the Project to manage construction noise impacts. This will be incorporated into the Project CEMP; and - The existing OEMP currently in place for the operating Site B Facility will be reviewed and updated to ensure all reasonable and feasible noise and vibration management measures have been incorporated into the operation of the Project.
Soil and Water	- A Sediment and Erosion Control Plan and a Soil and Water Management Plan will be prepared for the construction phase of the Project. Both these plans will form part of the CEPM for the Project; - The existing Water – stormwater/surface water management and control measures prepared for the Site B Facility as detailed in the existing OEMP, will be updated to incorporate the Project; and - The existing soil and groundwater management and control measures prepared for the Site B Facility as detailed in the existing OEMP, will be updated to incorporate the Project.
Waste	- The waste strategies developed for the existing Site B Facility will be updated to incorporate the Project. This can be summarised as the application of the waste hierarchy where the following will be employed, in order of preference: • *Avoidance* – The generation of wastes from the Facility will be avoided where possible; • *Reduce* – Reduce resource consumption, procure materials with less packaging and implement practices to reduce waste; • *Reuse* – Where feasible, materials will be reused onsite. However, due to the limited waste streams generated onsite, reuse options may be limited; • *Recycling* – Paper, cardboard, glass and plastics will be available for recycling. A bin will be placed adjacent to the office which will be collected by a waste management contractor on a regular basis; and • *Disposal* – Disposal of wastes will be minimised where possible. Putrescibles wastes from the office will be sent to landfill, with other wastes generally diverted for recycling; and - Waste strategies will be met through the extension of the existing Site B Waste management and control measures as detailed in the existing OEMP for operations at Site B and as part of the CEMP for waste generated during construction.
Visual Amenity	- A Landscape Plan will be prepared to manage the visual amenity of the Project.
Greenhouse Gas	- An Energy Efficiency Plan will be prepared as part of the existing Site B OEMP to include key elements of the Project and to describe how the plan will be applied across the entire terminal and a timeframe for this to occur.

Part H – Project Justification

This Part provides the justification for the Project according to biophysical, economic, social and ecologically sustainable development principles. Justification for the Project is also provided in relation to the EP&A Act.

24.0 Justification for Approval

24.1 Biophysical, Economic and Social Considerations

24.1.1 Biophysical Factors

The potential biophysical effects associated with the Project were assessed in **Part F** of this EIS. This EIS concludes that the residual risk associated with these potential impacts is predominately low and low/medium, after appropriate mitigation and management measures are implemented. The Project is therefore justifiable in terms of the biophysical elements of the environment. As detailed in **Part F**, the Project would operate within the relevant air quality and noise criteria.

24.1.2 Sociocultural Factors

The potential effects of the Project on social and cultural values and aspects that affect them were examined in **Part F.** The assessment presented in this EIS regarding heritage, traffic and visual amenity indicates that, provided appropriate mitigation and management measures as outlined in the Summary of Mitigation Measures are implemented, the Project would have a minimal impact on sociocultural factors. The Project is therefore justifiable on social and cultural grounds.

24.1.3 Economic

The Project would provide economic benefits to the local, regional and State economies. Importantly the fuels supplied by the Project are an important energy sources for the operation of the economics of Sydney and NSW The additional storage capacity would provide greater security of supply and make allowance for expected growth in the demand for the storage of imported fuel products into NSW. The Project is therefore considered to be justifiable from an economic perspective.

24.2 Ecologically Sustainable Development

Schedule 2 of the EP&A Regulation establishes four primary principles of ecologically sustainable development (ESD): the precautionary principle; intergenerational equity; biological diversity and ecological integrity; and valuation and pricing of environmental resources. The EPBC Act specifies a fifth principle for consideration, which involves decision-making processes. The application of these principles to the assessment of the Project is discussed in the following sections.

24.2.1 Precautionary Principle

The precautionary principle outlines the need to prevent environmental degradation whether a risk to the environment has been scientifically demonstrated or not. The identification of potential impacts to the environment through detailed specialist studies undertaken as part of this EIS has enabled the Project to be designed to avoid significant environmental impacts, and has allowed appropriate environmental management measures to be developed to manage potential impacts so that significant adverse environmental outcomes are avoided.

24.2.2 Intergenerational Equity

The principle of intergenerational equity puts an onus on society to ensure that the health, diversity and productivity of the environment are maintained, if not enhanced, for the benefit of future generations. The Project would have minimal effect on the health of either the environment or local residents, as air emissions would be managed within acceptable levels. As the Site is a previously cleared portion of land, the diversity and productivity of the Site would not be adversely affected.

24.2.3 Biological Diversity and Ecological Integrity

This principle requires the maintenance and conservation of a full and diverse range of plant and animal species. The Site is previously cleared, highly disturbed and modified and an area that is currently devoid of any significant native flora and fauna, therefore ecological impact arising from the Project in relation to biological diversity and ecological integrity would be negligible.

24.2.4 Valuation and Pricing of Environmental Resources

The Intergovernmental Agreement on the Environment (IGAE) and POEO Act require improved valuation, pricing and incentive mechanisms to be included in policy making and program implementation. In the context of environmental assessment and management, this would translate to environmental factors being considered in the valuation of assets and services. Due to the type and relativity small nature of the Project, there would be negligible impact on the pricing and valuation of resources.

24.3 The Objects of the *Environmental Planning and Assessment Act 1979*

This EIS has been prepared having regard to the objects of the EP&A Act. The objects of the Act are found in Section 5 of the Act and are outlined below:

a) to encourage:

- *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages of the purpose of promoting the social and economic welfare of the community and a better environment,*
- *the promotion and co-ordination of the orderly and economic use and development of land;*
- *the protection, provision and co-ordination of communication and utility services;*
- *the provision of land for public purposes;*
- *the provision of co-ordination of community services and facilities, and*
- *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- *ecologically sustainable development, and*
- *the provision and maintenance of affordable housing,*

b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

c) to promote increased opportunity for public involvement and participation in environmental planning and assessment.

The Project is generally compatible with these objects, as it is seeking to develop currently underutilised industrial port land for a port related purposes. The Project would also potentially benefit social, economic, community and environmental welfare by providing infrastructure which is required to meet the current and predicted fuel demands of the Sydney Region. The selected location is ideal for the Project as it maximises the use of existing port infrastructure without creating a disproportionate demand on resources and utilities.

The Project is compatible with the Site's zoning under the Three Ports SEPP. In using existing port related infrastructure to maximise efficiency, the Project promotes economic use and development of land which is currently unused.

The Project would not create an undue demand on existing communication and utility services, and would provide for the increased distribution of regular and renewable fuels in the Sydney region.

The Project would be unlikely to create significant environmental risks for any threatened species, populations, or communities.

Section 24.2 outlines how the Project complements the principles of ESD. The Project would assist the Sydney region meet its current and future energy needs with minimal environmental impact.

With the closest residential area located approximately 1.4 km away from the Site, it is not anticipated that the Project would have a significant impact on residential areas that could affect housing availability or pricing.

Vopak also initiated contact with the community during the planning and assessment phase of this Project. Further information about this is provided in **Section 9.0**.

24.4 Justification Summary

The Project supports the ability for a local fuel import storage facility to provide additional storage for the fuels that drive the Sydney and NSW economies. The Project would allow larger shipments of fuels to be received improving the efficiency of the fuel supply chain. Furthermore, the increased storage capacity would provide greater ability for the anticipated continued growth in demand for fuels to be met.

The Project would be able to provide these benefits in a manner that would have minimal impact on the environment and community. The subject site is a currently an unused industrial site with negligible environmental sensitivity. Buffer distances to the nearest sensitive receivers indicated that impact to the community would be negligible. The Site also has excellent transport access both the Port and the arterial road network, as well as to fuel pipelines to provide alternative means of delivering fuels to market with minimal environmental or community impacts.

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Part I – EIS Findings

This Part summarises the proposal, its alternatives, justifications, and sustainability and provides the concluding statements for the EIS.

25.0 Concluding Statement

25.1 The Proposal

The Project is seeking approvals to operate the proposed tank farm for the purpose of a satellite bulk liquids storage facility to be operated in coordination with the existing bulk liquids facility known as Site B currently operated by Vopak at Port Botany.

Vopak proposes to undertake the Project in two stages as follows:

- Stage 1 (B4A):
  - Construction of three storage tanks and bunding dedicated to Combustible Fuels (generally ADO with a nominal total capacity of 105,000 m^3);
  - Construction of new pipelines/culverts to inter-connect with the Site B manifold;
  - Installation of manifold/transfer pumps and connections to utilities; and
  - Extension of existing Site B fire protection system to B4A site.
- Stage 2 (B4B):
  - Construction of four storage tanks (nominal total capacity of 95,000 m^3) capable of storing any flammable (Class 3) Flammable or Combustible product;
  - Construction of additional transfer pipelines to Site B manifold systems; and
  - New fire protection system complying with AS 1940 requirements.

25.2 Alternatives

The potential Project alternatives of:

- Do-nothing;
- Use an alternative site in the Sydney Region; or
- Use an alternative site in outside the Sydney Regional in Port Kembla or the Port of Newcastle.

provide none of the benefits sought by the Project. Specifically none of the potential alternatives would allow the Project to take place in a manner that can achieve all the benefits that can be gained from:

- Developing the Project in association with an existing terminal;
- On a highly disturbed and modified site; and
- In close proximity to end users and transportation routes.

Following consideration of the possible alternatives, the Project represents the best outcome for stakeholders. With the recommended measures in place and potential impacts managed to appropriate levels the proposed Project provides better outcomes for the environment and the community compared to the alternatives.

25.3 Justification for the Proposal

The Project is justified as it has been shown that it would provide economic benefits to the local, regional and State economies, in particular through providing improved efficiencies and meeting increases in demand for fuels due to both organic growth in demand as well as due to the reduction in fuels being locally refined. These benefits can be provided in an environmentally responsible manner and in accordance with the principals of ESD. This can occur through the use of an established facility with minimal environmental impacts as demonstrated in this EIS. The Project is therefore considered to be justifiable.

25.4 Sustainability of the Proposal

The assessment of potential environmental impacts concluded that due to the highly modified nature of the site, and with the proposed management measures in place, impacts from the Project would be minor and that the Project can be undertaken in a sustainable manner.

25.5 Conclusion

This EIS has fully considered the beneficial and adverse effects of the Project, with full consideration of the principles of ESD. With the implementation of environmental mitigation measures outlined in this EIS, it is unlikely that significant adverse impacts would result on the environment or the community as a result of the Project.

Part J References

26.0 References

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