Environmental Assessment

Marine Fuel Storage/Distribution and Biodiesel Production Facility

KOORAGANG ISLAND

JANUARY 2008

Manildra Park Pty Ltd

Umwelt
Environmental Consultants

Environmental Assessment

Marine Fuel Storage/Distribution and Biodiesel Production Facility, Kooragang Island

Prepared by

Umwelt (Australia) Pty Limited

on behalf of

Manildra Park Pty Limited

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Executive Summary

Introduction

Manildra Park Pty Limited has secured an option for a long term lease over a site on Greenleaf Road, Kooragang Island, from the Regional Land Management Corporation Pty Ltd (RLMC). Manildra Park proposes to construct and operate a marine fuel oil/diesel distribution and biodiesel production facility on the site.

Manildra Park proposes to supply marine fuel and diesel to ships within the port of Newcastle via a refuelling barge, while road tankers will distribute diesel to other users within the port and local bulk fuel users.

The existing tanks on the site were used by Eastern Nitrogen for the storage of naphtha (a petroleum product), which was used in the production of hydrogen and also used as a fuel. Naphtha was imported via ships and unloaded at the Kooragang Island No 2 berth and transported to the site via a dedicated pipeline. Following decommissioning of the site in the late 1970s or early 1980s, the site was transferred to Ampol. Fuel storage was then proposed for the site. Ampol received development approval however the project never commenced. The project area has remained unoccupied since that time.

Need for the Project

Manildra Park currently transports approximately 16 truck loads of fuel per week to ships within Newcastle Port out of its existing Port Kembla facility. This involves trucks travelling a 550 kilometre round trip on public roads to deliver fuel to ships in Newcastle Port. This number has been increasing annually and is expected to increase in the future in line with marketing activities and expected increases to ship movements within the port. This Project will avoid such truck deliveries by providing a local terminal for the receival of fuel directly by ship and distribution by barge to ships within the Newcastle Port. In addition, the Project will significantly reduce the truck travel distance required for the distribution to other fuel users in the Hunter Valley. Biodiesel production in the later phase of development will provide further opportunity for significant environmental benefit via greatly reduced greenhouse and other exhaust emissions.

The Project

The key operational components associated with the project are as follows:

- **Receival**: the receival of marine fuel oils and diesel by ship and the primary raw materials (for biodiesel production) by ship and road;
- **Transfer**: the transfer of incoming marine fuel oils, diesel and the primary raw materials from the berth to the facility via a pipeline of approximately 400 millimetre diameter;
- **Storage**: the storage of marine fuel oils, diesel, biodiesel and the primary raw materials for the biodiesel facility;
- **Biodiesel Production**: the production of biodiesel from feedstock oils; and
- **Distribution**: the distribution of marine fuel oils, diesel and biodiesel via pipeline to a refuelling barge and then to ships within the Port of Newcastle and by road tanker to bulk diesel users within the region.

Manildra Park proposes to undertake the proposal in three discrete phases, as outlined below:

Phase 1: involves refurbishing the two existing storage tanks (T-1 and T-2), constructing the pipeline and operating fuel receival and distribution facilities at the berths, constructing a road tanker loading/receival bays and constructing amenities and service buildings and the purchase of a barge to distribute products around the port. The barge will also have the capability to undertake ship providoring. Under this phase the fuel storage capacity will be approximately 51 ML.

Phase 2: involves constructing three additional fuel storage tanks (T-3 to T-5). Associated with the increased storage capacity, it is proposed to increase the distribution volumes to service local land based bulk diesel users. Under this phase, the storage capacity is proposed to be increased by approximately 21 ML, taking the total storage capacity to approximately 72 ML.

Phase 3: involves constructing a biodiesel production facility with a production capacity of approximately 52 ML per year. The distribution of biodiesel will utilise the marine and road distribution infrastructure constructed as part of Phase 1. Under this phase, the construction of a 5 ML (T-6 and T-7 respectively) and 0.5 ML tanks increases the total storage capacity to approximately 77 ML.

It is proposed to operate the facility up to 24 hours a day, seven days a week in order to meet the demands of Port and local users.

Consultation

Consultation has been undertaken with the general community, neighbouring businesses, interest groups, service providers and government agencies during the preparation of the Environmental Assessment (EA). The consultation program included individual meetings, presentation to community interest groups and an information day.

Approval Process

The project is a 'Major Project' pursuant to Schedule 1 of the State Environmental Planning Policy (SEPP) (Major Projects) and thus Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) applies. The Department of Planning (DoP) have provided Director-Generals Requirements (DGRs) for preparation of this EA. The Minister for Planning will decide whether or not this Project is approved after considering all submissions received during public exhibition of this EA.

Key Environmental Issues

Noise

A comprehensive noise assessment has been undertaken, including consideration of existing noise levels and detailed modelling of potential noise emissions during construction and operation of the facility.

The predicted operational noise levels for each phase are below the intrusive and amenity noise goals for the day, evening and night time periods, at all receiver locations.

The noise assessment indicated that the construction noise levels would exceed the criteria by up to 2 dBA at Stockton West. This potential exceedance is considered minimal as it is

anticipated that LA_{10}(15minute) construction noise emissions will not be discernible at this location. Hence, the construction noise impacts are considered acceptable.

Traffic

The traffic assessment found that the local road network operates with significant spare capacity and that the projected traffic movements associated with this project will not affect road safety or traffic flows.

Hydrocarbon Management

Manildra Park has committed to implementing a range of physical, design, operational and behavioural hydrocarbon management measures to eliminate/prevent an incident through the implementation of physical control measures, e.g. bunding and automatic shut off valves and triggers, for each of the above components. Mitigation measures also include:

a. maintenance programs;

b. visual inspections;

c. operating procedures;

d. spill response equipment; and

e. staff training.

Stormwater Management

Clean water will be diverted around the site.

Water collected from working areas within the terminal will be treated on site with a spill pit and oil/water separator arrangement. Any discharge of treated water to the Hunter River, will need to meet relevant Department of Environment and Climate Change (DECC) water quality criteria.

The biodiesel facility will generate approximately 11 ML of wastewater per year. Given the significant and rapid technological advancements occurring with biodiesel technology and that the biodiesel facility is not expected to be constructed for approximately 3 – 5 years, it is anticipated that either waterless technology and/or significant improvements in plant performance will be achieved which will eliminate or significantly reduce water consumption. Prior to commissioning the biodiesel facility, Manildra Park will confirm wastewater volume characteristics and either seek approval from the DECC if on site treatment followed by discharge to the Hunter River is proposed, or alternatively transport the wastewater off site for disposal.

Air Quality

A comprehensive air quality impact assessment has been undertaken for the project, considering potential air quality emissions in the context of relevant DECC criteria for the protection of health and amenity.

Dust emissions associated with the construction of the facility can be effectively managed through routine construction management techniques, such that their impact is expected to be negligible.

Vapour emissions/odours from the storage of diesel, marine fuel oil, biodiesel and associated feedstock were considered to be minimal due to the low vapour pressure characteristics of these substances.

Computer modelling of the biodiesel facility operations was undertaken to assess the carbon dioxide, nitrogen dioxide, sulphur and the methanol emissions.

The modelling results showed that there would be no exceedances of the DECC short term or annual average goals for relevant pollutants.

Visual Impacts

The existing visual character/views of Kooragang Island are dominated by the existing industrial facilities. This inclusion of the Manildra Park project components will be consistent with the visual context of the area. Therefore only minor visual impacts from this location are anticipated.

The facility will be landscaped to improve the visual amenity of the site. Native shrub and grass species will be selected for landscaping, which complement the objectives of the Kooragang Wetlands Rehabilitation Project.

Preliminary Hazard Analysis

A comprehensive Preliminary Hazard Analysis (PHA) has been undertaken for the project, in accordance with the DGR. The assessment found that the majority of fuel transfer and storage activities do not pose any off site risk. The only credible hazardous events at the facility are pool fires associated with the storage of methanol in the tank and bunded area. The radiant heat loads which result from this event have been calculated and are contained within 30 metres the base of the flame, approximately 4 metres within the site boundary with the nearest neighbour. It is considered that the resulting impact of a confined bund fire on an unoccupied area is not significant. Additionally the 2.1 metre high bund wall will provide a degree of shielding reducing the thermal radiation from a fire on this location.

The majority of the fuel products held on site are classified as combustible material. These materials are stored in a separate bund from the methanol thereby minimising any potential risk.

In addition, no significant risks or limitation associated with the operation of the port are expected to occur as a result of this Project.

Similarly the potential of an explosion on site having off site impacts particularly on the nearby Orica Plant were also assessed and considered to be insignificant.

In accordance with the relevant guidelines, Manildra Park will prepare an Emergency Response Plan that coordinates onsite activities and defers authority to the Local Emergency Operations Controller once external support is sort is response to the emergency. The Local Emergency Operations Controller is the position as defined in the *Newcastle Disaster Plan Newcastle City Council 2005*

Soil and Groundwater Contamination

There are no known areas of soil or groundwater contamination which may be disturbed during the construction or operation of the facility. The transfer pipeline to the berth traverses an arsenic contamination plume associated with the Orica site. Works undertaken in the surface 1 to 1.5 metres of soil are unlikely to come into contact with the contamination,

because contamination is primarily present in the groundwater zone which is below this depth. As the pipeline will be located with 1.3 metres below the surface it is therefore unlikely that contact with contaminated material will occur. Manildra Park has however committed to installing a clay/bentonite plug within the pipeline trench at either end of the contamination plume to prevent the movement of contaminated groundwater along the pipeline trench.

An Environmental Management Plan (EMP) has been prepared for the contamination zone and Manildra Park will follow the process outlined in the Orica EMP, when constructing the pipeline through this zone.

Ecology

The proposed site has a long history of heavy industrial use and has been heavily disturbed.

An ecological assessment has been undertaken which indicated that the project would not result in any potential direct and indirect impacts on any threatened species, endangered populations, Endangered Ecological Communities (EECs), or their habitat that may occur in, or in the general vicinity of the project area.

Greenhouse Gas

A Greenhouse Gas (GHG) assessment has been undertaken for the project, which indicates that the distribution of fuel to end users within the Newcastle region from a local terminal will result in a decrease in GHG emission of 45,887 TCO2-e compared to current operations. This is due to the reduced transport distances associated with the distribution of fuel and the use of biodiesel.

This represents 0.008 per cent of Australia's total GHG emissions of 2005.

Waste Management

The management of waste materials generated by the construction and operation of the Project will be managed through the design; procurement of construction materials and purchasing; identification and segregation of reusable and recyclable materials; processing materials for recycling; and considering environmental impacts for waste removal processes.

Socio Economic Assessment

The project is expected to create 23 and 37 full-time positions during peak construction and operational phases respectively. In addition to directly creating incomes, the project would also generate indirect incomes through the purchase and transport of construction materials, petrol, diesel, truck parts, tyres, stationery, accommodation, various services and materials required to operate and maintain the facility and ship refuelling operation that would be sourced from local suppliers.

The project would create an efficient and cost effective supply of biodiesel in the Hunter Region and reduce the region's dependence on fuels transported from Sydney or Port Kembla. The project would also create an additional fuel supply service for ships within Newcastle Harbour. This would increase economic activity in the region, both through the generation of wages and by reducing costs associated with fuel transport.

The proposal would also generate revenues for Newcastle City Council and the State and Commonwealth governments through Council rates, land tax, GST and fuel excise.

In addition, the biodiesel production in Phase 3 of the development provides significant Greenhouse benefits and the use of biodiesel has several advantages over regular diesel. Firstly the combustion of biodiesel is more complete/efficient than traditional mineral petroleum based diesel, as fewer unburnt fuel emissions result. Recent studies commissioned by Camden City Council (2005) found biodiesel achieved the following reduction in exhaust emissions:

- smoke reduced by 79 per cent;
- particulates reduced by 91 per cent;
- hydrocarbons reduced by 68 per cent;
- carbon-dioxide reduced by 4 per cent; and
- Sulfurous (SOx) emissions are essentially eliminated with pure biodiesel. The exhaust emissions of sulphur oxides and sulphates are major components of acid rain.

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1.0 Introduction

Manildra Park Pty Limited (Manildra Park) is part of the Manildra Group, an Australian owned private company based in Auburn, NSW. The company was established in 1952 with the purchase of a single flour mill in Manildra, western NSW. Over the past 50 years, the Manildra Group has diversified. Its product range includes flour, pre mixes and products derived from flour such as modified starches, glucose syrups, maltodextrine, gluten, specialty protein products and ethanol.

The Manildra Group employs over 600 people in New South Wales and approximately 900 people nationally and internationally. Manildra Park directly employs 80 staff through its operations.

Manildra Park (operating as Port Kembla Marine Fuels (PKMF)) is the owner/operator of the Marine Fuel Terminal at Port Kembla. The company imports marine fuels into the Port Kembla Terminal and resells these fuels to the Australian bunker fuels market. A pipeline network is used to distribute fuel to ships within Port Kembla, while road tankers distribute fuel to land based bulk fuel users in the Illawarra, Sydney and Newcastle regions.

Manildra Park has secured an option for a long term lease over a site on Greenleaf Road, Kooragang Island, Newcastle, from the Regional Land Management Corporation Pty Ltd (RLMC). Manildra Park proposes to construct and operate a marine fuel oil and diesel terminal (for the refuelling of ships and supply of major industrial customers) and biodiesel production facility at this location.

The facility is located within the Kooragang Island Industrial Area, located at the southern end of Kooragang Island known as Walsh Point (refer **Figure 1.1**). Associated with the facility are, berth receival and distribution facilities, a pipeline connecting the terminal with the berth facilities, truck loading/receival facilities, a biodiesel plant and administration and amenities buildings. A detailed description of the proposal is provided in **Sections 2.3** to **2.5**.

In overview, the operations can be described as the following activities:

- **Receival**: the receival of marine fuel oils, diesel by ship and the primary raw materials (for biodiesel production) by ship and road;
- **Transfer**: the transfer of incoming marine fuel oils, diesel and the primary raw materials from the berth to the facility via a pipeline of approximately 400 millimetre diameter;
- **Storage**: the storage of marine fuel oils, diesel, biodiesel and the primary raw materials for the biodiesel facility;
- **Biodiesel Production**: the production of biodiesel from vegetable oils; and
- **Distribution**: the distribution of marine fuel oils, diesel and biodiesel via pipeline to a refuelling barge and then to ships within the Port of Newcastle and by road tanker to bulk diesel users within the region.

The Project is classed as a 'Major Project' under Part 3A of the EP&A Act (refer to **Section 3.1.1**), requiring the preparation of an EA. The NSW Minister for Planning will be the consent authority for the project.

Source: Aerial Photo: Port Waratah Coal Services

0 0.25 0.5 1.0km
1:25 000

Legend

Greenleaf Road Terminal

FIGURE 1.1

Locality Plan

A Major Projects Application for the project was lodged with the (DoP) in May 2007. The Project Application Area (project area) is shown on **Figure 1.2** and the schedule of lands is provided in **Appendix 1**.

This EA has been prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Manildra Park in accordance with the DGRs for the project issued by DoP (refer to **Section 4.4**). This EA includes a description of the project, a discussion of the planning and environmental context, a detailed environmental impact assessment for identified key issues, identifies the required management and mitigation measures, and contains a statement of commitments to be implemented as part of the project.

1.1 Overview of the Existing Environment

1.1.1 Project Area and Surrounds

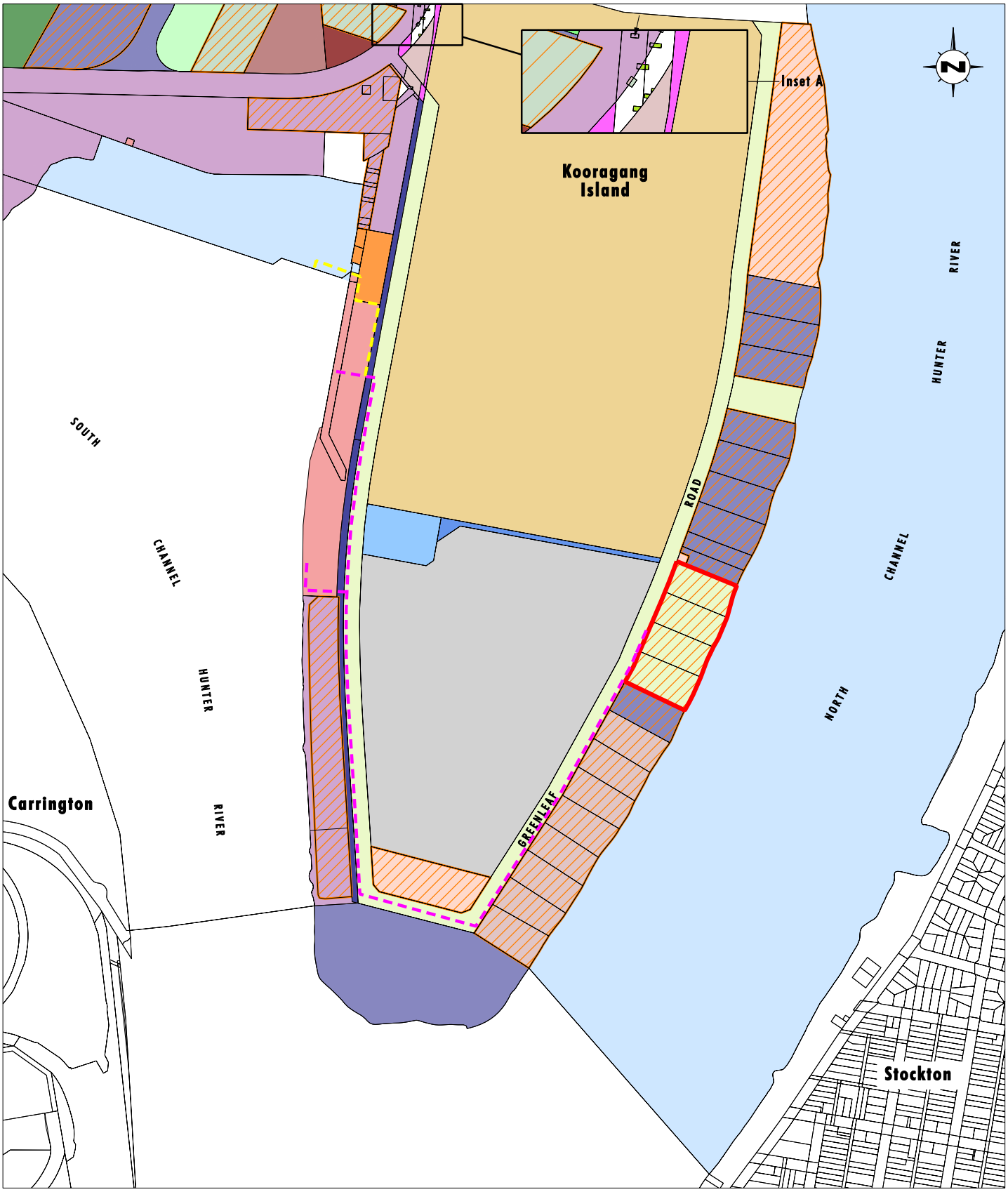
The project is located on Kooragang Island on the lower reaches of the Hunter River approximately two kilometres north of Newcastle (refer to **Figure 1.1**). Originally Kooragang Island was a series of deltaic islands (including Ash, Dempsey, Moscheto and Walsh Islands). Kooragang Island was created in the early 1900s by the reclamation of Dempsey, Moscheto and Walsh Islands, by the infilling of tidal mud flats and creeks. It is understood that Kooragang Island was reclaimed using dredged river sediments (Douglas Partners 2007). The progression of the amalgamation of the original islands is shown in **Figure 1.3**.

The Island was originally developed as the industrial centre for Newcastle. It was officially named in 1968, and has a total area of approximately 2600 hectares, and is bounded by the North and South Arms of the Hunter River.

The Hunter Estuary National Park (formerly known as the Kooragang Nature Reserve) is located approximately one kilometre north of the project area. Following an investigation into the natural areas and environmental importance of the site, parts of Kooragang Island were internationally recognised as a RAMSAR site in 1984. The Kooragang Wetland Rehabilitation Project (KWRP) was created in 1993, with ongoing support from government, local industries and the community. The KWRP includes work on Ash Island, to the north-west of the proposal, Stockton Sandspit to the north-east and Tomago wetlands to the north. The Hunter Estuary National Park was created on 16 July 2007.

The project is located on the eastern tip of the Island, on the North Arm of the Hunter River, providing ready access to sea going vessels via the Hunter River and Newcastle Harbour. As shown on **Figure 1.1**, the nearest urban areas are Stockton located approximately 600 metres to the east; and Carrington located approximately 1.6 kilometres to the south-west. The former BHP Steelworks and the current OneSteel operations are located to the west, across the South Arm of the Hunter River. Immediately adjacent to the proposed terminal are the Orica and Incitec Pivot facilities. The Hifert Distribution Centre is located approximately 500 metres to the north-west of the terminal.

Industry and port facilities are located on the southern part of Kooragang Island. Some of the businesses which occupy this area include: Port Waratah Coal Services (PWCS), Cargill Australia, Air Liquide, Orica, Incitec Pivot, Sawmillers Exports, Newcastle Woodchipping, Cleanaway, Mountain Industries, Blue Circle Cement, Boral, Port Hunter Commodities, Sims Metals, Kooragang Bulk Facilities and Transfield. Industrial land uses therefore dominate the immediate surrounding land uses. These businesses provide a range of industrial services, such as: cement production, concrete batching and recycling, concrete building products,

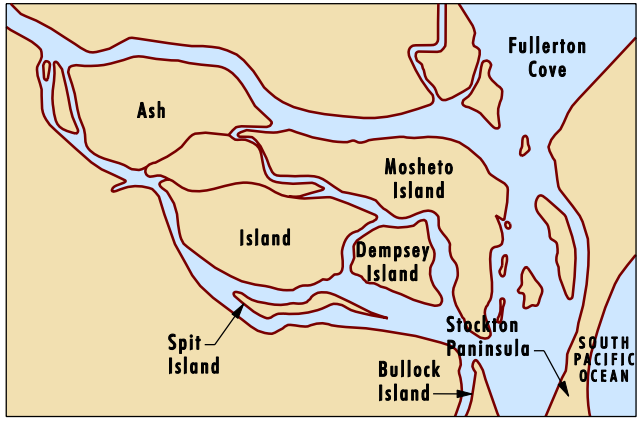


Legend

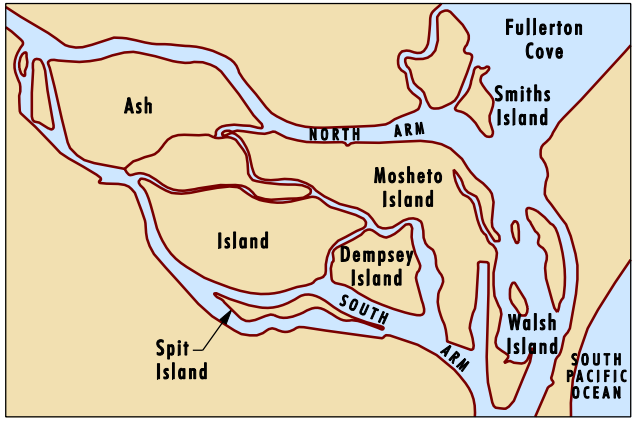
- Greenleaf Road Terminal
- Receival and Distribution Pipeline
- Barge Refuelling Pipeline
- Australian Rail Track Corporation
- Cargill Australia Limited
- Cormorant Properties Pty Limited
- Eastern Nitrogen Limited
- Gerard Lawance Beinoer
- Hydro Alluminium Kurri Kurri Pty Limited
- Incitec LTD
- John Holland Pty Limited
- Marine Ministerial Holding Corporation
- Maritime Authority of NSW
- Minister for Commerce
- Minister for Public Works
- Minister for Public Works and Ports
- Minister for Public Works and Services
- Minister for Public Works and Services NSW
- Mountain Industries Pty Limited
- Newcastle Port Corporation
- Reference Not Held
- Regional Land Management Corporation
- State Rail Authority of NSW
- Top Australia Limited
- NSW Land Managed by RLMC

FIGURE 1.2

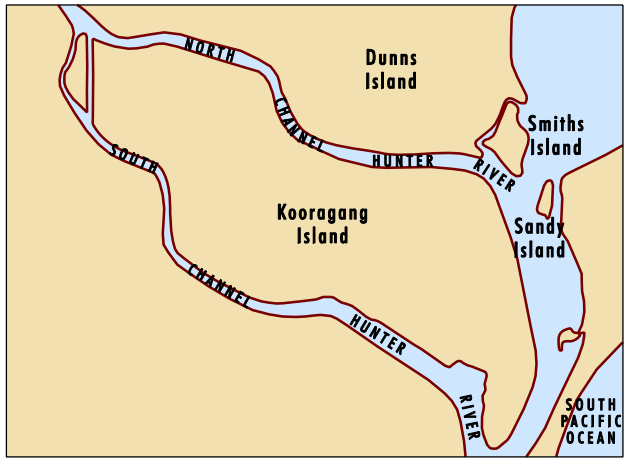
Land Ownership



Probable Arrangment of the
Hunter River Delta, Circa 1800



Hunter River Delta, 1950



Hunter River Delta, 1994

0 2.0 4.0 8km
1:145 000

FIGURE 1.3

Progressive Formation of Kooragang Island

Source: GHD (1993)

File Name (A4): R04_V1/2305_012.dgn

oilseed processing, fertiliser manufacturing and distribution, and ammonium manufacturing. In addition, surrounding industrial land use includes a hazardous waste management facility, LPG gas distribution facilities, a scrap metal reclamation facility, a licensed landfill and a number of engineering and fabrication operations.

The port facilities within the area are primarily used for the handling of raw materials, including coal, alumina, coke, wood chips, phosphate rock, and a number of agricultural products, most of which are utilised in the range of manufacturing operations associated with the heavy industry land uses within the area. There are also a number of transport and logistic companies located within the Kooragang Island industrial area.

Historically the proposed site and the existing tanks on the site were used by Eastern Nitrogen for the storage of naphtha (a petroleum product), which was used in the production of hydrogen and also used as a fuel. Naphtha was imported via ships and unloaded at the Kooragang Island No 2 berth and transported to the site via a dedicated pipeline. Eastern Nitrogen converted its fuel supply to natural gas in the late 1970s and the storage of naphtha terminated in the late 1970s or early 1980s. The tanks were subsequently decommissioned and have not been used since (Douglas Partners 2007).

The Greenleaf Road Site lease was transferred to Ampol in the early 1980s. Fuel storage was then proposed for the site. Ampol received development approval however the project never commenced. The project area has remained unoccupied since that time.

Within the Kooragang Island industrial area, there are considerable areas of vacant industrial land. The RLMC controls much of this land, with commercial leases being established between RLMC and entities to utilise land within this area. As noted in **Section 1**, Manildra Park has an option agreement with RLMC for a long term lease over the proposed site.

1.1.2 Property Description and Land Ownership

Land ownership for the site and surrounds is shown on **Figure 1.2**. All land within the project area is owned by the State of New South Wales, and managed by RLMC. RLMC is a subsidiary of Hunter Water Corporation (HWC), which was created by the NSW Government in 2003.

The major landowners within the area surrounding the project area include NSW Maritime, Newcastle Port Corporation, State of NSW and a number of private holders (refer to **Figure 1.2**).

The State of NSW, under the management of RLMC, also owns a number of other industrial sites within the area. The RLMC managed land to the west of the proposed site, on the south channel of the Hunter River, is currently associated with Sawmillers Exports and the Graincorp Agriterminal. A site to the south-west is currently occupied by Toll Logistics, while Kooragang Bulk Facilities occupies a site to the north-west. The areas directly to the north and south of the proposed site are currently vacant, while some are under lease agreements and could be used for the establishment of bulk goods handling and manufacturing facilities.

Land adjacent to the proposed site to the west, north-west and south-west are privately owned with a variety of operations currently being undertaken, as discussed in **Section 1.1.1**.

1.2 Overview of the Planning and Approval Process

This section contains an overview of the planning context for the project and the process followed during the preparation of the EA. A detailed discussion of the planning context for the Project is included in **Section 3.0**.

The project requires approval under Part 3A of the EP&A Act as it is of a class of development listed in Schedule 1 of the *State Environmental Planning Policy (SEPP) (Major Projects)* 2005. The Minister for Planning will therefore be the consent authority for the Project. The DoP have issued DGRs for the EA and these are provided in **Appendix 2** and discussed further in **Section 3.0**.

If project approval is granted under Part 3A of the EP&A Act, an Environment Protection Licence under the *Protection of the Environment Operations Act 1997* will be required prior to the commencement of construction of the project.

A licence under Part 5 of the *Water Act 1912* is required if groundwater is to be intercepted.

A Notification of Dangerous Goods on Premises licence is required as the facility will store over 10,000 litres of combustible product.

1.3 Project Team

Umwelt has prepared this EA on behalf of Manildra Park. A number of organisations undertook specialist studies as part of the EA process, including:

- Holmes Air Sciences — Air Quality
- Heggies Australia Pty Ltd — Noise Assessment
- Christopher Stapleton Consulting Pty Ltd — Traffic Impact Assessment
- Solly Engineering — Project Design
- SEE Sustainability — Greenhouse Assessment

Further details of the Project Team are provided in **Appendix 3**.

1.4 Purpose of the Document

The purpose of this EA is to enable the consideration of the environmental and social implications associated with the proposal. The EA has been prepared in accordance with the EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (refer to EA Statement of Authorship in **Appendix 4**).

1.5 Environmental Assessment Structure

An overview of the structure of this EA is provided below.

The **Executive Summary** provides a brief overview of the project, the consultation process, the major outcomes of the environmental assessment, and an outline of the key project commitments to mitigate potential impacts.

Section 1.0 introduces the project, outlines the project background and existing operations, provides a summary of the key project details, outlines the project team involved in producing the EA and the structure of the EA.

Section 2.0 contains a detailed description of the proposed project.

Section 3.0 describes the planning context and environmental context for the project, including the applicability of Commonwealth and State legislation.

Section 4.0 contains a description of the stakeholder consultation program and the environmental and community issues identified as part of this process for detailed assessment in the EA.

Section 5.0 contains a description of the existing environment and a comprehensive analysis and assessment of the key environmental assessment issues relevant to the project, including the project specific and cumulative impacts.

Section 6.0 contains a conclusion as required by the DGRs.

Section 7.0 details the draft Statement of Commitments proposed to be adopted throughout the life of the Project in order to mitigate impacts.

Sections 8.0 to **10.0** provide a checklist of the DGRs considered in the preparation of the EA, a list of references referred to in the EA, a list of abbreviations and glossary of technical terms.

2.0 Project Description

Manildra Park proposes to undertake the proposal in three discrete phases, as outlined below.

Phase 1: involves refurbishing the two existing storage tanks (T-1 and T-2), constructing the pipeline and operating fuel receival and distribution facilities at the berths, constructing a road tanker loading/receival bays and constructing amenities and service buildings and the purchase of a barge to distribute products around the port. Under this phase the storage capacity will be approximately 51 ML.

Phase 2: involves constructing three additional fuel storage tanks (T-3 to T-5). Associated with the increased storage capacity, it is proposed to increase the distribution volumes to service local land based bulk diesel users. Under this phase, the storage capacity is proposed to be increased by approximately 21 ML, taking the total storage capacity to approximately 72 ML.

Phase 3: involves constructing a biodiesel production facility with a production capacity of approximately 52 ML per year. The distribution of biodiesel will utilise the marine and road distribution infrastructure constructed as part of **Phase 1**. Under this phase, the construction of 5 ML and 0.5 ML tanks (T-6 and T-7 respectively) increases the total storage capacity to approximately 77 ML.

The estimated annual marine fuel oil, diesel and biodiesel distribution volumes are shown in **Table 2.1**. Product will predominantly be transported to the facility via ship. The subsequent distribution of marine fuel oil will be predominantly undertaken via barge, while diesel and biodiesel will mainly be distributed by road tankers.

Table 2.1 - Indicative Annual Marine Fuel Oil, Diesel and Biodiesel Distribution Volumes

		Year		
Product		**1-3**	**4-6**	**7-10+**
Marine Fuel Oil	**ML/Yr**	190	280	280
Diesel	**ML/Yr**	110	245	245
Biodiesel	**ML/Yr**	19	44	52

A detailed description of the individual components associated with each phase can be found in **Sections 2.3** to **2.5**.

2.1 Need for the Project

Newcastle Port operates 24 hours a day, 365 days a year and manages more than 3100 ship movements every year. A variety of materials are shipped via the port, with coal being the dominant export commodity. Of the 85.6 million tonnes of material which passed through the port in 2005-2006, approximately 80 million tonnes was coal. The total value of these exports was valued at more than $7.5 billion. It is expected that shipping numbers will increase with the rise in coal exports. PWCS recently received approval to increase it Kooragang Island Terminal's throughput from 77 million tonnes per year to 120 million tonnes per year. The Newcastle Coal Infrastructure Groups (NCIG) also recently received

approval to construct a third coal loader on Kooragang Island with a capacity of 66 million tonnes per year.

Re-development of the ex-BHP site is also expected to increase shipping activities within the port and therefore the demand for fuel bunkering services.

Manildra Park currently provides approximately 16 truck loads of fuel per week to ships within Newcastle Port out of its existing Port Kembla facility, with demand for ship fuelling services increasing annually. Similar logistical arrangements are also undertaken from terminals in Sydney and Newcastle on a regular basis. The development of this facility will satisfy the existing and future needs of vessels using the port.

The distribution of fuel to end users within the Newcastle region from a local terminal is expected to result in a net reduction in the emission of greenhouse gases (refer to **Section 5.12**). There are also benefits associated with the use of biodiesel in minimising greenhouse gas emissions and reduced air quality and health impacts.

The proposal will also provide a number of significant economic benefits via the employment of approximately 37 people, with many more indirect jobs created through flow-on effects.

The establishment of a bulk fuel terminal in Newcastle which receives products via ship for distribution to bulk users within the port and Hunter Region will minimise environmental and social impacts associated with road transport of bulk fuel.

2.2 Alternatives

2.2.1 Other Ports

Manildra Park's proposal consists of essentially five discrete operational activities, being:

- the receival of fuel and oil products;
- the storage of fuel and oil products;
- the distribution of fuel to ships within Newcastle Port via a refuelling barge;
- the distribution of fuel to bulk fuel users in the Newcastle region via truck; and
- the production of biodiesel.

While it is technically possible to refuel ships within Newcastle Port from another port, this is only one aspect of the proposal. Land based infrastructure (pipeline infrastructure and a terminal/storage tanks etc) and wharf facilities would still be required to undertake the distribution of fuel to land based bulk fuel users and the operation of a biodiesel plant. The components noted above would ideally be located in the Newcastle area given the proposed target markets are in this area.

While there may be alternative locations available in Sydney Harbour (White Bay) and Botany Bay for this facility, they provide a lower level of commercial advantages due to their greater distance to the target market of Newcastle Port and bulk fuel users in the Newcastle region.

The synergies (the sharing of wharf and pipeline facilities for the receival and distribution of fuel products/materials) and economies of scale for a consolidated operation within Newcastle Port provide obvious advantages and are key points of justification for the project in terms of configuration and location.

2.2.2 Road Transport

Ship refuelling, otherwise known as bunkering, within Newcastle Port is currently undertaken via road tankers. Approximately 16 truck loads of fuel per week are dispatched from Manildra Park's Port Kembla operations to ships within Newcastle Port. Manildra Park could increase its road transport logistical operation to meet the needs within Newcastle Port. Not only is this seen as an expensive option, it also has negative transport and environmental impacts when compared against the proposal.

2.2.3 Alternative Distribution Configurations

An alternative barge refilling berth was considered. The Boskalis Berth, also known as the old Westham berth is located to the north of the terminal. As with the Wallarah Berth fuel would be delivered to the Boskalis Berth via a pipeline. While this option is possible it was the least preferred as:

- it involved the construction of a greater distance of pipeline and therefore cost;
- it is located further away from the berths where ship refuelling would occur, i.e. greater barge travel time and therefore cost;
- the depth of water in the North Arm would mean a barge of particular design and draft would need to be sourced possibly leading to greater cost;
- the berth is subject to siltation;
- it posed greater environmental risks i.e. it may be harder to contain a spill should an incident occur given its exposure to the river flow; and
- it may not be able to be used during periods of high flow in the river.

The distribution of diesel by rail to bulk users in the Hunter Valley was also considered. This option is not preferred as:

- logistically the movement of small but regular fuel supplies i.e. 8 rail tankers per day via rail, is impractical;
- even if the number of rail wagons was practical, it significantly increases the complexity and capital cost of the operations because:
  - additional rail loading infrastructure would be required; and
  - a distribution terminal in the Hunter Valley would need to be established;
- the fuel once received at the Hunter Valley distribution point would still need to be trucked to a disperse number of locations; and
- transporting fuel over a short haul distance via rail for subsequent distribution by truck is not considered to be economic.

2.2.4 Other Land within Newcastle Area

There are other government and privately owned industrial sites available within the Kooragang Island, Mayfield and Tomago areas. While some of these sites may potentially be suitable to construct and operate the proposed terminal, the distance between these sites and the K2 and K3 Kooragang Island berths is greater than the preferred proposal and in some instances too far to viably construct the transfer pipeline.

The option of recommissioning an old fuel berth in the inner harbour area (e.g. Throsby) was investigated, however, this location was rejected due to its proximity to residential areas and the cost associated with upgrading the berth infrastructure to accommodate the fuel ships.

The preferred site was therefore selected due to the existing storage tanks which could be reused by this proposal and its proximity to the Kooragang common user berths at K2 and K3.

2.2.5 Alternative of Not Proceeding

The alternative of not proceeding has also been considered, however, this option is not considered appropriate as it is expected that the environmental and social impacts of the proposal can be effectively managed and not proceeding would result in the:

- loss of investment and employment opportunities in the region;
- increase of truck movements associated with the delivery of fuel to Newcastle Port from Manildra Park's Port Kembla terminal and other Sydney based terminals, as the demand for fuel grows with increasing shipping movements over time; and
- existing tanks remaining unutilised and/or being scrapped.

2.3 Phase 1

The general arrangement of the proposed facility can be seen in **Figure 2.1** and the main components are described in **Section 2.3.1**.

Under Phase 1 marine fuel oil and diesel will be received and distributed from the terminal. The marine fuel oil and some diesel will be predominantly distributed via barge to ships within the Port of Newcastle, while road tankers will distribute diesel to other users within the port and local bulk fuel users.

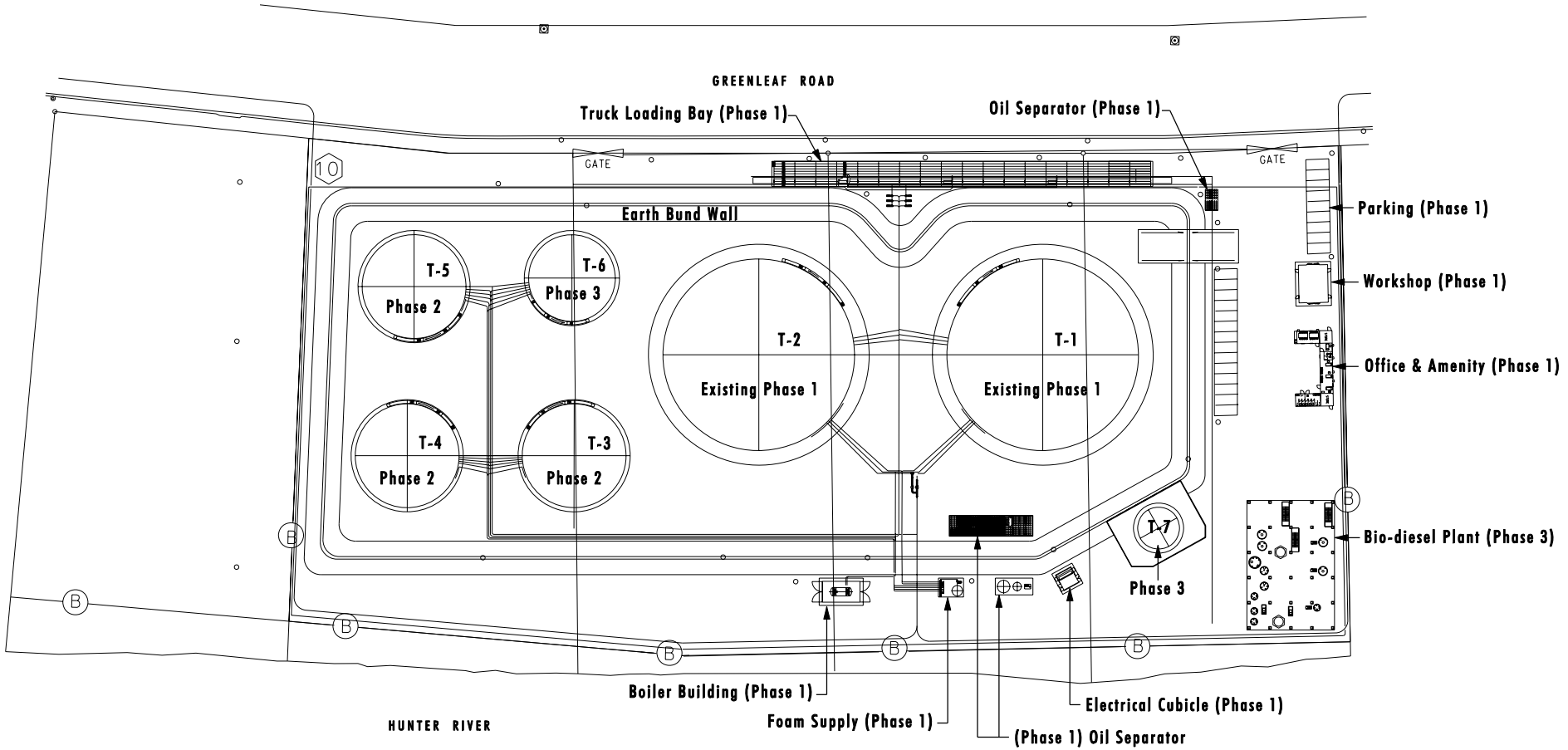
2.3.1 Greenleaf Road Terminal

Marine Fuel Oil and Diesel Storage

During the 1970s and early 1980s the site was used to store naphtha. The two existing steel tanks (T1 and T2), each with a capacity of approximately 25.5 ML and an earthen bund which surrounds these tanks, are evidence of this previous operation.

These tanks will be refurbished to allow for the storage of marine fuel oil and diesel.

The existing internal floating roofs in each tank will be removed and replaced with new ones. Repairs to the floor and walls of the tanks will be completed where required. The southern bund wall will be relocated to the north. The tank farm area (including the bund walls) will be



Source: Manildra Park

0 25 50 75m
1:1500

FIGURE 2.1

General Arrangement
Greenleaf Road Terminal

lined with an impervious membrane. A leak detection system will also be installed beneath the proposed and existing tanks. The leak detection system will be installed beneath the existing tanks during the refurbishment of the base plates of the tanks.

Road Tanker Loading/Receival Bay

The loading/receival bay will be roofed, bunded and drained to an oil separator. Truck loading operations will be semi automated to prevent overfilling. Spills during the coupling and uncoupling of hoses are minimised via the use of a 'dry break' coupling, which cannot be opened unless fitted to the vehicle. The trucks are also fitted with brake interlocks, which prevent the truck from driving off while connected to the loading bay hoses.

Discharge from the separator will be licensed under an Environment Protection Licence for the site.

Amenities and Services

Office and amenity buildings, together with car and truck parking areas, will be provided to accommodate staff at the terminal. A storage compound will also be constructed to store plant, equipment and emergency response equipment.

The site is unsewered and therefore an onsite sewage treatment facility will be designed and installed to treat wastewater from the office and amenity buildings.

The current fire ring main located on-site will be refurbished and reconnected to mains water and additional fire fighting equipment including foam, foam applicators and hoses will be installed around the terminal as required by legislation. A comprehensive Fire Safety Study will be carried out during the detailed design phase to identify the specific requirements of the site.

2.3.2 Berth Facilities - Receival

Marine fuel oils, diesel and oil will be shipped to Kooragang Island. The unloading of bulk fuels and oils will occur at either Kooragang Island Berth No 3 (K3) or Kooragang Island Berth No 2 (K2). The location of these berths is shown in **Figure 2.2**. The mechanics of unloading remains the same regardless of the unloading berth location, that is, fuel will be transferred from the ship to the terminal via a steel pipeline of approximately 400 millimetre (16") diameter. Flexible hoses will run between the ship and the point of connection with the steel pipeline (see **Plate 1**).

The general alignment of the pipeline will follow the eastern side of Greenleaf Road and the western side of Heron Road and terminate at the K2 and K3 berths (refer to **Figure 2.2**). The pipeline will be located approximately 1.3 metres below ground within the road reserve.

From Heron Road the pipeline turns to the west and continues underground through the backup land which adjoins the berth and terminates in a bunded area at the eastern edge of the berths. An underground position avoids operational conflicts associated with the existing plant and equipment which use the berths. A manifold will be constructed within the bunded area, which provides a connection point for flexible hoses, which can be connected to a ship for the unloading of fuels. Pig launching chambers will also be constructed within the bunded area (see **Plate 2**). Pigs are flexible rubber urethane plugs used to clear a pipeline after it has been used to transfer a liquid product. The pig is loaded into the launcher prior to pumping and when fuel loading or unloading has been completed it is pushed back to the terminal or berth using compressed air to ensure there is no product left in the line. A steel spill tray will also be used in the bunded area.

Source: Aerial Photo: Port Waratah Coal Services

0 100 200 500m
1:10 000

Legend

- Greenleaf Road Terminal
- Receival and Distribution Pipeline
- Barge Refuelling Pipeline

FIGURE 2.2

Location of Receival / Distribution Berths and Pipeline Alignments

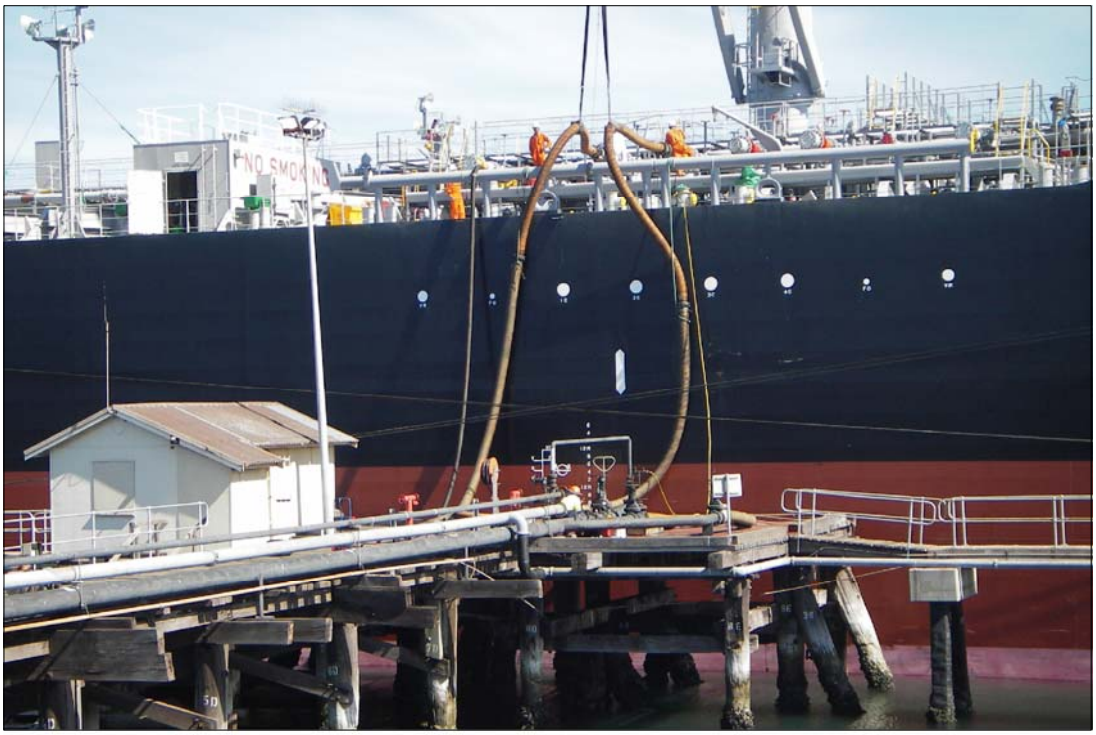


PLATE 1
Ship refuelling

PLATE 2
Pipeline Manifold

2.3.3 Berth Facilities - Distribution

The distribution of fuel to ships within the port will be undertaken using a refuelling (bunker) barge. The refuelling barge will moor at the refuelling berth (the Wallarah Berth) and will receive fuel from the terminal via a pipeline, as described below. The location of this berth is shown in **Figure 2.2**. The Wallarah berth is located to the north of K3 and east of Kooragang Island Berth No 4 (K4). Fuel will be delivered to the Wallarah berth by an extension to the steel receival pipeline located on the K3 berth. A diverter will be placed at the point where the steel receival pipeline comes onto the K3 wharf. The pipeline will run from this point north underground, where the pipeline will then turn west 90 degrees once it entered PWCS land. Once on PWCS property, the pipeline will be located on the surface and will run parallel to the Wallarah berth before extending onto the berth. The pipeline will terminate within a bunded area on land behind the berth. This bunded area will contain the pig launcher and will be housed in a small metal shed. From this shed a metal pipeline will extend onto the berth where it will terminate at a manifold in a bunded area. The loading of the refuelling barge will be accomplished by connecting flexible hoses between the manifold at the end of the pipeline and the refuelling barge.

The barge will also have the capability to undertake ship providoring. No additional infrastructure is required for these activities.

The barge will be self propelled and have a crew of three. When not in use the refuelling barge will be moored at the refuelling berth.

The need for any infrastructure, services upgrades and/or structural improvements such as berthing dolphins, fenders, walkways, anchoring points, power and water will be determined following a survey of the berths. These works may be undertaken from land and/or water.

The need for any fire fighting or safety equipment at the berth will be assessed in a comprehensive Fire Safety Study, to be completed in the detailed design phase of the proposal.

The alignment, design, construction, operation and maintenance of the pipeline will be undertaken in accordance with *AS 2885 Pipelines – Gas and Liquid Petroleum*. The pipeline will be cathodically protected for enhanced anti-corrosion properties. Any underground or inaccessible sections will be sheathed in polymer coating or wrapped in anti-corrosion impregnated tape. The pipeline will be hydrostatically tested every 12 months to ensure its integrity and visually inspected half hourly during product transfers.

An emergency stop system will run the length of the pipeline, which will activate a visual and audible alarm at the terminal, K2, K3 berths and barge refuelling point. In barge refuelling situations, the emergency stop system will also cut pumps and shut valves at the terminal pipeline manifold. Pressure switches will be installed on discharge pumps at the terminal to ensure maximum operating pressures are not exceeded and check valves will be installed on the pipeline at the ship discharge point, to ensure there is no backflow to the ship in the event of failure or power loss.

The pipeline will be cleared of product following the transfer of product by running a rubber plug, known as a ‘pig’ through the line propelled by compressed air. Flexible hoses used in the transfer of product between the berth receival/discharge points and marine ships or refuelling barge, will also be cleared of remaining product by using compressed air. To avoid accidental opening of valves, receival/discharge points will be fenced and secured by turning off, locking and isolating valves using bolted blind flanges.

2.4 Phase 2

Phase 2 involves the construction of three 7 ML diesel storage tanks (T-3 to T-5) within the Greenleaf Road Terminal as illustrated within **Figure 2.1**. Associated with the additional tanks will be the installation of additional pipe network infrastructure within the Terminal.

2.5 Phase 3

Phase 3 involves the establishment and operation of a biodiesel production and distribution facility with an annual production capacity of approximately 52 ML. Construction of the biodiesel facility consists of assembling prefabricated components. The location of the biodiesel facility is shown in **Figure 2.1**.

A 5 ML and 0.5 ML tank (T-6 and T-7) will also be constructed under this phase.

The biodiesel facility will convert oil into biodiesel. The chemistry of the biodiesel process is based on transesterification, where fats or oils are mixed with methanol and a catalyst (potassium hydroxide (KOH) or sodium hydroxide (NaOH) and heated. The chemical reaction that occurs through this process breaks down the oil molecules and replaces the glycerin portion of the molecule with an alcohol molecule. The glycerin falls to the bottom and is drained off resulting in biodiesel.

Biodiesel Primary Raw Materials

The primary raw materials and the estimated quantities used by the biodiesel facility are shown in **Table 2.2**, based on an estimated maximum production of 60,000 m^3/annum.

Table 2.2 – Indicative Biodiesel Feedstock Volumes

Input/Feedstock	Tonnes per Annum
Oil Raw Material	53515
Methanol	6063
Potassium Hydroxide KOH (90%)	1070
Sulphuric Acid (96%)	749
Softened Water	11921

Source: SAFER (2007)

The biodiesel process is not restricted in the type of feedstock oil which can be used. Oils which can be used include: palmolein, canola oil, soya bean oil, palm oil, palm kernel oil, tallow. The particular oil that will be used will vary depending on the ambient temperature/season, together with the market supply and demand at any given time. The ambient temperature/season is an important consideration in the handling, storage and use of the feedstock oils, as some solidify at low temperatures and thus require heating to keep them in a usable state.

Typically domestic oil supplies would be delivered via truck, while international oil supplies e.g. palm oil would be delivered to the facility via ship. Any palm oil used will be sourced from the member companies of the Roundtable on Sustainable Palm Oil (RSPO). The RSOP was established to address and promote the sustainable production and use of palm oil. RSPO's objective is to advance the production, procurement and use of sustainable palm oil through:

- development, implementation and verification of credible global standards and,
- engagement of stakeholders along the supply chain (RSPO 2007)

Methanol will be transported to the facility by road. The methanol may be sourced from suppliers in the Newcastle area or if ethanol is to be used, it may be sourced from Manildra Park's facility at Nowra. The unloading of methanol would be undertaken in the road tanker loading /receival bay constructed as part of the Phase 1 operations. Flexible hoses would be used to connect the road tanker to a manifold/pipeline which connects to the methanol storage tank (T-7 of **Figure 2.1**). The methanol storage tank location is bunded (see **Figure 2.1**). Methanol would be pumped via a pipeline to the biodiesel facility, as required.

KOH and acid would be delivered to the site via truck.

The proposed tank inventory configurations are detailed in **Table 2.3.**

Table 2.3 – Proposed Tank Inventory Configurations

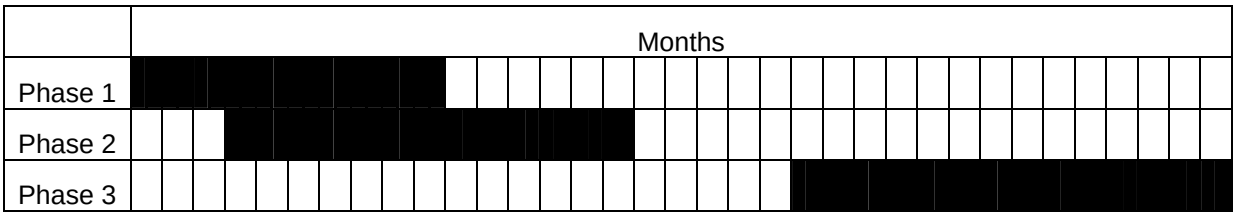
Tank ID	**Marine Fuel** (Combustible Class 1)	**Marine Diesel / Road Diesel / Biodiesel** (Combustible Class 1)	**Biodiesel feedstock (Raw Oil)** (No Classification)	**Ethanol / Methanol** (Flammable Class 3PGII)
T-1	✓	✓	✓	×
T-2	✓	✓	✓	×
T-3	✓	✓	✓	×
T-4	✓	✓	✓	×
T-5	✓	✓	✓	×
T-6	✓	✓	✓	×
T-7	✓	✓	✓	✓

Note: T-7 is intended for the sole storage of ethanol/methanol however, any of the products can be stored in T-7 without affecting the environmental impacts associated with the operation.

2.6 Construction Schedule

The construction of the proposal (Phase 1, 2 and 3) is predicted to be completed within three to five years. The construction of each phase will overlap during this three to five year period. The duration of each construction phase is shown in **Table 2.4**.

Table 2.4 – Indicative Construction Schedule



Construction activities which are audible at any residential or other sensitive receiver will be limited to between 7.00 am and 6.00 pm Monday to Friday and 8.00 am and 1.00 pm Saturdays.

Works proposed to be undertaken outside of these hours includes:

- any works that do not cause construction noise emissions to be audible at any nearby sensitive noise receiver;
- the delivery of materials as requested by the Police or other authorities for safety reasons;
- emergency work to avoid the loss of life, property and/or prevent environmental harm; and
- any other work as agreed through negotiation between Manildra Park and potentially affected noise receivers or as otherwise agreed by the DECC.

2.7 Hours of Operation

The facility will operate up to 24 hours a day, seven days a week in order to meet the demands of Port and local users.

2.8 Workforce

It is anticipated that the proposal will generate approximately 37 full-time equivalent positions, plus an estimated 25 additional indirect jobs involved in the transportation of diesel and biodiesel products, plant maintenance, cleaning, automation and IT services and other contracted roles. Construction workforce is estimated to be approximately 23 full-time equivalent positions at peak.

3.0 Planning Considerations

The following sections identify the local, State and Commonwealth legislation and policy applicable to the proposal, including the planning approval process.

3.1 New South Wales Legislation

3.1.1 Environmental Planning and Assessment Act 1979

State Environmental Planning Policy (Major Projects) 2005

The Minister has formed the opinion that the Project is consistent with Clause 10 (2) of Schedule 1 of the SEPP (Major Projects) and thus Part 3A of the EP&A Act applies. Consequently, the Minister for Planning will determine the Project Application. In addition, the following sections of the EP&A Act are relevant to the approvals process for this Major Project.

Application of Environmental Planning Instruments

The Proposal is located wholly within the Newcastle Local Government Area and thus the Newcastle Local Environmental Plan 2003 (Newcastle LEP) applies.

However, Section 75R of the EP&A Act provides that environmental planning instruments, other than SEPPs, do not apply to Major Projects defined under Part 3A of the Act, other than as detailed below.

Permissibility

Newcastle LEP is relevant to the permissibility of the proposal. Section 75J(3)(b) of the EP&A Act provides the Minister cannot approve the carrying out of a project that would be wholly prohibited under an environmental planning instrument.

The areas to be affected by the proposal are zoned 4(b) Port and Industry under the Newcastle Local Environment Plan (LEP) 2003 (see **Figure 3.1**). The objectives of this zone are:

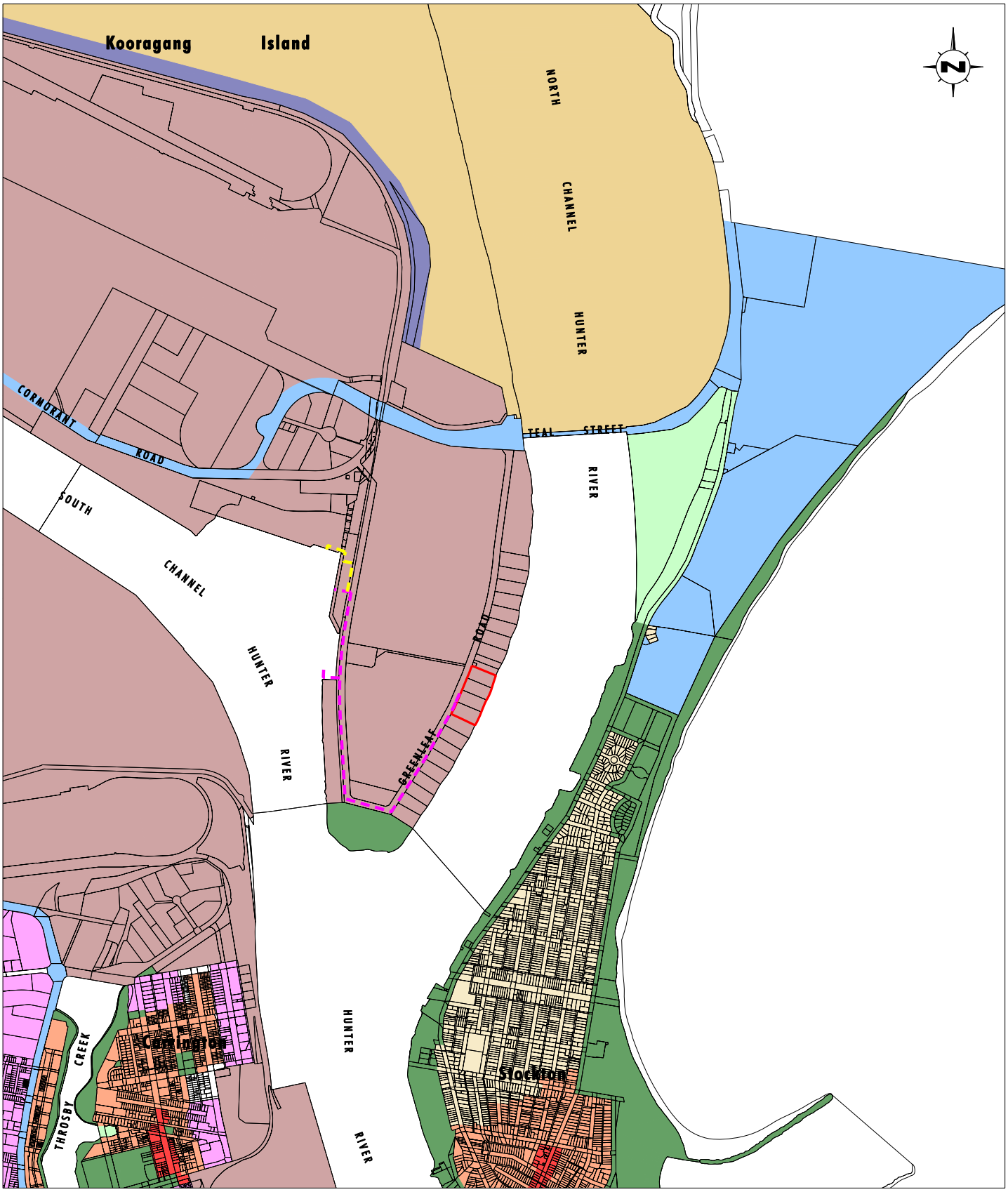
a) To accommodate port, industrial, maritime industrial, and bulk storage activities, which by their nature or the scale of their operations require separation from residential areas and other sensitive land uses.

b) To require that development of land within 750 metres from the high-water mark of the shores of the Port of Newcastle, capable of docking ocean-going vessels, is used for purposes that:

   i) require a water front location that provides direct access to deep water, or
   ii) depend upon water-borne transport of raw materials or finished products, or
   iii) have a functional relationship that necessitates proximity to the activities described above.

c) To facilitate sustainable development through the application of industrial ecology.

d) To provide for other development which will not significantly detract from the operation of large scale industries or port-related activities, that is primarily intended to provide services to persons employed in such industries and activities.



Source: Newcastle City Council

0 0.25 0.5 1.0km
1:25 000

Legend

- Greenleaf Road Terminal
- Receival and Distribution Pipeline
- Barge Refuelling Pipeline
- 2(a) Residential Zone
- 2(b) Urban Core Zone
- 3(a) Local Centre Zone
- 4(a) Urban Services Zone
- 4(b) Port and Industry Zone
- 5(a) Special Uses Zone
- 5(b) Special Uses Reservation Zone
- 6(a) Open Space and Recreation Zone
- 7(a) Conservation Zone
- 8(a) National Parks Zone

FIGURE 3.1

Zoning

The proposal is consistent with the objectives of the LEP and so the proposal is permissible with development consent.

Approvals Legislation Which Does Not Apply

Under Section 75U of the EP&A Act if the Project is granted project approval under Part 3A of the EP&A Act, the following approvals, which may otherwise have been relevant, will not be required to carry out the project (see **Table 3.1**).

Table 3.1 - Approvals Legislation Which Does Not Apply

Act	Approval
Fisheries Management Act 1994	Permit for works or structures within a waterway.
Heritage Act 1977	Disturbance to an item listed on State Heritage Register or Interim Heritage Order; Excavation permit.
National Parks & Wildlife Act 1974	Preliminary research permit; consent to destroy relics.
Water Management Act 2000	Water use approval, water management work approval or activity approval.

If the Project is granted project approval under Part 3A of the EP&A Act, the following approvals must not be refused by the relevant approval authority and must be substantially consistent with the terms of the Project approval (see **Table 3.2**).

Table 3.2 - Approvals Legislation to be Applied Consistently

Act	Approval	Authority
Protection of the Environment Operations Act 1999	Environmental Protection Licence	Department of Environment and Conservation (DEC)
Roads Act 1993	Permit to impact on a public road	Local roads – Newcastle City Council
Pipelines Act 1967	Licence for construction and operation of pipeline	Department of Water and Energy
Water Act 1912	Groundwater extraction licence under Part 5	Department of Water and Energy

In addition to approval under Part 3A of the EP&A Act, there are other Commonwealth and State legislation and policies that are potentially relevant to this Project, as outlined below.

3.1.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (PoEO Act) is administered by the DECC and requires a licence for environmental protection including waste, air, water and noise pollution control. Manildra Park will apply for an Environment Protection Licence (EPL) following receipt of project approval. As outlined in **Section 3.1.1**, should project approval be granted, the granting of an EPL cannot be refused and must be substantially consistent with the terms of the project approval.

3.1.3 Environmentally Hazardous Chemicals Act 1985

The DECC is granted power under the *Environmentally Hazardous Chemicals Act 1985* to assess and control chemicals and declare substances to be chemical wastes.

Part 3 Division 1 Clause 10(1) defines chemical wastes as:

> '…any chemical substance (including any mixture) is or is likely to be stored in accumulating deposits or dumped or abandoned or otherwise dealt with as chemical waste, the Authority, by order published in the Gazette, may declare that substance to be a chemical waste for the purposes of this Act.'

As the input streams to the facility are not waste products and the by-products from the facility are proposed to be reused either within the facility or transported off site for reuse, the *Environmentally Hazardous Chemicals Act 1985* is not applicable.

3.1.4 Roads Act 1993

The *Roads Act 1993* is administered by the Roads and Traffic Authority (RTA), local council or the Department of Lands (DoL). The RTA has jurisdiction over major roads, the local council over minor roads, and the DoL over road reserves. Under the Act applications are required to be made to the Minister for the closure of Crown roads and for works on public roads.

As outlined in **Section 1.1.2** there are no known Crown Roads within the Project site. In addition, Greenleaf and Heron Roads are privately owned by the RLMC. As such no such approval under the Roads Act will be required.

3.1.5 Pipelines Act 1967

The *Pipelines Act 1967* is administered by the Minister for Energy and Utilities. *The Pipelines Act 1967* provides for the approval and licensing of the construction and operation of a pipeline for the purposes of conveying oil, gas or petroleum. As outlined in **Section 3.1**, approval is being sought for the Project under Part 3A of the EP&A Act. As such Manildra Park will not be relying on the provisions of Pipelines Act for the approval of the proposed transfer pipeline.

The Pipelines Act requires pipelines of a certain class to be licensed under the Act, even where consent for the pipeline has been issued under the EP&A Act. Section 5(1) of the Act provides guidance on the application of the licensing requirements, and provides for a range of exemptions from licensing under the Act. Specifically Section 5(1)(e) of the Act provides that a pipeline of the prescribed class constructed for the purposes of conferring dangerous goods, does not require licensing under the Act. A pipeline of the prescribed class is a pipeline with a length of less than 10 kilometres.

The proposed transfer pipeline will convey hydrocarbon products between the Greenleaf terminal and the shipping berths. As the proposed transfer pipeline is less than 10 kilometres in length, a licence is not required and the Act does not apply.

3.1.6 Occupational Health and Safety Act 2000

On 1 September 2005 the *Dangerous Goods Act 1975* was repealed by the *OHS Amendment (Dangerous Goods) Act 2003* and the supporting OHS Amendment (Dangerous Goods) Regulation 2005.

The changes mean that dangerous goods are now regulated under the *Occupational Health and Safety Act 2000* and the Occupational Health and Safety Regulation 2001. The provisions of the repealed *Dangerous Goods Act 1975* relating to the licensing and regulation of the storage, transport and use of dangerous goods, have been incorporated into the *Occupational Health and Safety Act 2000* (OH&S Act). Section 135A of the Act specifies

how the provisions of the Act relate to the management of dangerous goods. Essentially, the Act provides provisions relating to offences, regulations, industry codes of practice and investigations and workplace inspections, which extends to the management of dangerous goods as specified within the Australian Dangerous Goods Code.

There are no specific licensing or approval requirements for the management of dangerous goods under the OH&S Act and any dangerous goods at the facility will be managed within the Occupational Health and Safety management framework established by the OH&S Act. As the facility will store over 10,000 litres of combustible product, Manildra Park will provide WorkCover with a Notification of Dangerous Goods on Premises in accordance with the regulations.

3.1.7 Road and Rail Transport (Dangerous Goods) Act 1997

The *Road and Rail Transport Act (Dangerous Goods) Act 1997* aims to regulate the transport of dangerous goods by road and rail in order to promote public safety and protect property and the environment. The Act provides the statutory regime for the licensing of the transport of dangerous goods by road or by rail. Where the Act determines that the transport of a dangerous good is to be licensed, it is an offence to use, or employ, engage or permit the use, of an unlicensed vehicle for the transport of dangerous goods.

Manildra Park will ensure that all dangerous goods transportation is undertaken in accordance with the provisions of the Act.

3.1.8 Water Act 1912

The *Water Act* 1912 is administered by the Department of Water and Energy. A licence must be obtained under Part 5 of the *Water Act 1912* to extract groundwater. A Part 5 licence will be required for the extraction of groundwater inflow to the spill and oil separators pits.

3.2 State Environmental Planning Policies

3.2.1 State Environmental Planning Policy 11 (Traffic Generating Developments) 1985

SEPP No 11 requires that the RTA is made aware of and given the opportunity to make representations in respect of developments listed in Schedule 1 of the SEPP.

Schedule 1(j) includes:

> Transport terminals, bulk stores, container depots or liquid fuel depots or the enlargement or extension of any existing transport terminal, bulk store, container depot or liquid fuel depot by increasing by more than 8000 square metres the area of land or the gross floor area of buildings used for that purpose.

As discussed in **Section 5.3.2** the RTA was consulted regarding the proposal.

3.2.2 State Environmental Planning Policy 33 (Hazardous and Offensive Development) 1992

SEPP No. 33 requires the consent authority to consider whether an industrial proposal is a potentially hazardous industry or a potentially offensive industry. A hazard assessment is completed for potentially hazardous developments to assist the consent authority to

determine acceptability. A Preliminary Hazard Analysis has been undertaken as part of the EA. Further details can be found in **Section 5.8**.

3.2.3 State Environmental Planning Policy 55 (Remediation of Land) 1998

SEPP No. 55 requires the consent authority to consider whether the land on which the proposal will be undertaken is contaminated. Furthermore, if the land is contaminated, whether it is suitable for the purpose of the proposed development and if the land requires remediation to be made suitable for the purpose of the proposed development.

A contamination report was undertaken as part of the EA, the results are discussed in **Section 5.9**.

3.2.4 State Environmental Planning Policy No 71—Coastal Protection

SEPP 71 aims to protect and manage the natural, cultural, recreational and economic attributes of the New South Wales coast. The SEPP identifies State significant development in the coastal zone, and requires certain development applications to carry out development in sensitive coastal locations to be referred to the Director-General. While it is noted that the EA is being referred to the Director-General, the SEPP does not apply to the project as Clause 9(2)(b) of the SEPP states this part does not apply to development where another environmental planning instrument applies or the Minister or the Director-General is the consent authority.

3.3 Regional Environmental Plans

3.3.1 Hunter Regional Environmental Plan

The objective of the Hunter Regional Environmental Plan (HREP) is to provide a coordinated and balanced approach to the development of the region, the improvement of its urban and rural environments and the orderly and economic development and optimum use of its land and other resources, consistent with conservation of natural and man made features and so as to meet the needs and aspirations of the community.

Part 7 (Division 1) – Pollution control of the HREP is relevant to the project. The objective of this Part is to control development such that air, noise and water pollution are minimised. Detailed noise, air and water pollution assessments have been undertaken in preparing this EA (see **Section 5.0**). These investigations identified that there would be no significant adverse environmental impacts and thus the project satisfies the requirements of the HREP.

Part 7 (Division 4) of the HREP requires that the public is provided an opportunity to provide comment on the erection of buildings over 14 metres in height and these buildings are assessed for their local impact and regional significance. The highest structure proposed to be built on site is the biodiesel plant at 24 metres. The public exhibition of the EA and the information contained in this EA satisfies these requirements.

3.4 Newcastle Development Control Plan

The provisions of the DCP and most specifically Element 7.4 - Kooragang Port and Industrial Area provides guidelines for the development within the Port and Industrial Area. Section 75R of the EP&A Act notes that the Newcastle Development Control Plan (DCP) does not apply to this project as it is a Major Projects defined under Part 3A of the Act.

Nevertheless, as requested by Newcastle City Council, the guidelines are outlined below and where possible have been incorporated into the proposed development:

- Strategic Context – the marine fuel storage/distribution and biodiesel facility requires the use of port facilities. The proposal is therefore consistent with the objective of facilitation the development of port related activities. (See **Section 2.0**).

- Industrial Ecology – the production and distribution of biodiesel and the distribution of fuel from a local facility provides significant environmental, social and economic benefits to the region. The use of the existing tanks on site also optimises energy and resource use and minimise pollution and waste. (See **Section 5.0**).

- Water Quality – the proposal has been designed to minimise the potential impacts on water quality and volumes. (See **Section 5.5**).

- Air Quality – a detailed air quality impact assessment using local meteorological data has been undertaken for the project which details that there will be no adverse impact on air quality in the area either directly or cumulatively. (See **Section 5.6**).

- Site Contamination – Soil and groundwater contamination aspects have been assessed in preparing the EA. Where it is likely that contaminated soil and/or groundwater will be encountered appropriate management measures have been detailed in the EA. (See **Section 5.9**).

- Building Structures and Site Layout – the facilities energy demand has been minimise through the use of pipelines and the refuelling barge to transfer and distribute product. Steel is the dominant construction material for the facility. This material is recyclable and thus a sustainable building material. (See **Section 2.0**).

- Landscaping, habitat conservation and open space – landscape areas have been incorporated into the development of the facility. The species used will be endemic to the area and will complement the objectives of the Kooragang Wetland Rehabilitation Project. (See **Section 5.7**).

- Access and Parking - The design of the access driveway, and internal access roads, will conform to Australian Standard *AS 2890.2:2002 - Off Street Commercial Vehicle Facilities*. A minimum of 18 parking spaces has been provided on-site. (See **Section 5.3**).

- Noise and Vibration - a detailed noise impact assessment using local meteorological data has been undertaken for the project and details that there will be no adverse impact on noise in the area either directly or cumulatively. (See **Section 5.2**).

- Risk Assessment - a detailed risk assessment has been undertaken which identifies the credible risks. The project was found to comply with the relevant criteria and does not contribute to the cumulative risk profile of the Kooragang Industrial area. (See **Section 5.8**).

- Bulk Liquid Storage – a suite of technical control measures and non-technical safeguards and procedures are proposed to reduce the level of risk associated with the operation of the facility. (See **Section 5.8** and **Section 5.4**).

- Pipelines - the design, construction, operation and maintenance of the pipeline will be undertaken in accordance with *AS 2885 Pipelines – Gas and liquid petroleum.* (See **Section 5.4**).

- Fire Fighting – The facility includes fire detection and fire suppression systems which incorporate a fire water ring main, cooling water system and foam deluge fire fighting system. (See **Section 5.8**).

- Lighting - lighting associated with the proposed development will be designed, installed and operated in accordance with *AS 4282:1997 - Control of the Obtrusive Effects of Outdoor Lighting*. (See **Section 5.7**).

- Fencing – a chain wire person proof fence will be constructed around the perimeter of the facility. (See **Section 5.8**).

In summary, the project is considered to be consistent with the objectives of the DCP.

3.5 Commonwealth Legislation

3.5.1 Environment Protection and Biodiversity Conservation Act (1999)

The primary objective of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to 'provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance.'

Under the EPBC Act, approval of the Commonwealth Minister for the Environment and Water Resources is required for any action that may have a significant impact on matters of national environmental significance. The provisions of this legislation relevant to the proposal relate to potential impacts on migratory and threatened species, listed in the EPBC Act, and RAMSAR listed wetlands.

Actions that are considered to have a significant impact on a matter of national environmental significance are defined under the EPBC Act as a 'controlled action'. The determination of whether an action is a 'controlled action' and if the action requires further assessment is made by Department of Environment and Water Resources (DEWR) through a preliminary referral process.

The proposal is located 1.2 kilometres to the south of the Hunter Estuary National Park a RAMSAR wetland and a number of migratory and threatened species listed in the EPBC Act are known to occur in the area. The proposal is located entirely within an area previously disturbed by industrial activities and does not directly impact on the nearby RAMSAR wetland. Off-site impacts (noise and dust) are also not expected to significantly contribute to existing ambient levels. On this basis, the proposal will not have a significant impact on the wetland or listed species, and therefore will not need to be assessed as 'controlled action' under the EPBC Act. **Section 5.10** details the ecological assessment undertaken to date and the proposal's potential ecological impacts.

3.5.2 Native Title Act 1993

The *Native Title Act 1993* is administered by the National Native Title Tribunal. The Tribunal is responsible for maintaining a register of native title claimants and bodies to whom native title rights have been granted. A search of the register was undertaken in June 2007, indicated that there are no existing native title claims over land within the project area.

4.0 Stakeholder Consultation

Consultation with the community, government authorities and other relevant stakeholders has been undertaken during preparation of the EA throughout 2007. The consultation process aimed to inform stakeholders about the proposal and to identify relevant issues to be investigated and assessed during the preparation of the EA. Further details on the community and agency consultation undertaken for the proposal are outlined below.

4.1 Authority Consultation

A number of key government authorities were consulted throughout the assessment period to identify the key agency issues for assessment and discuss specific issues relevant to the proposal. The DoP were initially consulted to confirm the application of the Part 3A approval path for the proposal. A Preliminary EA for the Project was prepared in May 2007 and was distributed to relevant agencies for review. Project briefings were also provided to DoP and a number of other key government agencies as outlined in **Table 4.1**.

Table 4.1 - Summary of Agency Consultation

Agency	Date	Purpose
Department of Planning (DoP)	October 2006	Initial Project Briefing.
	22 May 2007	DoP provides DGRs for the Project.
	May 2007	Briefing provided on Project and overview of preliminary environmental studies.
	October 2007	DOP reviewed the EA during the adequacy period however, declined a specific project meeting during the adequacy review period.
Department of Environment and Conservation (DECC)	May 2007	DECC reviewed the Preliminary Environmental Assessment and provided EA requirements to DoP for consideration in the DGRs provided in **Appendix 2**.
	May 2007	DECC declined a specific project meeting during the preparation of Preliminary EA.
	October 2007	DECC reviewed the EA during the adequacy period however, declined a specific project meeting during the adequacy review period.
Department of the Environment and Water Resources (DEWR)	10 May 2007	DEWR reviewed the Preliminary EA and provided EA requirements to DoP for consideration in the DGRs provided in **Appendix 2**.
	October 2007	DEWR reviewed the EA during the adequacy period however, declined a specific project meeting during the adequacy review period.
NSW Maritime	May 2007	NSW Maritime declined specific project meeting during the preparation of Preliminary Environmental Assessment.
	18 May 2007	NSW Maritime reviewed the Preliminary EA and provided EA requirements to DoP for consideration in the DGRs provided in **Appendix 2**.
	October 2007	NSW Maritime reviewed the EA during the adequacy period however, declined a specific project meeting during the adequacy review period.

Table 4.1 - Summary of Agency Consultation (cont)

Agency	Date	Purpose
Newcastle City Council (NCC)	May 2007	NCC declined specific project meeting during the preparation of Preliminary Environmental Assessment.
	28 May 2007	NCC reviewed the Preliminary EA and provided EA requirements to DoP for consideration in the DGRs provided in **Appendix 2**.
	October 2007	NCC reviewed the EA during the adequacy period and attended a specific project meeting provided during the adequacy review period.
Newcastle Port Corporation (NPC)	23 May 2007	Initial project briefing provided during preparation of Preliminary Environmental Assessment.
	21 May 2007	NPC reviewed the Preliminary EA and provided EA requirements to DoP for consideration in the DGRs provided in **Appendix 2**.
	29 June 2007	Project update briefing provided as part of ongoing consultation process.
	October 2007	NPC reviewed the EA during the adequacy period and attended a specific project meeting provided during the adequacy review period.
NSW Roads and Traffic Authority (RTA)	22 February 2007	RTA reviewed the Preliminary EA and provided EA requirements to DoP for consideration in the DGRs provided in **Appendix 2**.
	October 2007	RTA reviewed the EA during the adequacy period however, declined a specific project meeting during the adequacy review period.

Following the lodgement of the Project Application and Preliminary EA, DoP requested a number of government agencies to provide feedback for the preparation of the DGRs.

The land associated with the Project is owned by the RLMC, established by the State Government to administer and manage large areas of land on Kooragang Island and other locations in the Lower Hunter. Manildra Park has undertaken ongoing consultation with RLMC throughout the project planning phases. Consultation has included a number of individual meetings and the provision of information outlining the Project.

During this process, agreement has been reached on the pipeline location in the road reserve and commercial aspects for the project.

As outlined in **Section 1.1.2**, land ownership of Kooragang Island is a mixture of private ownership and lease agreements with the State Government. The NSW Maritime holds a number of leases to land within the vicinity of the facility. As such, Manildra Park consulted with the NSW Maritime in 2006 to provide a briefing on the Project and to identify any relevant issues. It is noted that NSW Maritime declined a briefing as part of the Preliminary EA phase. NSW Maritime leases the Wallarah berth to PWCS and will therefore be party to the berth's use for the refuelling barge.

The Australian Rail Track Corporation (ARTC) operates and maintains the rail line servicing Kooragang Island. Part of the line extends along Heron Road to service the bulk handling facilities and shipping berths. The proposed transfer pipeline will cross under the rail corridor. Manildra Park has consulted ARTC, including a number of individual meetings and

the provision of information outlining the Project. A Rail Corridor Access application has been submitted to ARTC outlining details of those aspects of the project relevant to the pipeline route and rail crossing points.

The Department of State and Regional Development have been briefed on the project on a number of occasions and are supportive of the project.

4.2 Community Consultation

The Project is of interest to the local community, particularly the neighbouring community of Stockton. Manildra Park has undertaken consultation with the Stockton Residents Forum and conducted an information day to inform the community about the project and to encourage open engagement. Approximately 35 people attended the Stockton Residents Forum on 26 September 2007. A presentation was provided by Manildra Park and Umwelt on the project and environmental assessment findings. The participants were asked to provide feedback on relevant issues and there was considerable feedback and discussion during the meeting. Two feedback forms were also received as a result of the presentation to the forum and have been considered in the preparation of the EA. Four people attended the community information day held at RLMC offices on Kooragang Island on 27 September 2007. Project displays and personnel from Manildra Park and Umwelt were available throughout the day to answer questions raised. No feedback forms were received from the individuals who attended the information day. Issues noted during this process are discussed in Section 4.21.

The aim of consultation with the community was to notify, inform and receive feedback from a cross section of the local community to assist in the identification of key environment and community issues.

A range of consultative mechanisms were used to engage the community throughout the preparation of the EA as outlined below.

Table 4.2 - Community Consultation Methods

Method	Description
Individual Briefing Meetings	Manildra Park undertook a number of briefing meetings with existing and proposed neighbouring industry stakeholders to outline the Project. These were carried out by a personal visit to neighbouring sites.
Community Presentations	Presentations were made to the Stockton Residents Forum to outline the Project and invite feedback through questions at the forum or via a feedback form provided.
Community Feedback Sheets	Community Feedback Sheets were issued to all participants that attended the community briefings in order to provide a mechanism for direct feedback and expansion of any issues raised during the community consultation.
Community Information Day	A community information day was held in the RMLC offices on 27 September 2007. The information day was advertised in the Newcastle Herald on three occasions prior to the day. Story boards were used to outline the project details to attendees. Feedback sheets were also provided.

4.2.1 Key Community Issues Identified

The primary community issues relating to the Project raised during the consultation process include:

- air emissions from the biodiesel plant;
- the ability of the existing road network to cope with the additional trucks;
- potential hazards/safety issues associated with the interaction of trucks from the Orica plant and the proposed Manildra Park project;
- the potential for the distribution of fuel to the Hunter Valley by rail;
- noise;
- potential hazard/fire impacts on the Orica plant;
- interactions/inter relationship with the Newcastle Disaster Plan;
- management/containment of leaks;
- interaction with groundwater;
- fire water management; and
- visual impacts at Stockton and potential for screening/landscaping.

These issues have been considered in the Project design and the detailed assessment outlined in **Section 5.0**.

4.3 Consultation with other Stakeholders

4.3.1 Neighbouring Industry - Existing and Proposed

Manildra Park has consulted with neighbouring businesses within the vicinity of the facility. This consultation was undertaken to provide neighbouring operations with an overview of the Project and to discuss specific operational interactions with the Project. Consultation with these stakeholders included a number of individual meetings and the provision of information outlining the Project. The neighbouring industrial operations specifically consulted throughout project planning and preparation of the EA included:

- Cargill Australia;
- Orica;
- Incitec Pivot;
- Port Waratah Coal Services;
- Kooragang Bulk Facilities;
- P&O Ports; and

- Boral Timber.

Issues raised during this consultation included:

- access agreements to K2 and K3 berths;
- future berth capacity issues;
- trucking issues on the island; and
- environmental risks associated with the pipeline and facility.

These issues have been considered in the project design.

4.4 Identification of Key Environmental Issues

Identification of key environmental and community issues for the EA for the Project is based on consideration of:

- the planning and environmental context for the locality (refer to **Sections 1.0** and **3.0**);
- outcomes of the community and authority consultation process (refer to **Section 4.0**);
- the DGRs for the facility (refer to **Appendix 2**); and
- baseline studies completed as part of preparation of the EA.

Table 4.3 provides a summary of the key issues identified through these processes and provides reference to the section of the EA in which these issues have been addressed.

Table 4.3 - Key Environmental and Community Issues

Issue	EA Reference
Air Quality	**5.6**
Traffic	**5.3**
Noise	**5.2**
Hazards and Risks	**5.8**
Aboriginal Heritage	**5.11**
Water and Soils	**5.9**
Waste Management	**5.13**
Visual	**5.7**
Greenhouse Gas Emissions	**5.12**

5.0 Environmental Assessment

5.1 Environmental Risk Assessment

To assist in identifying the key environmental and community issues that required detailed assessment as part of this EA, a preliminary environmental risk analysis was undertaken as part of the Preliminary EA (Umwelt, 2007). Each risk was assessed using a five level qualitative ranking of consequence and likelihood. The preliminary environmental risk analysis identified the following issues as requiring detailed investigation in the EA, including:

- noise;
- traffic;
- leaks/spills of fuel;
- stormwater management;
- visual impacts;
- hazard and operability; and
- air quality.

The Preliminary EA was provided to DoP along with the Project Application for consideration in issuing the DGRs for the project. The Preliminary EA was also provided to other relevant government agencies with whom DoP consulted regarding the DGRs. The DGRs identified the key environmental assessment issues for the project as:

- hazards and risk;
- water and soils;
- air quality;
- greenhouse gas emissions;
- noise;
- traffic;
- visual;
- waste management;
- flora and fauna; and
- Aboriginal heritage.

Detailed assessment of these key issues has been undertaken and documented in this EA, including the consideration of management and mitigation methods, as outlined below, in **Section 5**.

5.2 Noise

In accordance with the DGRs for the Project, a comprehensive noise assessment has been undertaken by Heggies Australia Pty Limited (Heggies). This assessment provides details of the existing noise levels within the Kooragang Island area; determines the noise impact assessment criteria based on the existing noise environment and relevant DECC guidelines; predicts the noise levels that are expected to result from the proposal; and provides an assessment of these noise levels against relevant criteria. The noise assessment assumes that all of the pumps are enclosed or a mitigated source.

This section provides and overview of the noise assessment, which is included in **Appendix 5**.

5.2.1 Existing Noise Environment

The existing noise environment within the Kooragang Island area has been determined from monitoring undertaken within the surrounding area as part of noise assessments for other projects. Relevant noise monitoring has used a combination of both unattended noise logging and attended noise measurements.

The most recent noise monitoring program in the area surrounding the proposal was conducted by Heggies on behalf of NCIG in April 2006 to quantify background noise levels (i.e. all noise sources) and to estimate industrial noise only (i.e. in the absence of transport, natural and domestic noise) at ten representative residential, commercial and industrial receiver areas (Resource Strategies 2006). Supplementary noise monitoring has also been carried out by Heggies on behalf of PWCS at two additional locations, Fern Bay North (FN1) and Fern Bay West (FW3) in July 2006 for a period of 10 days.

In accordance with the DEC Industrial Noise Policy (INP) (DEC 2000), a Rated Background Level (RBL) has been determined for each of the receiver areas, to form the basis of the assessment of noise impacts associated with the project. The RBL is based on the determination of existing background noise levels in the absence of noise from the proposed industrial development. The RBLs applicable to the project at representative locations have been determined based on existing noise monitoring undertaken in the surrounding area in the absence of the proposed operations (refer to **Table 5.1)**.

Table 5.1 - Rated Background Levels and Industrial Noise Levels for Assessment

Receiver Area	ID	Measured RBL[1, 2] (L_{A90}) All Noise Sources			Measured L_{Aeq}(period)[1, 3] All Noise Sources			Estimated L_{Aeq}(period)[1, 4] Industrial Noise Only		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Fern Bay West Residential	FW1	50	42	44	60	55	54	<54	46	48
Stockton West Residential	SW1	42	44	44	63	57	59	<54	47	48
Mayfield Residential	M1-M5	46	47	43	63	59	56	<54	45	44
Carrington Residential	C1	42	41	37	62	67	57	46	45	42
Kooragang Is Industrial	KI1	51	51	47	61	56	55	<64	53	51

Table 5.1 - Rated Background Levels and Industrial Noise Levels for Assessment (cont)

Receiver Area	ID	Measured RBL[1, 2] (L_{A90}) All Noise Sources			Measured $L_{Aeq(period)}$[1, 3] All Noise Sources			Estimated $L_{Aeq(period)}$[1, 4] Industrial Noise Only		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Mayfield North Industrial	MN1	56	57	57	60	59	59	<64	57	57

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

Note 2: RBL for the Mayfield receiver area is the median of RBLs at all locations (M1-M5).

Note 3: LAeq(Period) for the Mayfield receiver area is the logarithmic average of the L_{Aeq}(Period) for all locations (M1-M5).

Based on the existing noise environment findings the following points can be drawn in relation to Fern Bay and Stockton:

- *Existing Traffic Flows* - Fern Bay is exposed to the Nelson Bay (arterial 20,000 vehicles per day) Road and Stockton is exposed to the Fullerton (collector) Road.

- *Adjacent Land Uses* - Fern Bay and Stockton are located adjacent to Kooragang Island and Mayfield North industrial areas and separated by the Stockton Hospital.

- *Existing Noise* - There is a minor decrease in the RBLs between the daytime and night time periods at FW1, while there is a minor increase in the RBLs between the daytime and night time periods at Stockton west. The industrial amenity levels at both locations are comparable between the day time, evening and night time periods.

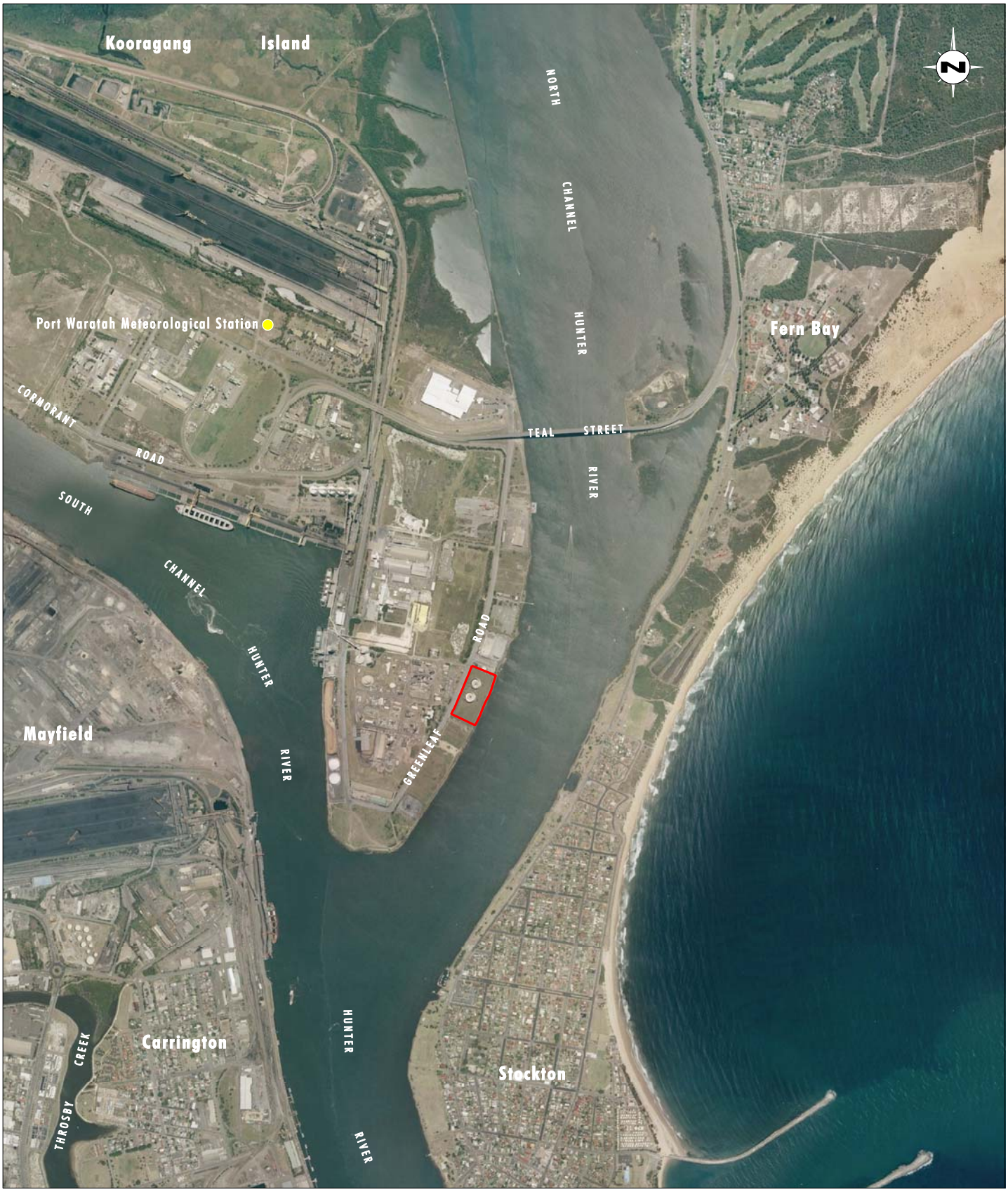
Fern Bay and Stockton are urban residential areas which adjoin the Port of Newcastle and are visually and acoustically exposed to the existing industrial operations and associated transportation networks (operating 24 hours per day, 7 days per week).

The INP requires assessment of predicted noise levels under certain meteorological conditions that have the potential to enhance noise impacts. An assessment of prevailing meteorological conditions has been undertaken based on the meteorological data recorded at Kooragang Coal Terminal (KCT) (see **Figure 5.1**). This assessment determined that wind conditions of 3 m/s or below are a significant feature of the environment during evening and night time periods and the frequency of occurrence of moderate to strong temperature inversions is greater than 30 per cent during the combined evening and night time period. Therefore in accordance with the INP, these metrological conditions have been considered in the noise impact assessment.

5.2.2 Assessment Criteria

Construction Noise Criteria

The construction activities associated with the proposal are expected to occur over a three to five year period and include the refurbishment of existing tanks, construction of facilities and storage tanks, and the establishment and operation of a biodiesel production and distribution facility, as discussed further in **Section 2.3** to **2.5**.



Source: Aerial Photo: Port Waratah Coal Services

0 0.25 0.5 1.0km
1:25 000

Legend

Greenleaf Road Terminal

FIGURE 5.1

Kooragang Coal Terminal Meteorological Station

Chapter 171 of the Environmental Noise Control Manual sets out noise criteria applicable to construction site noise depending on the duration of construction activities, as contained in **Table 5.2**.

Table 5.2 - Construction Noise Assessment Criteria

Construction Period	Criteria
4 weeks and under	$L_{A10,\ 15\ minute} < L_{A90}$ plus 20 dB(A)
4 weeks to 26 weeks	$L_{A10,\ 15\ minute} < L_{A90}$ plus 10 dB(A)
Greater than 26 weeks	$L_{A10,\ 15\ minute} < L_{A90}$ plus 5 dB(A)

*Applicable between the hours of 7.00 am and 6.00 pm Monday to Friday, and 8.00 am to 1.00 pm Saturdays. For all other times construction noise must be inaudible at the receiver. No construction work is to take place on Sundays or Public Holidays.

Given that the duration of the individual construction phases is greater than 26 weeks a L_{A10} construction noise goal of background (L_{A90}) plus 5dB(A) has been adopted for this assessment.

Operational Noise Criteria

The assessment of industrial noise sources in accordance with the INP has two components; impact assessment of intrusive noise levels as well as noise amenity levels. The intrusiveness and amenity assessment criteria applied to a proposal are derived independently. The intrusiveness criteria is aimed at controlling noise sources such that the subject development does not exceed the existing background noise levels by more than 5 dBA, whereas the amenity criteria is designed to limit continuing increases in noise levels in an area from new industrial noise sources. In assessing the noise impact of industrial developments, both criteria must be taken into account for residential receivers, but in most cases, only one will become the limiting criterion and form the project specific noise levels for the industrial development.

In accordance with the INP, the project specific intrusive and amenity assessment criteria for the residential, commercial and industrial receiver areas have been established. Project specific intrusive assessment criteria have been established by adding 5 dBA to the RBLs shown in **Table 5.1**. While project specific amenity assessment criteria have been established by comparing the existing estimated industrial noise levels with the recommended noise levels from industrial sources. Where the existing noise level from industrial sources is close to the acceptable noise level a modification factor has been applied to the acceptable noise level to account for the existing level of industrial noise. In this case the modification factor results in the project specific amenity assessment criteria being lower than the recommended criteria detailed in the INP. The project specific intrusive and amenity assessment criteria are presented in **Table 5.3**.

Table 5.3 - Project Specific Intrusive and Amenity Assessment Criteria (dBA)

Receiver Area	Noise Amenity Area	Intrusive L_{Aeq}(15minute)			Amenity L_{Aeq}(period)[1]		
		Day	Evening	Night	Day	Evening	Night
Fern Bay West	Suburban	55	47	49	49	37	37
Stockton West	Suburban	47	49	49	49	37	37
Mayfield	Urban	51	52	48	60	48	39
Carrington	Urban	47	46	42	60	48	42
Kooragang Island	All Industrial	Intrusive noise not applicable			70	70	70
Mayfield North	All Industrial	Intrusive noise not applicable			70	70	70
Any	School	Intrusive noise not applicable			External 45 when in use		
Any	Hospital	Intrusive noise not applicable			External 50 when in use		

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

It is noted that in cases where the relevant INP assessment criteria in **Table 5.3** are exceeded, it does not automatically follow that all people exposed to the noise would find the noise noticeable or unacceptable. In subjective terms, exceedances of the criteria can be generally described as follows:

- negligible noise level increase (less than 1 dBA) (not noticeable by all people);
- marginal noise level increase (between 1 dBA and 2 dBA) (not noticeable by most people);
- moderate noise level increase (between 3 dBA and 5 dBA) (not noticeable by some people and may be noticeable by others); and
- appreciable noise level increase (greater than 5 dBA) (noticeable by most people).

Sleep Disturbance Criteria

Sleep disturbance criteria are based on the EPA Environmental Noise Control manual (1994) which suggests that to prevent sleep arousal, the $L_{A1,\ 1minute}$ level of noise should not exceed the background noise level by more than 15 dB.

Road Traffic Criteria

Criteria for the assessment of noise from public roads are provided in the Environmental Criteria for Road Traffic Noise (ECRTN) (DEC 1999). The relevant criteria are shown in **Table 5.4**. In terms of the ECRTN road classifications, Nelson Bay Road, Cormorant Road and Industrial Drive are all classified as 'arterial roads'.

Table 5.4 - NSW Environmental Criteria for Road Traffic Noise

Receiver Area	Road	Policy	Period	Traffic Noise Criteria
Fern Bay	Nelson Bay Road	Land use developments with the potential to create additional traffic existing on freeways/arterials	Daytime (0700 – 2200)	60 dBA L_{Aeq}(15hour)
Kooragang Island	Cormorant Road		Night-time (2200 – 0700)	55 dBA L_{Aeq}(9hour)
Mayfield Carrington Maryville	Industrial Drive			

5.2.3 Noise Modelling Methodology

Noise levels at receiver areas were calculated using the Environmental Noise Model (ENM). This model has been endorsed by DECC for environmental noise assessment. ENM takes account of noise attenuation due to geometric spreading, atmospheric absorption, shielding and the effect of acoustically soft ground. It can also be used to predict noise levels under various meteorological conditions, defined by a combination of temperature gradient, wind speed and wind direction.

The model uses sound power level data for all relevant items of plant and equipment as detailed in the noise impact assessment (**Appendix 5**). The sound power levels adopted are based on currently feasible, reasonable and achievable noise emissions levels. Data from the Port Waratah Coal Services weather stations was used to derive the various meteorological conditions used in the model. This station is located approximately 1.2 kilometres from the terminal.

Noise modelling was conducted for the three (3) construction and three (3) operational phases of the development for calm and prevailing meteorological conditions. A typical 'worst-case' scenario was modelled (which has been determined as being phase 3 night time operations under temperature inversion conditions).

Temperature inversions are an important atmospheric factor that influences noise impacts. This results from variations in temperature occurring in layers in the atmosphere that can increase noise impacts. The INP includes a methodology for estimating the effect of inversions, however the noise modelling for the Project has considered existing temperature inversion conditions. As a result, the calculated noise levels more accurately reflects expected noise impacts, in comparison to the default industrial noise policy temperature inversion assumptions which would otherwise apply.

5.2.4 Noise Impact Assessment

Construction Noise Impacts

The potential noise impact from the noise sources associated with each phase of construction, as outlined in Section 2.0 of the noise impact assessment (**Appendix 5**), have been modelled using the DECC endorsed Environmental Noise Model. The predicted L_{A10}(15minute) noise level from the construction activities at representative receiver locations can be seen in **Table 5.5** and **Figure 5.2** shows the predicted construction noise contours.

Source: Heggies Pty. Ltd.
Aerial Photo Source: Port Waratah Coal Services

0 200 400 600m
1:12 500

Legend

- Greenleaf Road Terminal
- 35 Predicted Day-Time Construction Noise Contour (dBA)

FIGURE 5.2

Predicted Day-Time Construction Noise Contours

Table 5.5 - Predicted Construction $L_{A10(15minute)}$ Noise (dBA re 20 µPa)

Receiver Area	ID/Location		Construction Criteria	Phase 1	Phase 2	Phase 3
Fern Bay West	FW1	1 Fullerton Lane	55	<30	<30	<30
	FW2	Stockton Hospital	50[1]	35	34	42
Stockton West	SW1	284 Fullerton Street (cnr Beeston Rd)	47	49	48	49
	SW2	Cnr Pembroke and Fullerton Streets		40	38	40
Mayfield	M4	52 Arthur Street	51	< 30	<30	32
	M6	Hunter Christian School		<30	<30	30
	M7	Mayfield East Primary	45[1]	<30	<30	29
Carrington	C1	Elizabeth St	47	<30	<30	<30
Kooragang Island	KI1, KI2, KI3 Egret St industrial		70[1]	32	31	32
	KI4, KI5 Raven St Industrial			33	32	33
	KI6, KI7, Sandpiper Cl Industrial			34	32	33
	KI8, KI9, KI10 Heron Rod/ Cormorant Rd industrial			42	41	45
Mayfield North	MN1	OneSteel	70[1]	<30	<30	<30

Note 1: External amenity criteria from INP adopted for non residential receivers.
Note 2: Criteria based on RBLs from **Table 5.1**.

All of the predicted construction noise levels are below the relevant assessment criteria for each receiver location, with the exception of Stockton West where the LA_{10} noise levels are predicted to potentially exceed the criteria by up to 2 dBA. This potential exceedance is considered minimal as it is anticipated that $L_{A10(15minute)}$ construction noise emissions will not be discernible at this location. Hence, the construction noise impacts are considered acceptable.

Operational Noise Impacts

The potential noise impact from the noise sources associated with each phase of operation, as outlined in Section 2.3 of the noise impact assessment (**Appendix 5**), have been modelled using the DECC endorsed Environmental Noise Model. The 'worst-case' scenario was modelled which has been determined as being phase 3 night time operations under temperature inversion conditions. The predicted $L_{Aeq(15minute)}$ and $L_{Aeq\ (9\ hour)}$ noise levels from each operational phase have been assessed against the intrusive and amenity noise goals respectively for the day, evening and night time periods.

The predicted $L_{Aeq(9\ hour)}$ amenity noise levels associated with night time operation of the facility are shown in **Table 5.6** and **Figure 5.3** shows the predicted night-time amenity noise contours. The amenity noise criteria are the more stringent criteria and thus only these predictions have been presented.

Source: Heggies Pty. Ltd.
Aerial Photo Source: Port Waratah Coal Services

0 200 400 600m
1:12 500

Legend

- Greenleaf Road Terminal
- 35 Predicted Night-Time Amenity Noise Contour (dBA)

FIGURE 5.3

Predicted Night-Time Amenity Noise Contours

Table 5.6 - Night-time[1] Operation Amenity Noise (dBA re 20 μPa)

Receiver Area	ID/Location		Phase 1	Phase 2	Phase 3	Amenity Criteria
			Temp Inversion & Drainage Wind[2]			
Fern Bay West	FW1	1 Fullerton Lane	<30	<30	<30	37
	FW2	Stockton Hospital	30	30	30	50
Stockton West	SW1	284 Fullerton Street	36	36	37	37
	SW2	Cnr Pembroke and Fullerton Sts	<30	<30	<30	
Mayfield	M4	52 Arthur Street	<30	<30	<30	39
	M6	Hunter Christian School	N/A	N/A	N/A	
	M7	Mayfield East Primary	N/A	N/A	N/A	N/A
Carrington	C1	Elizabeth St	<30	<30	<30	42
Kooragang Island	KI1, KI2, KI3 Egret St industrial		<30	<30	<30	70
	KI4, KI5 Raven St Industrial		<30	<30	<30	
	KI6, KI7, Sandpiper Cl Industrial		30	30	30	
	KI8, KI9, KI10 Heron Rod/ Cormorant Rd industrial		43	43	43	
Mayfield North	MN1	OneSteel	<30	<30	<30	70

The predicted operational noise levels for each phase of operations are below the amenity and intrusive noise goals for the day, evening and night time periods, at each of the representative receiver locations. **Figure 5.4** shows the predicted night-time intrusive noise contours.

Traffic Noise Impacts

The proposal will result in a less than 0.1 per cent increase in traffic numbers in the Kooragang Island Industrial area, as discussed in **Section 5.3**. This corresponds to a less than 0.1 dB increase in the existing daytime $L_{Aeq\ (15\ hour)}$ or night time $L_{Aeq\ (9\ hour)}$ noise level which is considered to be negligible.

5.2.5 Cumulative Noise Impacts

As discussed in **Section 1.1**, there are a number of industrial land uses in close proximity to the proposal associated with the Kooragang Island industrial area that have been considered in the assessment of potential cumulative noise impacts.

The DGRs for the proposal specifically required the assessment of potential cumulative noise impacts to take into account noise generation from relevant existing and approved development within the area surrounding the proposal. The existing and approved developments considered in the assessment of cumulative noise impacts are listed in **Table 5.7**.

Source: Heggies Pty. Ltd.
Aerial Photo Source: Port Waratah Coal Services

0 200 400 600m
1:12 500

Legend

- Greenleaf Road Terminal
- 35 Predicted Night-Time Intrusive Noise Contour (dBA)

FIGURE 5.4

Predicted Night-Time Intrusive Noise Contours

Table 5.7 - Existing and Approved Developments

Site	Operator	Approval Date	Development	Status	Source of Noise Data
Newcastle Coal Export Terminal	Newcastle Coal Infrastructure Group	13/4/07 Stage 1 Stage 2		Approved Approved	Heggies (2006)
Kooragang Coal Terminal	Port Waratah Coal Services Ltd	13/4/07	Increase to Throughput capacity	Approved	Heggies (2006)
Kooragang Coal Terminal	Port Waratah Coal Services Ltd	25/11/1996 Stages 1, 2 and 3A Stage 3 Steps (1-4) Project 3D Stage 3 Remainder		Operating Operating Operating Planned Development	ERM (1996)
Cargill Oilseed Processing Facility	Cargill Australia Ltd	04/04/2006 Stage 1 Stage 2 Expansion		Operating Planned Development	HLA Envirosciences (2005)
Extension of Shipping Channels	NSW Waterways Authority	09/08/2005	Approved	Temporary Planned Development	NSW Waterways Authority (2004)
Cold Mill Facility	Protech Steel Pty Ltd	2002	Approved	Unlikely[1]	GHD (2001)
Multi-purpose Facility	BHP Company Ltd	06/04/2001	Approved	Not yet commenced	URS (2000)

Note 1 Cold Mill Facility not assessed cumulatively as it would be effectively sterilised by the proposed NCET.

In assessing cumulative noise impacts the Industrial noise policy establishes two control objectives:

1. the intrusive noise emission from any single source does not exceed the background level by more than 5 dBA. ; and

2. the $L_{Aeq(period)}$ amenity level (i.e. non-transport related) does not exceed the specified 'acceptable' or 'maximum' noise level appropriate for the particular locality and land use. This is aimed at restricting the potential cumulative increase in amenity noise levels otherwise known as 'background creep'.

Only the predicted amenity levels for Phase 3 night time operations were just above the Industrial Noise Policies acceptable criteria (but below the maximum), for urban residential land use. At all other periods (day, evening and night) and at all other land use categories (residential, commercial and industrial), the predicted amenity noise levels are below the Industrial Noise Policies acceptable criteria. The cumulative assessment of noise from existing, approved and proposed developments has therefore been restricted to the residential areas during the night-time period, the results of which are presented in **Table 5.8**, together with the acceptable and maximum amenity criteria for the residential receiver areas.

Table 5.8 - Night-time Cumulative Existing, Approved and Facility Amenity Noise Levels (dBA re 20 µPa)

Industrial Noise Source	Fern Bay West Residential	Stockton West Residential	Mayfield Residential	Carrington Residential
Existing Industry Measured	48	48	44	42
PWCS (Adverse)[2]	34	35	31	24
Cargill Stage 2 (Adverse)[1]	33	33	28	25
Channel Extension (Adverse)[1]	30	35	39	30
Multi Purpose (Limits)[1]	30	30	36	34
CET Facility (Adverse)[1]	36	35	38	31
Manildra (Adverse)[1]	< 30	38	<30	<30
Cumulative Sum (Adverse)[1]	**49**	**49**	**47**	**43**
INP Night time Amenity Criteria				
Acceptable	45		45	
Maximum	50		50	

Note 1: Average adverse weather noise predictions for each locality.
Note 2: PWCS noise contribution based on predicted emissions associated with the approved capacity throughput increase for PWCS.

It is noted that existing industrial noise is a feature of the residential night-time noise environment at all receiver areas. Sometimes it is not discernible but at other times it is distinguishable particularly during lulls in transport, domestic and natural noise sources. Westerly wind and/or temperature inversions also contribute up to 5 dBA to the industrial noise levels at Stockton and Mayfield. When these meteorological conditions are not present the industrial noise levels at these locations is just below the acceptable noise amenity level of 45 dBA.

The cumulative noise impact of Manildra Park's operations at the surrounding residential receivers is described as follows:

- ***Fern Bay (West)/Stockton (West)***: Existing night-time industrial noise generally emanates from Kooragang Island and was estimated as 48 dBA at both receiver areas during noise-enhancing weather conditions. Cumulative noise amenity levels from all proposed and approved developments are anticipated to increase ambient noise levels by up to 1 dBA under noise enhancing conditions and would not exceed the maximum noise amenity level of 50 dBA. Generally, industrial noise is at least 5 dBA less in the absence of westerly winds and/or temperature inversions and therefore would be just below the acceptable noise amenity level of 45 dBA.

- ***Carrington/Mayfield***: There would be no increase in noise amenity levels attributed to the operation of the Facility at these respective locations.

5.2.6 Noise Management and Mitigation Measures

Noise modelling of the facility has identified that operation of the facility will comply with the DECC noise goals at all locations during the day, evening and night time periods, assuming that all pumps associated with phase 3 operations are enclosed or mitigated and plant

design, specification and implementation to achieve the relevant noise criteria (see Appendix 5).

Manildra Park proposes to implement existing biodiesel technology which utilises modular components for each step in the biodiesel production process. The desired production capacity of the biodiesel plant therefore determines the number of modules required for each production process. Given the modular nature of the biodiesel technology the noise impacts have been assessed based on a conceptual plan.

During the detailed design and procurement process Manildra Park will confirm that the noise emissions from the facility meet the DECC goals.

5.3 Traffic and Transport

As required by the Director General's requirements the access, traffic, pedestrian, cyclist, public transport and parking issues associated with the proposal have been assessed by Christopher Stapleton Consulting Pty Ltd. A summary of the traffic report is provided below, with the full report included in **Appendix 6**.

5.3.1 Existing Traffic Environment

The local road network within the vicinity of the proposal is shown in **Figure 5.5**. Roads in the vicinity of the facility include Greenleaf Road, Heron Road, Cormorant Road and Teal Street. Access to the terminal will be off Greenleaf Road. The majority of trucks will travel via Greenleaf Road, Teal Street, Cormorant Road, Tourle Street and Industrial Drive to delivery locations throughout the region.

The local traffic network exhibits all the features of a successfully designed industrial area, including:

- immediate access to a sub-regional connector (Cormorant Road) which has itself been designed to higher industrial standards for width and weight, and provides for the movement of all vehicles including restricted access vehicles (i.e. B-Doubles over 19 metres);
- from Cormorant Road, immediate access to the regional road network at Industrial Drive via a well designed signalised intersection with significant spare capacity for existing and future traffic generation;
- wide local access roads with broad shoulders and turning aprons to accommodate even the largest vehicles;
- well designed local intersections, including internal access intersections and the junction of Cormorant Road and Teal Street, which has recently been upgraded by the RTA to provide significant spare capacity; and
- access options, with the on and off ramps from Teal Street at the Stockton Bridge providing a viable alternative for sites off Greenleaf Road to the Cormorant Road roundabout.

Overall, the local traffic network has multiple local routes available which caters for all vehicle types; and operates at a high level of service, with the roads and intersections in the area having significant spare capacity, as shown by the modelling undertaken by Christopher

Source: UBD Australian City Streets

Legend

Greenleaf Road Terminal

FIGURE 5.5

Local Arterial Road Network

Stapleton Consulting Pty Ltd (refer to **Section 5.3.3**). The low traffic flows coupled with the well designed intersection geometry and sight distances ensures a high standard of performance at intersections including Cormorant Road and Heron Road, and the on and off ramp approaches from Greenleaf Road to Teal Street.

Approximately 2300 and 2900 vehicles, move through the Teal street Cormorant Road roundabout during the morning and afternoon peak hours respectively. The proportion of heavy vehicles during the morning and afternoon peak hours is 13 and 5 per cent, respectively. Assuming that all of the heavy vehicle movements for the project occur within the morning and afternoon peak hours, a scenario which will not occur, the proportion of heavy vehicles passing through the roundabout would increase by 2 per cent. Manildra Park predicts that an average of three trucks per hour over an eight hour period will travel to and from the site. This would represent approximately a 0.2 per cent increase in the proportion of heavy vehicles passing through the roundabout during the morning and afternoon peak hours.

5.3.2 Assessment Methodology

A rigorous assessment of the existing and future operations of the local traffic network was undertaken. Discussions were held with Newcastle City Council and the Hunter Regional RTA to determine local traffic and transportation issues, as well as to consolidate the scope of the assessment.

A review of the key traffic and transport guidelines and assessment criteria, included:

- RTA Guide to Traffic Generating Developments;
- RTA Road Design Guide;
- Newcastle City Council Newcastle DCP 2005;
- *AS/NZS 2890.1:2004 - Parking Facilities – Off-street car parking*;
- *AS 2890.2:2002 - Parking Facilities – Off-street commercial vehicle facilities*;
- on-site observations and traffic surveys; and
- intersection modelling (SIDRA).

Christopher Stapleton Consulting Pty Ltd has modelled the performance of the key local intersections using the SIDRA model. SIDRA, an RTA (and preferred) intersection modelling suite, was used to provide key indicators for delay, queuing and capacity and ultimately the level of service of key intersections, assuming all of the vehicle movement occurred during the morning (8 - 9 am) and afternoon (5 - 6 pm) peaks.

Due to the staged nature of the proposal, the existing traffic numbers have been increased by a factor of 2 per cent over a period of 2, 5 and 10 years respectively for Phase 1, 2 and 3, to represent annual growth, as per discussions with the RTA.

The traffic impacts associated with Phase 1, 2 and 3 construction (including the construction of the pipeline between the berths and the terminal) and operational activities have been assessed. The traffic impacts for each phase have been assessed on the basis that all of the trips generated under each operational phase occurred during the morning and afternoon peak periods. This assessment methodology was adopted given that the traffic flow and volumes associated with construction was limited while the operational traffic data was

comprehensive. The likelihood of the construction phase generating more trips than the operational phase is low, particularly given that the method of analysis loads the total daily vehicle trip generation during a single peak hour, a period during which construction vehicles rarely operate.

The trip generation of each Phase will comprise both distribution vehicles (heavy) and staff vehicles (light). It was estimated that during Phase 1 the facility will generate only a small number of daily distribution trips, with approximately 10 heavy vehicle trips (i.e. 5 truck loads arriving and departing), and trips generated by 13 full time staff. It is estimated that during Phase 2 the daily heavy vehicle generation of the facility will increase to approximately 16 trips (i.e. 8 loads arriving and departing), plus the generation of an additional 4 full time staff, taking the total to 17 full time staff. During Phase 3 the heavy vehicle generation of the facility will increase to approximately 64 trips per day (i.e. 32 loads arriving and departing), plus the trip generation of an additional 20 full time staff, taking the total to 37 full time staff.

5.3.3 Traffic Impact Assessment

Pipeline Construction

The traffic impacts associated with constructing the pipeline between the wharf and the Greenleaf Road terminal are limited to Heron Road and Greenleaf Road. The impacts of this aspect of the project have been assessed using peak and low flow traffic numbers. The existing daily traffic volumes using Greenleaf Road are low. While flows in Heron Road are lower than those in Greenleaf Road, they comprise a higher percentage of heavy vehicles. The existing peak traffic flow of 214 vehicles per hour occurs between 3 pm and 4 pm. Traffic flows between 7:00 pm and 5:00 am comprise 15 per cent of the total daily flow in Greenleaf Avenue, with a maximum of 58 two-way vehicle trips per hour (7:00 pm – 8:00 pm), which has been used to asses the traffic impact associated with constructing the pipeline during low flow periods.

The traffic assessment considered that some form of traffic management would be required during construction of the pipeline. This could be either the use of a simple one lane ‘stop-go’ arrangement or the temporary closure of both Heron and Greenleaf Roads.

The assessment concluded that due to the low levels of traffic in Heron and Greenleaf Roads a simple one lane ‘stop-go’ arrangement or temporary road closure could be implemented with little if any impact on the operating efficiency of local roads/intersections, at any time of the day.

Operation

The majority of heavy vehicles and staff vehicles are expected to be generated to and from the west (Newcastle). Additionally, a review of the survey data shows that sites in Greenleaf Road generate trips predominantly via the Teal Street ramps, not via Heron Road and Cormorant Road (east).

The Teal Street ramps will provide for the majority of access demands for the terminal, with only a small number of movements via the internal local roads (Greenleaf Road, Heron Road and Cormorant Road) to access the north (Stockton Bridge towards Williamtown). **Figure 5.6** shows the transport routes to and from the terminal.

Accounting for these factors provides the following distribution of the additional trips:

- 80 per cent of heavy vehicle trips travel between Cormorant Road (west) and the terminal via Teal Street, the Teal Street ramps and Greenleaf Road;

Source: Aerial Photo: Port Waratah Coal Services

0 0.25 0.5 1.0km
1:25 000

Legend

- Greenleaf Road Terminal
- Traffic Route

FIGURE 5.6

Traffic Route

- 80 per cent of staff trips utilise this same Teal Street ramp route;
- 20 per cent of heavy vehicle trips travel north of the terminal via Greenleaf Road, Heron Road, Cormorant Road, Teal Street and the Stockton Bridge; and
- 20 per cent of staff trips utilise this same Heron Road route.

Using the methodology as outlined in **Section 5.3.2**, the potential traffic impacts associated with both the construction and operational components of the proposal have been assessed. **Table 5.9** and **Table 5.10** show the existing performance of the Cormorant Road and Teal Street intersection during the morning and afternoon peak traffic flow periods The SIDRA results for the Cormorant Road and Teal Street intersection are also shown for Phase 1, Phase 2 and Phase 3 respectively.

Table 5.9 - AM Peak SIDRA Results for Cormorant Road and Teal Street Intersection

Phase	Level of Service	Average Delay (sec)	Worst Delay (sec)	Capacity
Existing	A	11	17	0.35
Phase 1	A	11	17	0.37
Phase 2	A	11	17	0.39
Phase 3	A	11	19	0.45

Source: Christopher Stapleton Consulting Pty Ltd 2007

Table 5.10 - PM Peak SIDRA Results for Cormorant Road and Teal Street Intersection

Stage	Level of Service	Average Delay (sec)	Worst Delay (sec)	Capacity
Existing	A	10	14	0.44
Stage 1	A	10	14	0.46
Stage 2	A	10	14	0.49
Stage3	A	11	15	0.56

Source: Christopher Stapleton Consulting Pty Ltd 2007

As shown in **Table 5.9** and **Table 5.10**, the additional traffic flows (even if generated during a single peak hour) would not significantly affect the existing classification of local roads, or in any way impact upon the existing performance of local intersections. Even under worst case conditions, the key local intersection of Cormorant Road and Teal Street would accommodate the additional traffic generation of the site with only a minor change in the average delay occurring during the Phase 3 afternoon peak. This is due in part to the volumes of traffic generated by the proposal representing only a small percentage of daily total and peak period flows through the local network.

Overall, the assessment indicated that there would be no impact on the existing local traffic environment, and specifically no impact on the operation of the key local intersection of Cormorant Road and Teal Street. Furthermore, the forecast average annual increases as used in the SIDRA analysis, significantly exceed the traffic generated by the operation of the Greenleaf Road terminal. This is clearly shown by comparing the total number of vehicle movements (light and heavy vehicles) through the Cormorant Road and Teal Street roundabout for the existing and future traffic flows - assuming 10 years of growth with the contribution made by the project (see **Table 5.11**).

Table 5.11 - Existing, Future and Project Contribution to Traffic Flows

	Heavy Vehicles	Light Vehicles
Existing AM Peak	168	1651
Future 10 year AM Peak	269	2050
Annual Growth	101	399
Phase 3 Project Contribution AM Peak	64	37

Site Access Arrangements

The access driveway, and internal access roads, will be designed to conform to Australian Standard *AS 2890.2:2002*. This driveway geometry combined with the width of Greenleaf Road and excellent sight distances will facilitate the safe movement of vehicles onto and off the site, such that there are no conflicts expected to occur with either traffic on Greenleaf Road or vehicles accessing or exiting other business's located off Greenleaf Road.

Maritime Traffic

Newcastle Port operates 24 hours a day, 365 days a year and manages approximately 3000 ship movements every year. As outlined in **Section 1.1**, a variety of materials are shipped via the port, with coal being the dominant export commodity.

It is expected that shipping numbers will increase with the rise in coal exports. PWCS recently received approval to increase its Kooragang Island Terminal's throughput from 77 million tonnes per year to 120 million tonnes per year. At maximum capacity this increase in capacity represents an increase of approximately 380 vessels per year (or approximately 1 per day) over the current ship movements associated with the Kooragang Island Terminal.

In addition, the NCIG recently gained approval for the construction and operation of a third coal loader in the Newcastle Port. The NCIG coal loader has approval for 66Mtpa, which equates to an additional 12 ships per week, or approximately 600 additional vessels per year (Resource Strategies 2006).

At maximum capacity up to 27 vessels per year will deliver marine fuels, biodiesel and raw feed stock to the project. The project will also generate up to 190 refuelling barge movements per year within the harbour.

Consultation with the Newcastle Port Corporation (NPC) by Manildra Park has confirmed that sufficient navigational capacity is available for the additional ship and barge movements and that marine safety would not be jeopardised as a result of the Project. NPC is responsible for the management of maritime incidents in the Port. It has conducted appropriate maritime oil spill response training and has a detailed environmental management plan and an environmental procedures manual in place.

5.3.4 Pedestrian, Cyclists and Public Transport Impacts

The traffic assessment (refer to **Appendix 6**) included an assessment of the potential impact of the Project on alternative transport modes including public transport, cyclists and pedestrians. The traffic assessment indicated that in the case of the Project these alternative modes of travel are unlikely to play a significant role. This is a function of the location of the Site, and the fact that access (via car) is provided with relative ease along roads with significant spare capacity.

Overall there are limited public transport options servicing the Kooragang Island area. The only bus option is provided by the Hunter Valley Bus Company Route 135, which operates between Stockton and Newcastle; however, services are extremely limited, and there is no formal stop in close proximity to the Site.

There are comparatively better cyclist choices, with on road cycle lanes from Newcastle linking to Cormorant Road and thence over the Stockton Bridge to the north. Only a short distance of the trip (between the Site and Teal Street) would be made without a dedicated lane or path, but given the wide local carriageways and excellent sight distance safe passage for cyclists would be available.

Pedestrian traffic within the Kooragang Island area is minimal and largely associated with industrial operations within the area. There is a small public reserve located at the end of Cormorant Road that may be a potential source for pedestrian traffic in proximity to the Project site. Given the large carriageways, ample spare capacity in the local road network and driveway design, it is expected that the Project will not significantly impact on pedestrian movement or safety within the local area.

The traffic impact assessment (refer to **Section 5.3.3**) indicates that the Project will not have a significant impact on the local road network. As such it is predicted there will not be a significant impact on these alternative modes of transport.

5.3.5 Traffic Control Measures

Pipeline Construction

Traffic management measures will be required during the construction of the pipeline in Heron Road and Greenleaf Road. Manildra Park will consult with the RLMC, traffic management operators, Newcastle City Council and the RTA to determine the most effective traffic management measures to be implemented during the construction of the pipeline.

Operations

The traffic management measures to be implemented include:

- the proposal will provide a minimum of 18 parking spaces on site, where possible. Off-site staff parking may also be permitted in accordance with the Newcastle DCP 2005;
- overnight heavy vehicle parking will be accommodated for on site;
- the access driveway, and internal access roads, will be designed to conform to Australian Standard *AS 2890.2:2002 - Off Street Commercial Vehicle Facilities*;
- appropriate access driveways and circulation roadways, as well as loading areas, will ensure that all manoeuvring occurs on site; and
- on-site service areas including the refuelling, service or maintenance bays, will be designed with reference to *AS 2890.2*; where appropriate. Through bays may be utilised where the vehicles do not need to manoeuvre on either approach or departure to the service area. All movements will be contained on site so that all vehicles enter and depart the Greenleaf Road terminal in a forward direction, and any on-site manoeuvring is undertaken under controlled conditions.

As a principle, heavy vehicles will use the route via Greenleaf Road and the Teal Street on and off ramps for access to and from the west to minimise any potential traffic flow issues.

5.4 Hydrocarbon Management

The handling of hydrocarbons can be categorised into four main areas being:

- **Storage**: the storage of hydrocarbon in tanks at the terminal;
- **Transfer Pipeline**: the transfer of hydrocarbon via steel and/or flexible pipelines to or from ships i.e. receival and distribution of fuels;
- **The Refuelling Barge**: the loading of fuel at the Wallarah Berth; and
- **Road Tanker Loading/Unloading Bay**: the loading/unloading of road tankers at the terminal.

The design and operational philosophy adopted by Manildra Park for the facility is based on the following principles. The primary goal is to prevent an incident through the implementation of physical control measures. Physical control measures are typically incorporated into the design of the facility and include items such as bunding and automatic shut off valves and triggers. Where physical controls do not eliminate the incident to an acceptable risk level, mitigation measures will be implemented. Mitigation measures may include a combination of one or more of the following:

- maintenance programs;
- visual inspections;
- operating procedures;
- spill response equipment; and
- staff training.

Manildra Park has operated a marine fuel distribution terminal at Port Kembla for approximately five years. Given the similarity between the Port Kembla and the proposed Kooragang Island facilities Manildra Park proposes to implement the relevant procedures at its Kooragang Island facility. The management and control measures associated with these procedures for the main areas outlined above have been summarised in **Section 5.4.1**. The incorporation of these measures ensures that the operation of the facility will not contribute to the existing soil or groundwater contamination. Therefore the operation of the facility is not expected to result in any significant adverse impact.

5.4.1 Management and Control Measures

Storage

The following physical controls and mitigation measures have been incorporated into the design and operation of the terminal:

- the storage tanks and connecting pipeline infrastructure has been designed in accordance with *AS 1940:2004: The storage and handling of flammable and combustible liquids*;
- a leak detection system has been incorporated within the base of each tank (see **Figure 5.7**);

- the tanks are contained within a bunded area which has been designed in accordance with *AS 1940:2004*. The bunded area has a storage capacity of approximately 110 per cent of the storage capacity of the largest tank. This capacity has also taken into account firewater and rainfall events;

- the bunded area will be lined with an impervious layer, such as bentonite (clay) or high density polyethylene (plastic), ensuring that any spills can not disperse into the soil and/or groundwater;

- an automated monitoring system will be installed in all tanks (radar gauge and Programmable Logic Control system-fuel level detector), which will automatically stop fuel pumping if the storage level in the tank exceeds its designed limits during a fuel transfer, i.e. high level alarms;

- standby emergency spill kits will be available. Additional resources are available from the Newcastle Port Corporation and from Australian Marine Oil Spill Centre (AMOSC) members located in the area, such as Shell etc;

- isolation valves will be physically locked when not in use; and

- valves will be located within secure/fenced area.

Transfer Pipeline

The following physical controls and mitigation measures have been incorporated into the design and operation of the transfer pipeline:

- the design, construction, operation and maintenance of the pipeline will be undertaken in accordance with *AS 2885 Pipelines – Gas and liquid petroleum*;

- the pipeline will be cathodically protected for enhanced anti-corrosion properties;

- any underground or inaccessible sections will be sheathed in polymer coating or wrapped in anti-corrosion impregnated tape;

- flexible hoses will be blown out and cleared of fuel with compressed air at end of every use, prior to disconnecting the flexible hose;

- fuel will be removed from the steel pipeline at the conclusion of each transfer operation i.e. the pipeline will be pigged. The steel pipeline is empty when connecting flexible hose/or not in use;

- drip trays of a size to Australian Standards will be located underneath the point of connection between the steel pipeline and flexible hose on wharf and barge. Drip trays to be removed by hand and cleaned at terminal;

- the pig launching and catching points will be bunded. The capacity of the bund will exceed the capacity of the pig hatch;

- the terminal tank(s) will be dip gauged before filling the pipeline and after pigging pipeline to ensure zero fuel remains in pipeline, i.e. confirm the total volume of fuel dispatched/received;

- the volume of fuel dispatched/received will be cross checked at both ends;

- regular (every half hour) cross checks of volume dispatched from terminal to that received at the berth and visa versa;

- regular (continuous at start of pumping then every half hour) cross checks of the pressure within the pipeline at the terminal to that at the berth will be undertaken. Pressure will be logged on the Product Transfer Form;

- automatic shut off of the terminal pumps will occur if the maximum operating pressure of the pipeline is exceeded;

- visual inspection of the pipeline will be undertaken prior to and during loading. Half hourly checks will be undertaken during loading;

- emergency stop buttons will be located at staffing points i.e. at terminal, berth, and refuelling barge. Staff walking the pipeline will be in contact with staff at these locations via a radio;

- multiple isolation valves are located along the pipeline, to enable damaged sections of the pipeline to be isolated to minimise spills;

- isolation valves are physically locked when not in use;

- non-return valves will be used on pipeline;

- flexible hoses used for fuel tanker vessel discharge will be pressure tested prior to every discharge operation;

- pressure testing of transfer pipeline will be undertaken at the following intervals:

    - on installation, the pipeline will be pressure tested to 1.5 times its maximum allowable operating pressure;

    - yearly hydrostatic leak and strength testing of pipeline in accordance with the existing operating procedure at Port Kembla; and

    - monthly air pressure test of pipeline in accordance with the existing operating procedure at Port Kembla;

- flexible hoses for barge and ship refuelling are pressure and continuity tested every 6 months in accordance with the existing operating procedure at Port Kembla;

- valves located within secure/fenced area;

- collision aspects have been considered in the design of pipeline. Physical protection methods e.g. bollards, armco guard rail etc and high visibility colours and signage on pipeline including emergency contact phone numbers will be included where required;

- fuel transfer operations will be undertaken in accordance with the existing operating procedure at Port Kembla;
- minor spills will be cleaned up using spill kit materials;

- large volume of spilt oil to be removed by a licensed waste oil contractor (e.g. Nationwide Oil), as required;

- appropriately trained and competent operators in accordance with the existing operating procedure at Port Kembla; and

- multiple staff are located a critical locations during fuel transfer operations allowing for greater awareness and quick response to any issues.

The Refuelling Barge

The following physical controls and mitigation measures have been incorporated into the design and operation of the refuelling barge:

- the barge will be double hulled/double skin:

    - if the hull of the barge is damaged the contents will be emptied to a ship or the terminal; and

    - additional water based spill control equipment and resources can be called on from the Newcastle Port Corporation and Australian Marine Oil Spill Centre (AMOSC) members e.g. Shell etc;

- Manildra Park will have an emergency response vehicle based on land and the barge will also carry oil spill response equipment (e.g. floating booms) (Manildra Park's Oil Spill Response system and capability exceeds IMO & AMSA 'Marine Oil Spill & Pollution Guidelines');

- all loading operations will be computer controlled using Programmable Logic Control (PLC) system at terminal;

- flow meters will provide readings of volumes transferred with automatic presets to stop pumps at set volumes;

- a radar gauge is used to provide constant readout of barge tank capacity with alarms activated when tanks are nearing capacity;

- manual dippings and ullages (the volume remaining in the tank) at terminal tanks and barge tanks, are undertaken to confirm flow meter and radar gauge readings;

- fuel is to be loaded evenly between the barges tanks to minimise the listing of the refuelling barge;

- the barge includes a dedicated overflow/slops tank;

- radio contact between barge, terminal and staff walking pipeline is available at all times;

- maintenance of barge is undertaken as part of overall maintenance program;

- the operation and calibration of measuring equipment is undertaken as per the existing operating procedure at Port Kembla;

- minor spills to be cleaned up using spill kit materials;

- large volumes of spilt oil to be removed by licensed waste oil contractor (e.g. Nationwide Oil), as required;

- multiple staff at critical locations during barge refuelling operations allowing for greater awareness and quick response to any issues;
- emergency stop buttons located at staffing points;
- all Manildra Park staff will be trained and accredited by the Australian Marine Oil Spill Centre (AMOSC);
- procedures will adhere to International Safety Guideline for Oil Tankers and Terminals (ISGOTT) Manual; and
- competent and trained operators will be used e.g. Barge Master.

Road Tanker Loading/Unloading Bay

The following physical controls and mitigation measures have been incorporated into the design and operation of the road tanker loading bay:

- truck loading will occur within a bunded concrete area;
- all spills/stormwater within the loading bay are directed to a 20 KL Spill Pit meeting AS 1940 requirements which includes an impervious lining layer, such as bentonite (clay) or high density polyethylene (plastic) and provides capacity for spillage from one 8 KL road tanker compartment;
- trucks connect to a PLC system during loading, which controls the loading process via:
  - correlating volume to be loaded with truck ID Tag; and
  - the Scully system i.e. sensor which detects fuel level in tank and activates automatic shut off if triggered;
- flow meters provide readings of volumes transferred with automatic presets to stop pumps at set volumes;
- emergency stop buttons are located at filling bays;
- trucks fitted with brake interlocks, which prevents the truck from driving off while connected to the loading bay hoses;
- hoses are fitted with dry break couplings which prevents spills/leaks during connection/disconnection operations; and
- mobile spill kits will be available at the loading site (e.g. wheelie bins with quick response resources).

The incorporation of the above measures ensures that the operation of the facility will not contribute to soil or groundwater contamination or surface water/stormwater quality impacts (refer to Section 5.5). Therefore the operation of the facility is not expect to result in any significant adverse impact on the soil, groundwater or on Newcastle Harbour.

5.5 Hydrology/Water Quality

In accordance with the DGRs an assessment of the potential water impacts including impacts on Newcastle Harbour associated with the proposal have been assessed.

5.5.1 Stormwater Quality

Kooragang Island is located in the lower reaches of the Hunter River between its north and south arms (refer to **Figure 2.2**). The Hunter River catchment has a total area of approximately 22,000 square kilometres and extends past Cassilis in the west, Murrurundi in north and Cessnock in the south.

Water quality in the lower reaches of the Hunter River is typically influenced by stormwater inflows and contaminated sediment within the estuary.

Stormwater is a major contributor to the pollution of rivers and bays; with runoff quality and quantity being responsible for the degradation of most urban streams. The quality of stormwater varies significantly depending on its location within the catchment and the stormwater management controls that have been implemented within the catchment.

Typically stormwater runoff from city streets, footpaths, gardens and especially industrial locations carries litter, sediment, pollutants and nutrients into rivers, creeks and bays.

5.5.2 Impact Assessment

Potential water quality impacts could occur during construction of the facility through the entrainment of sediments from stockpiles or exposed ground within runoff. Water quality impacts could occur during operations via contact with hydrocarbons. Spills from the storage tanks and associated pipelines and chemicals used in the biodiesel production process are the most likely sources of a significant stormwater contamination event associated with the operation of the terminal. Internal roads, driveways, parking areas and the workshop have also been identified as minor sources.

The potential for hydrocarbon spills to occur from the plant and refuelling operations are discussed in **Section 5.4**, including measures to mitigate and manage spills that have the potential to enter waterways either directly or indirectly.

The biodiesel facility will generate approximately 11 ML of wastewater per year. Given the significant and rapid technological advancements occurring with biodiesel technology and that the facility is not expected to be constructed for approximately 3 – 5 years, it is anticipated that either waterless technology and/or significant improvements in plant performance will be achieved. This may alter the wastewater characteristics. Therefore, prior to constructing the biodiesel facility, Manildra Park will revise and update the soil water management plan and if necessary seek a variation to its EPL from the DECC if on-site treatment followed by discharge to the Hunter River is proposed. Alternatively the wastewater could be transported off site for disposal.

Although every effort will be made to prevent the release of hydrocarbons to the environment throughout the construction and operation of the proposal, it should be noted that the behavioural characteristics of biodiesel and mineral petroleum based diesel are not identical. Biodiesel degrades about four times faster than mineral diesel in water making it more suitable for applications in close proximity to aquatic environments (http://www.biodiesel.org/: July 2006).

Ground disturbance activities associated with the construction of the facility are relatively minor in scale. The water quality impacts therefore associated with the entrainment of sediments during construction of the facility can be effectively managed through routine construction management techniques, such that the impact is expected to be negligible.

Operationally the site has been divided into 'clean' and 'dirty' water areas. Functionally the clean water is diverted around the site and is allowed to discharge to the Hunter River via an existing stormwater pipe located in Greenleaf Road. Water which collects in the dirty water areas will be retained on site, either within the spill or oil separator pits or within the bunded area. This water may contain oil/ grease particles and/or entrained sediments. The spill and oil separator pits will facilitate the settlement of the entrained sediments, while an oil/water separator will remove the oil/grease particles. Prior to being discharged off site to the Hunter River, the water tested to confirm it meets the water quality criteria as outlined in **Table 5.12**. It is noted that the truck loading bay has been roofed to minimise the volume of water to be managed during rain events.

Groundwater in the vicinity of the project is in the order of 1.5 to 2.3 metres below ground surface (RCA 2007 and Douglas Partners 2007). Earthworks associated with the construction of the terminal with the exception of the transfer pipeline, oil separation and spill pits, are note expected to exceed 0.5 metres and thus there will be no interaction with groundwater on the site. The excavation depth for the transfer pipeline is 1.3 metres and construction of the pipeline will therefore not come into contact with the groundwater table The dimensions of the oil separator pit is 20 metres long, 5 metres wide and 5 metres deep, while the spill pit is 5 metres long, 3 metres wide and 2 metres deep. The groundwater table may be intersected by these structures. These structures will be constructed of concrete and be located inside a pit lined with a 2 millimetre thick polyethylene liner. These structures are impermeable and are not considered to pose a significant risk to the groundwater pollution and/or impede the movement of groundwater.

Sewerage will be treated on site using an Enviro Tank type system.

No adverse water quality impacts on the Hunter River are expected to occur as a result of the either the construction or operation of the facility.

5.5.3 Stormwater Management and Mitigation Measures

The following management and mitigation measures will be implemented to minimise impacts to local water quality during construction and operation of the facility:

Construction

- a Soil and Water Management Plan will be developed in accordance with the requirements of the 'Managing Urban Stormwater: Soils and Construction (Landcom 2004);
- stockpiles will be located away from major drainage lines;
- stockpiles will be managed to ensure storage times are minimized and excessive storage of spoil will be avoided;
- any material which is tracked onto pavement surfaces will be removed at the end of each working day;
- hardstand material or rumble grids will be installed at exit points to minimise the tracking of soil onto pavement surfaces;

- construction and regular maintenance of catch drains, silt fences and sediment dams to minimise sediment generation and contain sediment downslope of disturbed areas;

- clearly identifying, delineating and minimising areas required to be disturbed and ensuring that disturbance is limited to those areas. Clearing vegetation only as required to achieve the works and minimising machinery disturbance outside of these areas;

- applying gypsum, where required, to reduce the dispersibility of the subsoils that will be disturbed and to minimise the potential for tunnel erosion and surface rilling of disturbed or reshaped areas. The application rate to be determined by localised soil testing as required;

- ensuring that where possible all drainage and sediment and erosion control works are designed and constructed to be free draining to minimise the potential for ponding, infiltration and tunnel erosion;

- establishing a stable vegetative cover on all areas as soon as possible and regularly maintaining these areas;

- construction of drains upslope of areas to be disturbed to convey clean runoff away from most disturbed areas; and

- diversion of surface and road runoff away from disturbed areas where possible.

Operation

The terminal has been divided into clean and dirty water catchment (see **Figure 5.8**). These areas are defined as follows:

Dirty water areas:

- water collected/captured within the tank farm bund;

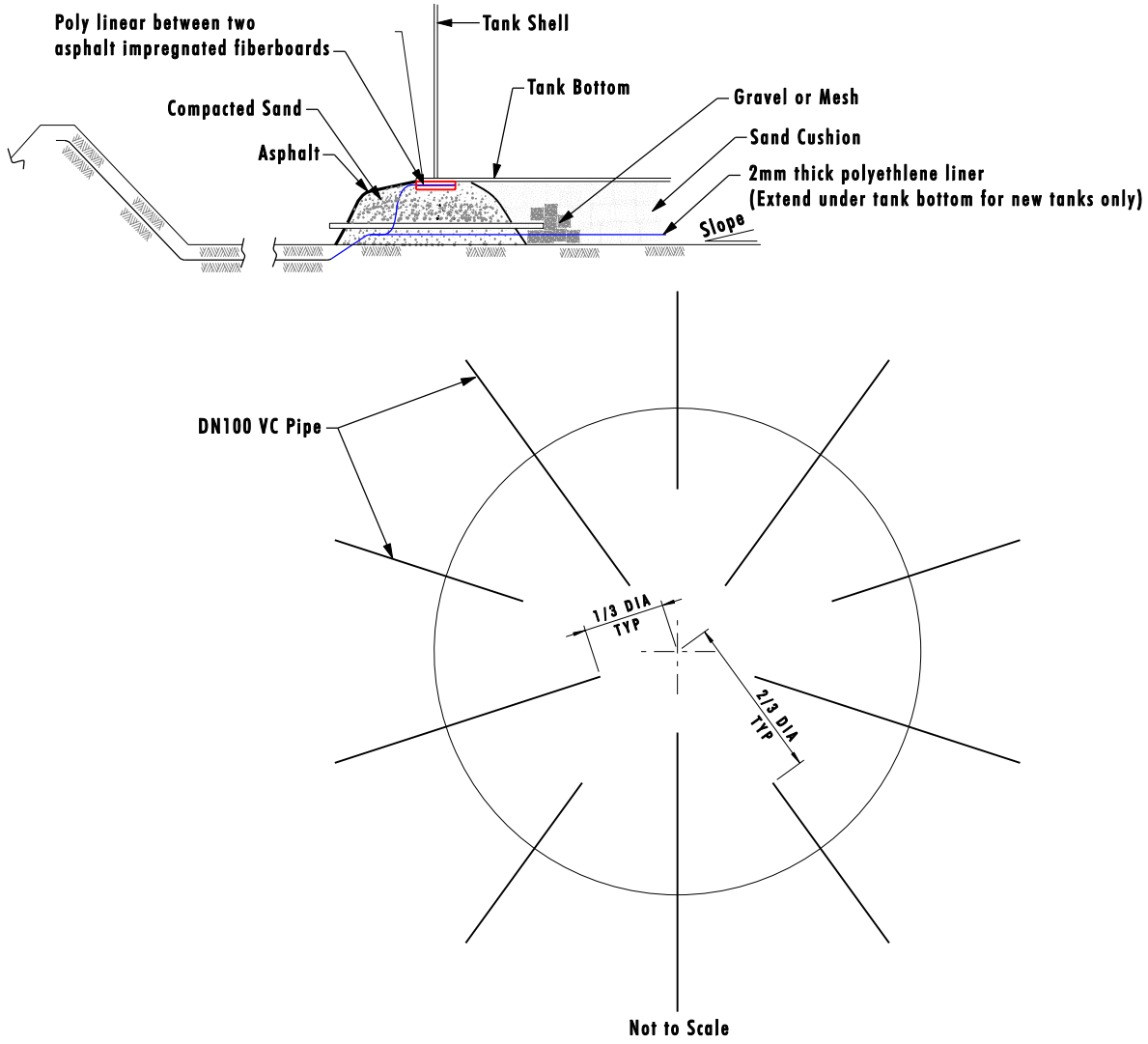
- water collected/captured within the biodiesel bund;

- water collected/captured within the truck loading bays; and

- water collected/captured within the internal roads and car parking areas.

All other areas are defined as clean water areas. The terminal has been designed to divert the clean water off site without it coming into contact with a dirty water area.

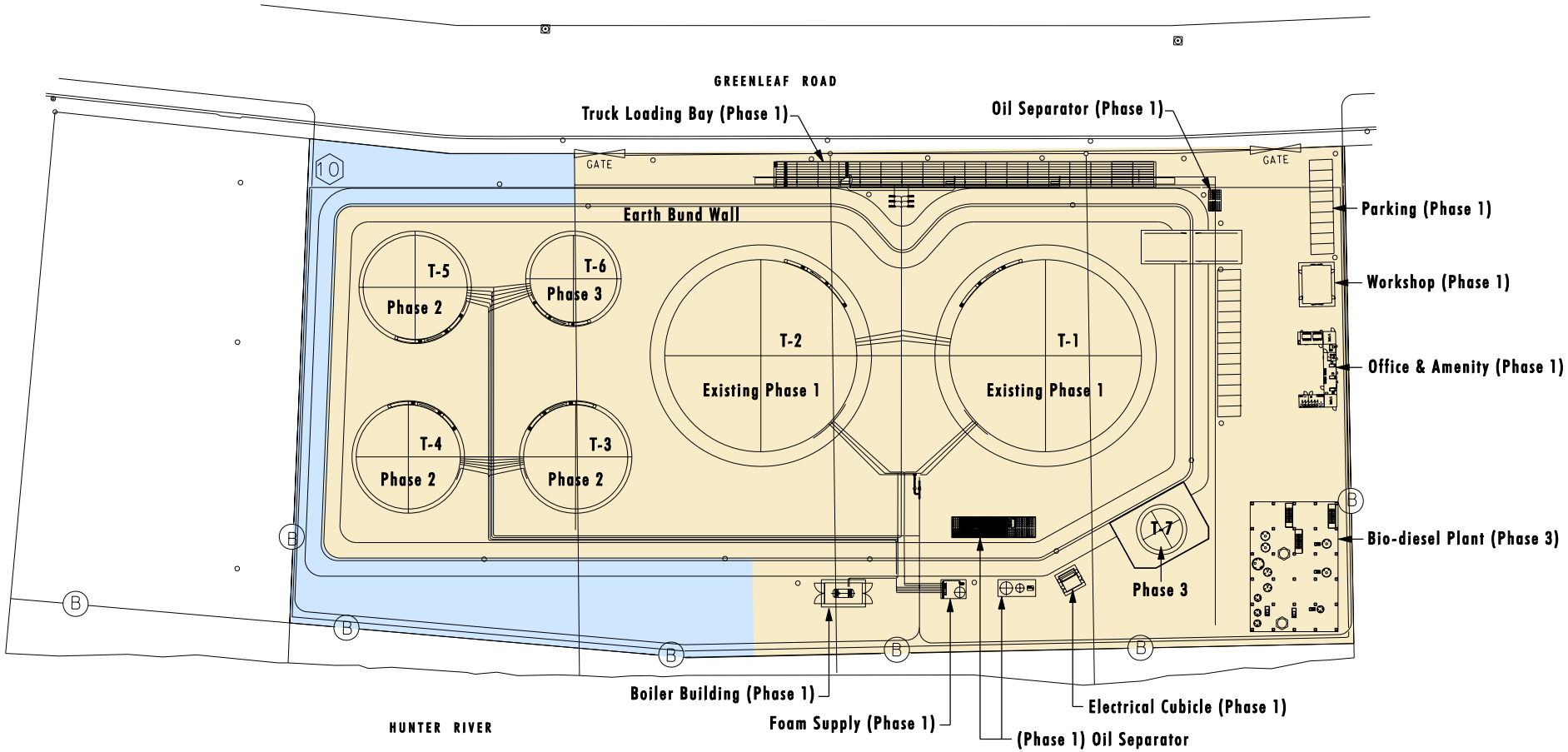
Water collected from the dirty water areas will be retained on site within a lined spill pit and/or bunded area. This water will be passed through an oil/water separator and tested prior to being discharged off site to the Hunter River, subject to meeting the water quality criteria as shown in **Table 5.12**. Discharges will be undertaken in accordance with the EPL for the facility.



Source: Manildra Park

FIGURE 5.7

Tank Leak Detection System



Source: Manildra Park

0 25 50 75m
1:1500

Legend
- Clean Water Area
- Dirty Water Area

FIGURE 5.8

Clean Water / Dirty Water Areas

Table 5.12 - Water Quality Discharge Criteria

Water Quality Parameter	Unit of Measure	Criteria 100 % Concentration Limit
pH	pH	6.5 – 8.5
Total Suspended Solids	mg/L	50
Oil and Grease	visible	none
Chemical Oxygen Demand	mg/L	40
Volume	KL	none
BOD	mg/L	

As outlined in **Section 5.5.2**, Manildra Park will seek an EPL variation from the DECC if off-site discharge of wastewater from the biodiesel plant is proposed.

5.6 Air Quality Assessment

A comprehensive air quality impact assessment has been undertaken by Holmes Air Sciences in accordance with the DGRs for the EA. The assessment report is included as **Appendix 7**, with an overview of the assessment provided in this section.

The main emissions sources associated with Project are associated with the biodiesel manufacturing process during Phase 3 of the Project. Specifically these emissions will be associated with the combustion products from the boiler, controlled methanol emissions from the methanol recovery system stack and some fugitive emissions from the methanol storage tank.

Vapour emissions from the storage of diesel, marine fuel oil, biodiesel and associated feedstock (fats and oils) will be minimal due to the low vapour pressure characteristics of these substances. This is further minimised by using floating roofs for each of the storage tanks.

As such the key air quality considerations include Carbon Monoxide, Nitrogen Dioxide, Sulphur dioxide and methanol. In addition it is expected that there will be some minor dust emissions associated with the construction activities.

5.6.1 Climate and Meteorology

Meteorological data have been collected at the PWCS Kooragang Coal Terminal by Pavel Zib and Associates. The meteorological station is located approximately 1 kilometre from the Project site (refer to **Figure 5.1**). Given the proximity of the PWCS meteorological station to the Project site, the PWCS data is considered to be representative of the conditions experienced at the Project site.

Data from the PWCS meteorological station indicates that on an annual basis, the most common winds are from the WNW and NW. Winds from the east are also common, but to a lesser extent. In the summer months, winds from the east indicate the direction of the sea-breeze while winds in winter are predominantly from the WNW.

To use the wind data to assess dispersion it is necessary to also have available data on atmospheric stability. A stability class was calculated for each hour of the meteorological

data using sigma-theta (a measure of the fluctuation of the horizontal wind direction) according to the method recommended by the US EPA (US EPA, 1986).

5.6.2 Existing Air Quality

As outlined above, combustion products from the boiler, being predominantly CO, NO_x and SO_2, together with methanol emissions are the relevant pollutants of interest. The existing concentrations of these pollutants i.e. the background levels, with the exception of methanol, are recorded at the DECC operated air quality monitoring stations at Newcastle and Wallsend (refer to **Figure 5.9**). A summary of the data recorded between 2000 and 2005 is provided in **Table 5.13**.

Table 5.13 - Summary of Monitoring Data at DECC Monitoring Sites at Newcastle and Wallsend

		Pollutant			
		Carbon Monoxide	**Nitrogen Dioxide**		**Sulphur Dioxide**
Goal		**8-hour 9 ppm**	**1-hour -12 pphm Annual Average 6 pphm**		**1-hour -20 pphm 24-hour 8 pphm Annual Average 2 pphm**
		Site			
Year		**Newcastle**	**Newcastle**	**Wallsend**	**Wallsend**
2000	Maximum Average	3.1	4.4 0.9	5.4 0.8	4.1 1.0 0.2
2001	Maximum Average	4.0	4.0 0.9	4.4 0.9	4.9 1.3 0.2
2002	Maximum Average	3.2	4.7 0.9	4.3 0.9	4.5 1.2 0.2
2003	Maximum Average	2.8	3.9 0.8	5.0 0.8	4.7 1.1 0.2
2004	Maximum Average	2.4	4.4 0.9	4.1 0.8	6.7 1.4 0.2
2005	Maximum Average	1.9	4.1 0.9	5.8 0.8	4.8 0.7 0.1

The highest measured values have been used as conservative estimates of background concentrations for the air quality assessment (refer to **Appendix 7**).

Source: LPI NSW (2000), DECC (2007)

0 1.0 2.0 2.5km
1:50 000

Legend

- Greenleaf Road Terminal
- Meterological Station Locations

FIGURE 5.9

Meterological Station Locations

5.6.3 Air Quality Criteria

When assessing the potential air quality impacts associated with a proposed operation, it is necessary to compare the existing air quality environment, the proposed operation and the relevant air quality criteria. Air quality criteria are used to assess the potential for ambient air quality to give rise to adverse health or nuisance effects.

Within its guidelines, *Approved Methods and Guidance for Modelling of Air Pollutants in NSW* (DECC 2005), the DECC specified air quality assessment criteria for CO, NO_x,SO_2 and methanol and are outlined in **Table 5.14**.

Table 5.14 - Relevant Air Quality Criteria

Pollutant	Criterion*	Averaging Period	Source
Carbon monoxide (CO)	25 ppm or 30 mg/m^3	1-hour maximum	DECC
	9 ppm or 10 mg/m^3	8-hour maximum	DECC
Nitrogen dioxide (NO_2)	0.12 ppm or 246 μg/m^3	1-hour maximum	DECC
	0.03 ppm or 62 μg/m^3	Annual mean	DECC
Sulphur dioxide (SO_2)	20 pphm or 570 μg/m^3	1-hour maximum	DECC
	8 pphm or 228 μg/m^3	24-hour maximum	DECC
	2 pphm or 60 μg/m^3	Annual mean	DECC
Methanol	2.4 ppm or 3.0 mg/m^3	1 hour 99.9th percentile	DECC

* ppm = parts per million; pphm = parts per hundred million.

The assessment of CO, NO_x and SO_2 emissions from a facility against air quality criteria considers the existing levels of each substance and the contribution of the Project, i.e. the cumulative impact. The goal for methanol however, relates to the project emissions alone and does not take into account any existing background concentrations. The goal for methanol is based on its odorous properties and relates to the 99.9th percentile prediction.

5.6.4 Assessment Methodology

The air quality assessment (refer to **Appendix 7**) has been undertaken in accordance with the *Approved Methods and Guidance for Modelling of Air Pollutants in NSW* (DECC 2005). The guidelines specify how assessments based on the use of air dispersion models should be undertaken. They include guidelines for the preparation of meteorological data to be used in dispersion models, the way in which emissions should be estimated and the relevant air quality criteria for assessing the significance of predicted air quality impacts associated with a Project.

The specific approach to the air quality assessment (refer to **Appendix 7**) included dispersion modelling based on the existing meteorological conditions and emissions factors to estimate emissions from Project related processes. Off-site air quality impacts have been predicted using AUSPLUME. It is widely used throughout Australia and is regarded as a 'state of the art' model. The AUSPLUME model is accepted by the DECC for air quality impacts assessment.

The model has utilised meteorological data collected from the PWCS station; existing air quality data collected from DECC operated meteorological stations at Newcastle and Wallsend; and estimated emissions rates and characteristics associated with the operation of the Project.

5.6.5 Air Quality Impact Assessment

Construction Phase

During the construction phases dust emissions are the dominant source of air emissions. The dust emissions can be effectively managed through routine construction management techniques, such that their impact is expected to be negligible. Any grit blasting of the existing tanks will be carried out under WorkCover regulations using a suitable enclosure with the means to capture all dust and grit particles.

Operational Phase

Combustion product emissions from the boiler and odorous volatile organic compounds (VOC) emissions associated with the biodiesel plant are the primary air quality impacts associated with the operation of the facility.

Table 5.15 summarises the highest predicted ground level pollutant concentrations for carbon monoxide, oxides of nitrogen and sulphur dioxide due to emissions from the proposed boiler. Estimates of background levels are provided and combined with predicted project related emissions to provide an indication of the cumulative air quality impacts as a result of the operation of the facility (refer to **Table 5.15**).

Table 5.15 - Highest Predicted Ground-level Pollutant Concentrations for CO, NO_x and SO_2

Pollutant and Averaging Time	Assessment Criteria	Boiler Stack /Emissions	Existing Levels	Total (Project Contribution + Existing)
Maximum 1-hour average CO (mg/m^3)	30	0.006	4.5	4.506
Maximum 8-hour average CO (mg/m^3)	10	0.004	4.5	4.504
Maximum 1-hour average NO_x ($\mu g/m^3$)	246	23	116	139
Annual average NO_x ($\mu g/m^3$)	62	0.5	16	16.5
Maximum 1-hour average SO_2 ($\mu g/m^3$)	570	8.5	192	200.5
Maximum 24-hour average SO_2 ($\mu g/m^3$)	228	2.3	40	42.3
Annual average SO_2 ($\mu g/m^3$)	60	0.2	6	6.2

As outlined in **Table 5.15**, there are no predicted exceedances of the relevant air quality assessment criteria. The results of the air quality assessment predict that the emissions from the Project will be substantially below the relevant air quality goals.

Odour emissions from the storage of diesel, marine fuel oil, biodiesel and associated feedstock will be minimal due to the low vapour pressure characteristics of these substances. The tanks used to store these substances are fitted with floating roofs which will assist in further minimising vapour emissions and are fitted with a pressure relief valve. Consequently, emissions from the tank will only occur when the pressure inside the tank exceeds the design value of the tank. Emissions will be vented directly to the atmosphere under this situation. While emissions to the atmosphere are considered unlikely due to the floating roof arrangement, it may occur during the hotter months when the tanks are at

maximum capacity i.e. full and thermal expansion of air in the tank head space occurs. The emissions, if detected, are expected to be inoffensive due to their low odour strength.

Methanol however, has a comparatively higher vapour pressure of 127 mm Hg @ 25°C and is odorous. Methanol vapour emissions therefore have the potential to cause off site odour impacts via fugitive sources, e.g. the methanol storage tank and/or the biodiesel production process.

To minimise methanol vapour emissions the storage tanks will be fitted with an internal floating roof, while the biodiesel methanol process tank will be blanketed using nitrogen. An estimate of the fugitive emissions from the methanol storage tank was undertaken using the TANKS program. The estimated fugitive methanol emissions from the proposed storage tanks is considered to be minor compared to the stack emissions.

The biodiesel production process, which includes a Methanol Recovery System (MRS) to recover unused methanol, is undertaken in a closed system. Approximately 98 per cent of the methanol used in the process is consumed in the reaction process, the remaining 2 per cent is recovered by the MRS. The MRS is a separation process that removes the unused methanol from the biodiesel and delivers it to a distillation column. The efficiency of the MRS system is expected to be in the order of 80 to 90 per cent. For modelling purposes the MRS was assumed to be operating at 80 per cent efficiency.

The maximum ground level concentration of methanol emitted form the MRS is shown in **Table 5.16**.

Table 5.16 - Highest Predicted Ground-level Pollutant Concentrations for Methanol

Pollutant and Averaging Time	Assessment Criteria	Methanol Emissions	Total (Project Contribution)
99th percentile 1-hour methanol (mg/m^3)	3.0	0.8	0.8

Ethanol which may be substituted for methanol in the biodiesel process, will also comply with the DECC goal.

As outlined in **Table 5.16**, the predicted methanol concentrations do not exceed air quality assessment criteria and are substantially below the DECC goal.

The air quality emissions from the project are between 45 and 90 per cent below the relevant DECC assessment criteria. Therefore no adverse air quality impacts are expected to occur as a result of the project.

5.6.6 Air Quality Management and Mitigation Measures

As outlined in **Section 5.6.5**, the air quality assessment (refer to **Appendix 7**) has indicated that the Project will not have a significant impact on air quality through the construction and operational phases of the Project. Furthermore, the air quality assessment has indicated that the predicted emissions from the Project are substantially below relevant criteria. Despite this, Manildra Park have committed to the following air quality management and mitigation measures for the Project:

- maintenance of appropriate dust management controls during the construction phase of the Project including minimisation of disturbed areas, watering of exposed surfaces during construction and the stabilisation of exposed areas post construction;

- fitting diesel, marine fuel oil, bio diesel and associated feedstock storage tanks with floating roofs and pressure release valves to assist in minimising vapour emissions from the tanks; and

- blanketing (using nitrogen) all vessels using methanol in the biodiesel process to minimise vaporous emissions; and

- internal floating roof for the methanol storage tank.

5.7 Visual Impacts

As required by the DGRs, an assessment of the visual impacts associated with the facility has been undertaken. This includes an assessment of the existing visual character of the area and the potential visual impacts of the project.

5.7.1 Existing Visual Amenity

The proposed development is located on the eastern bank of Kooragang Island, which is bounded by the North and South arms of the Hunter River. Kooragang Island has little vertical relief and is relatively flat. The existing visual character of the area is dominated by industrial and port related developments and the Stockton Bridge. These structures are dominant components of the visual character of the area when viewed from Stockton as seen **Plate 3**. As mentioned in **Section 1.1.1**, Kooragang Island is dominated by large-scale industrial uses including concrete batching and recycling, engineering and manufacturing, fertiliser manufacturing and distribution, port facilities and coal loading. The location of the visually prominent surrounding industrial operations is shown in **Figure 5.10**.

5.7.2 Legislation and Standards

The 'Newcastle Development Control Plan (DCP), Element 7.4 – Kooragang Port and Industrial Area' requires various principles, objectives and provisions to be considered in the design of new buildings. While the nature of the project (under Part 3A) means that it is not directly assessed with reference to the DCP, the DCP nonetheless provides a suitable reference base. In particular, the following objectives have been developed in relation to landscaping and lighting:

Landscaping

- incorporate local plant species which will contribute to biodiversity and landscape values of the locality, complementing the objectives of the Kooragang Wetland Rehabilitation Project; and

- ensure plant species selection is compatible with local soil and climatic conditions.

The provisions of the DCP and most specifically Element 7.4 - Kooragang Port and Industrial Area provides guidelines for the development within the Port and Industrial Area. Section 75R of the EP&A Act notes that the Newcastle Development Control Plan (DCP) does not apply to this project as it is a Major Projects defined under Part 3A of the Act. Nevertheless, as requested by Newcastle City Council, the setback requirements as outlined in the DCP have been considered. The DCP provisions specify that the landscaped areas should extend along the entire street frontage of the site and shall have a minimum width of 10 metres. This requirement can not be satisfied for this project as the distance between the boundary fence and the existing earthen bund is 8 metres. Compliance with this provision

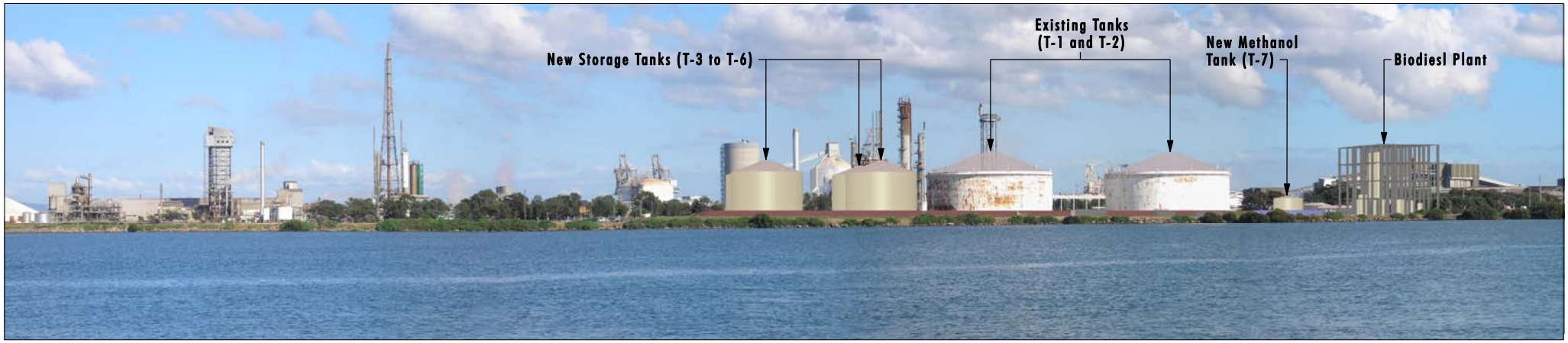


PLATE 3
Panoramic view from Stockton

Source: Aerial Photo: Port Waratah Coal Services

0 0.25 0.5 1.0km
1:25 000

Legend

- Greenleaf Road Terminal
- View 1 - Hunter River
- View 2 - Mangrove Screening
- View 3 - Interspersed from Stockton
- View 4 - Stockton Bridge
- View 5 - Carrington
- View 6 - Greenleaf Road

FIGURE 5.10

Industrial Character and View Corridors

File Name (A4): R04_V4/2305_011.dgn

would require the removal of the existing earth bund and subsequent disposal of this material and the construction of a concrete bund wall due to the reduced operational area which would result. The costs associated with complying with the setback requirements are considered to be operationally restrictive, not relevant for this project and does not result in an overall environmental benefit.

Lighting

- ensure lighting does not cause distraction to vehicle drivers on internal or external roads or the occupants of adjoining properties;
- ensure lighting does not cause disturbance to adjacent or nearby fauna habitats or the Kooragang Nature Reserve; and
- lights shall be positioned and directed so that glare or excessive light spillage will not occur onto neighbouring land. External lights shall comply with Australian Standard 4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.

5.7.3 Visibility of the Project

The facility has a waterfront location i.e. it is located on the eastern bank of Kooragang Island. The facility will therefore be a feature of any view corridor in which it is contained. There are four main view corridors associated with the facility (see **Figure 5.10**). These corridors comprise:

- **Hunter River (North Arm)**: The terminal has a waterfront location and thus views from watercraft on the north arm of the Hunter River are readily available (refer to View 1 on **Figure 5.10**). Views from this location would consist of the terminal and other developments on Kooragang Island in the foreground. The Sugarloaf Ranges would form an element in the background.
- **Fullerton St, Stockton**: Fullerton St is located along the western bank of the Stockton peninsula and runs generally parallel to Greenleaf Road. Views of the terminal from the road, park and residential area towards Kooragang Island (refer to View 2 on **Figure 5.10**) are generally screened by a dense line of mangroves which occupy the eastern shoreline of the Hunter River (North Arm). Limited views of the terminal are available from this location, which are similar to those viewed from the Hunter River as mentioned above. Further south, interspersed views are available due to a limited number of mangroves and other visual screens (refer to View 3 on **Figure 5.10**).
- **Stockton Bridge (West-bound Lane)**: Due to the relatively high fencing, and the location of the pedestrian path in the centre of the bridge, only limited views of the site are provided from this vantage point (refer to View 4 on **Figure 5.10**).
- **Carrington**: Limited views of the development are available when looking north from the industrial area at Carrington (refer to View 5 on **Figure 5.10**). Views from residential properties will be screened by the industrial developments on the southern bank of the Hunter River at Carrington.

5.7.4 Visual Impacts

The proposed development will involve the construction of five new storage tanks. The dimensions of which together with the existing tanks can be seen in **Table 5.17**. All tanks within the development will be painted white.

Table 5.17 - Approximate Dimensions of Existing and Proposed Infrastructure

Tank ID	Diameter (metres)	Height (metres)
T1 (existing)	46	24
T2 (existing)	46	24
T3	25	19
T4	25	19
T5	25	19
T6	21	19
T7	10	7

The dimensions of the biodiesel plant are approximately 22 metres wide by 30 metres long and 24 metres high. The height of these tanks is 3 to 8 metres higher than the existing tanks, while their visual appearance is considered to be consistent with the existing visual character of the area.

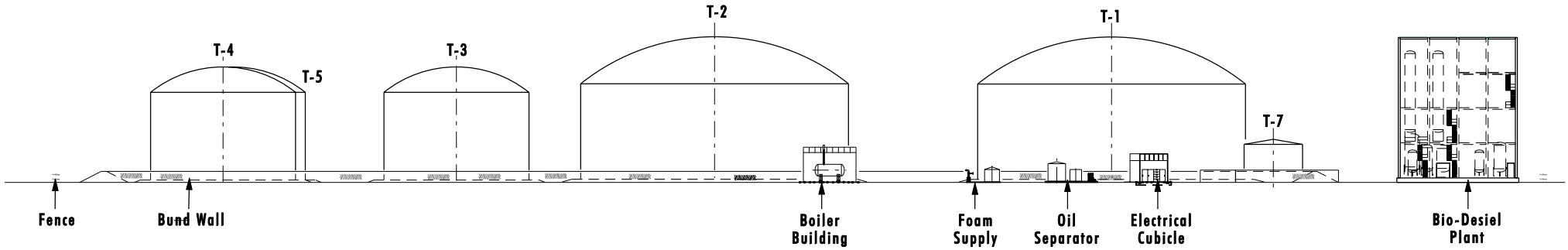
The terminal will be part of any view when viewed from the Hunter River (North Arm). However, limited views are available of the terminal from Fullerton St, due to the screening provided by the mangrove located on the eastern bank of the Hunter River (North Arm). Despite this, the size and style of the new infrastructure is consistent with the existing visual context of the area, especially when considering the size of the existing tanks on site, and the visual catchment in which the terminal is contained (refer to **Figure 5.11**). Therefore only minor visual impacts from this location are anticipated.

Similarly, views from Carrington will be dominated by the existing industrial developments such as the Orica plant, which is located adjacent to the terminal. Again the new infrastructure will not look out of place within the visual catchment in which it is contained and will result in only minor visual impacts.

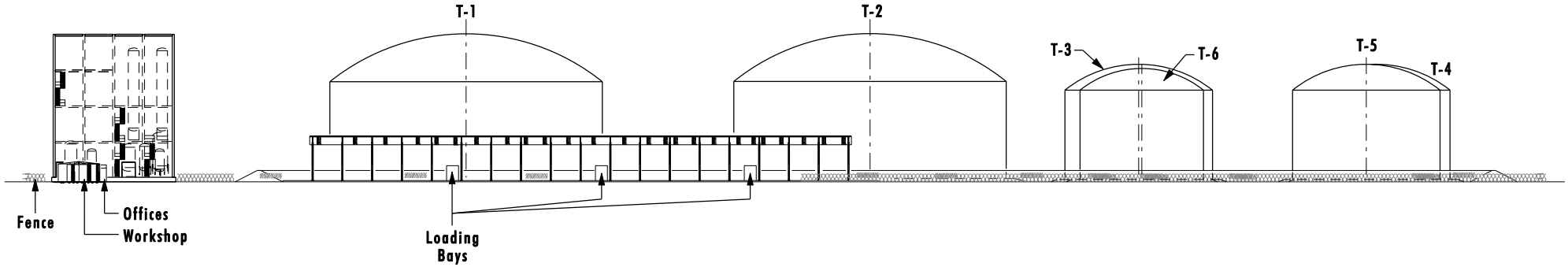
Views from the west-bound lane of the Stockton Bridge will comprise the large buildings associated with the Orica plant in the background, with the relatively smaller buildings and tanks of the proposal in the foreground. Again this view is consistent with the existing visual character if the area and will not look out of place.

Visual impacts associated with locating the pipeline within the road reserve were also considered during the assessment. No visual impacts are expected to occur as a result of the pipeline given that it will be located underground within the road reserve. Sections of the pipeline will be located above ground within the terminal and the PWCS facility. Visually the pipeline will be located adjacent to existing services/utilities and will appear consistent with the existing visual character. The pipeline is therefore not expected to result in any visual impacts.

Currently there are a large number of industries which operate 24 hours per day, 365 days per year within the Kooragang Island Industrial area. Lighting associated with the proposed facility is expected to make only a minor contribution to the existing environment. Residents in Stockton and Carrington are considered to be too far removed from the site to experience lighting impacts. Thus no light spill impacts are expected to occur during operation of the facility.



View from Stockton



View from Greenleaf Road

Source: Manildra Park

0 10 25 50m
1:1000

FIGURE 5.11

Profile of the Facility

5.7.5 Proposed Visual Controls

The facility will be landscaped to improve the visual amenity of the site. The extent of landscaping is shown in **Figure 5.12**. Native shrub and grass species will be selected for landscaping. The species used would be endemic to the area and would complement the objectives of the Kooragang Wetland Rehabilitation Project. Plantings within the site are not proposed as it is considered to pose fire safety and operational risks for this type of facility.

All lighting associated with the proposed development will be designed, installed and operated in accordance with *AS 4282:1997 - Control of the Obtrusive Effects of Outdoor Lighting*.

5.8 Preliminary Hazard and Risk Assessment

In accordance with the DGRs a preliminary risk screening of the proposed development is required under *SEPP No. 33 – Hazardous and Offensive Development* (NSW Government 1997), to determine the need for a PHA. The preliminary screening methodology concentrates on storage of specific dangerous goods classes that have the potential for significant off-site effects.

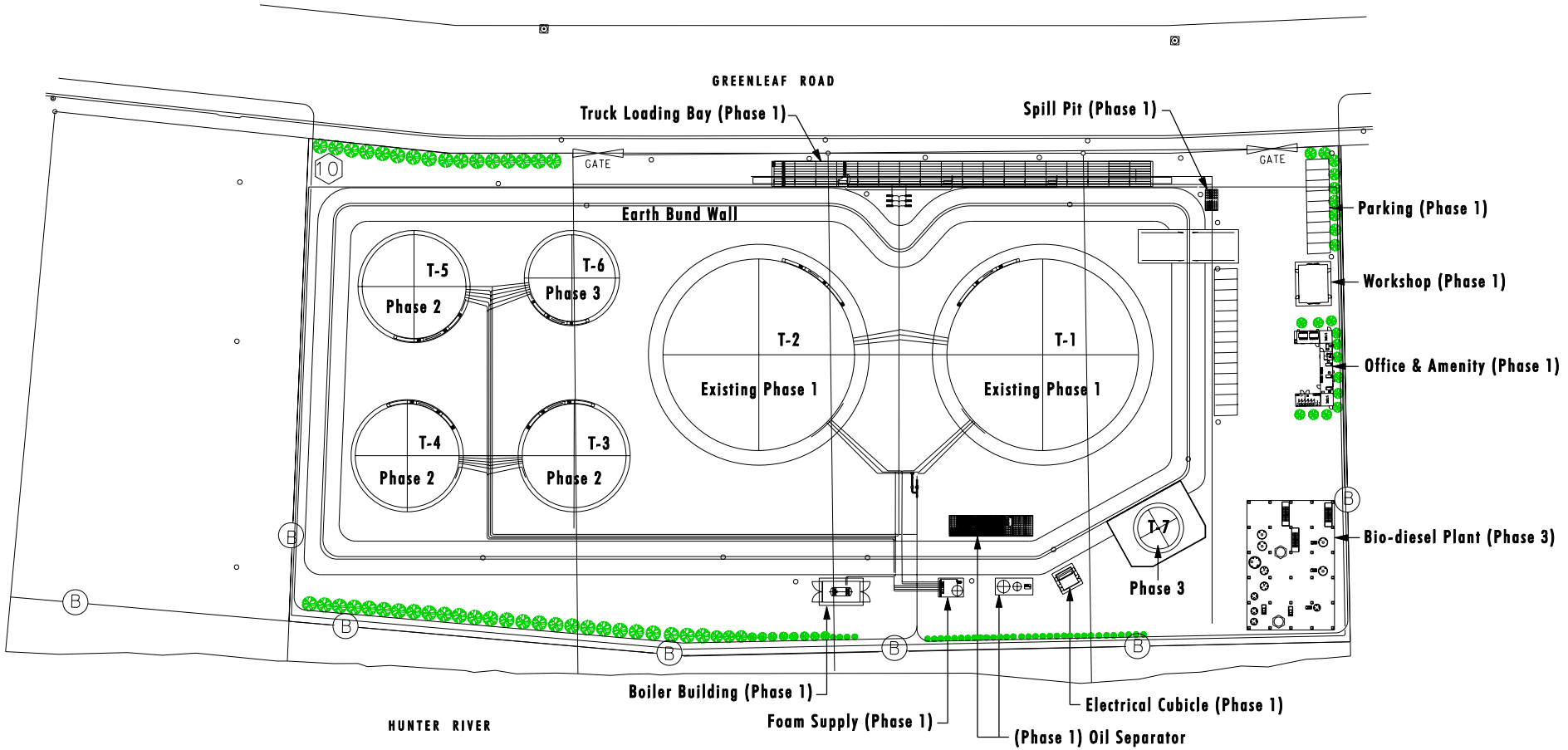
The PHA identifies the potential hazards associated with the facility, estimates the associated level of risk, evaluates the risk on the basis of accepted risk criteria and identifies strategies for managing residual risk. The PHA Report is included in **Appendix 8** with an overview of the risk screening and PHA provided in **Sections 5.8.1** to **5.8.5**.

5.8.1 SEPP 33 Assessment

SEPP 33 applies to all industries that are considered to be potentially hazardous industry or potentially offensive industry. The policy is designed to ensure industrial proposals only proceed if they are suitably located and able to demonstrate that they can be built and operated with an adequate level of safety (DUAP 1994).

Clause 3 of the policy contains the definitions of potentially hazardous industry and potentially offensive industry and these are presented below.

> **Potentially hazardous industry** means a development for the purposes of any industry which, if the development were to operate without employing any measures (including for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:
>
> a) to human health, life or property, or
>
> b) to the biophysical environment,
>
> and includes a hazardous industry and a hazardous storage establishment.
>
> **Potentially offensive industry** means a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment.



Source: Manildra Park

0 25 50 75m
1:1500

Legend

Landscape Areas

FIGURE 5.12

Proposed Landscape Plan

5.8.2 Preliminary Screening

In order to determine whether an industry is classified as 'potentially hazardous industry', the former Department of Infrastructure, Planning and Natural Resources (DIPNR) (now DOP) developed a preliminary risk screening procedure based on the quantity of dangerous goods stored on site that have the potential for significant off-site effects and the distance of these materials from the site boundary. Hazardous materials are classified by the Australian Code for the Transport of Dangerous Goods by Road and Rail (Australian Dangerous Goods Code). If a project proposes to store quantities of these goods below the relevant thresholds it can be assumed there is unlikely to be a significant off-site risk and the proposal is therefore not classified as 'potentially hazardous industry'.

The inventories of hazardous materials that will be used at the facility are provided in **Table 5.18**, with the shading highlighting exceedance of the threshold. The 'site boundary' for the purposes of this risk screening procedure is considered to be the proposed facility boundary fence line.

Table 5.18 - Dangerous Goods Inventories for Risk Screening

Material Inventory	Dangerous Goods Classification	Storage Capacity	Distance to Boundary (metres)	Screening Threshold (metres)*
Marine Fuel Oil	C1	25.5 ML tank	na	na
Marine Diesel	C1	25.5 ML tank	na	na
Road Diesel	C1	3 x 7 ML tank	na	na
Biodiesel	C1	5 ML tank	na	na
Raw Oil e.g. - Palm Oil, Canola Oil, Tallow	No Classification	2,700 m^3 tank		
Methanol	3 PG II	480 m^3 tank	19m	30m
Glycerine	No Classification	51 m^3 tank		
Sulphuric Acid	8	4 m^3 tank	25 t/25 m^3	na
Potassium Hydroxide (KOH)	8	8 m^3 total		
Potassium Sulphate (K_2SO_4)	No Classification	28 m^3 tank	na	na

Note: * the screening threshold is based on the relationship between storage capacity and distance to boundary. To be considered not potentially hazardous the storage tank would need top be >30 metres from the site boundary.

na SEPP 33 states the following for combustible materials:

If class C1 and/or class C2 are present on site and are stored in a separate bund or within a storage area where they are the only flammable liquid present they are not considered to be potentially hazardous. If, however, they are stored with other flammable liquids, that is, class 3PGI, II or III, then they are to be treated as class 3 PGIII, because under these circumstances they may contribute fuel to a fire.

It is noted that the storage of the combustible materials (Marine Fuel Oil, Road Diesel and Biodiesel) are not considered to be potentially hazardous, in accordance with the SEPP 33 guidelines, as they are stored in a separate bunded area where they are the only combustible liquid present.

A proposed development may also be considered as potentially hazardous based on the number of traffic movements involving hazardous materials and/or the volume of dangerous goods carried per vehicle as a result of the proposed operation. The annual number of traffic movements associated with dangerous goods and the associated transport volumes are shown in **Table 5.19** and **Table 5.20**, with the shading highlighting exceedance of the threshold.

Table 5.19 - Estimated Vehicle Movements of Dangerous Goods

Dangerous Goods Classification (DGC)	Deliveries Annual/Weekly	Delivery Screening Threshold	Exceeds Delivery Threshold Y/N
Class 3 PG II	200/4	>500/>30	N
Class 8 PG II	530/11	>500/>30	Y

Table 5.20 – Estimated Payloads of Vehicle Transporting Dangerous Goods

Dangerous Goods Classification (DGC)	Typical Deliveries Quantity	Quantity Screening Threshold	Exceeds Quantity Threshold Y/N
Class 3 PG II	24 t	1 t bulk	Y
Class 8 PG II	7 to 14 t	2 t bulk	Y

Based on **Table 5.18** the facility is potentially hazardous with respect to the storage of class 3 PG II substances. According to **Table 5.19** and **5.20** the proposed development is potentially hazardous with respect to the number of deliveries of class 8 PGII substances and also potentially hazardous with respect to the size of the deliveries of class 3 PGII and class 8 PGII substances. As a result SEPP 33 applies and a PHA is required for the Project. A transportation route evaluation study should be included as a part of the SEPP 33 assessment (see **Section 5.3**).

Assessment of Potentially Offensive

In order to determine whether or not the proposal is potentially offensive, it is recommended in DoP, 1994, to consider the following:

- Does the proposal require a licence under any pollution control legislation administered by DECC?
- Does the proposal require pollution control approval pursuant to any legislation or by-laws administered by Council?
- Does the proposal cause offence having regard to the sensitivity of the surrounding environment?

The development will require an EPL from the DECC as the development falls under the definition of a Scheduled activity under the POEO Act, being chemical storage facility and potentially a chemical works due to the production of biodiesel.

Therefore the development is considered to be potentially offensive and SEPP 33 applies.

DoP (Department of Planning, 1994) also states, however, that if an EPL can be obtained for a development, the development is not considered to be an 'offensive industry' and is permissible under SEPP 33.

Subject to project approval being granted, Manildra Park will apply for an EPL for the Project from the DECC. The final scope of the EPL will be determined in consultation with DECC during the licence application process. In accordance with Section 75V of the EP&A Act (refer to **Section 3.1.1**) the EPL application cannot be refused. As such it is considered that an EPL will be obtained for the Project, and the proposed facility does not constitute an 'offensive industry' as defined by SEPP 33.

When SEPP 33 applies to a proposed development because of the transport requirements or because it is potentially offensive there are no specific requirements on the level of risk assessment that may be required.

The proposed facility is classified as a 'potentially hazardous industry' as demonstrated by the risk screening process outlined below and therefore a PHA is required.

5.8.3 Risk Classification and Prioritisation

DUAP's *Multi Level Risk Assessment* (MLRA) (DUAP 1997) suggests the use of preliminary analysis of the risks related to a proposed development to enable the selection of the most appropriate level of risk analysis in the PHA. This preliminary analysis includes risk classification and prioritisation using a technique adapted from the *Manual for Classification of Risk due to Major Accidents in Process and Related Industries (Manual for Classification of Risk)* (International Atomic Energy Agency (IAEA), 1993). This technique is detailed in the MLRA (DUAP 1997) document. This technique is based on a general assessment of the consequences and likelihoods of accidents and their risks to individuals and society, and the comparison of these risks to relevant criteria to determine the level of assessment required, be it qualitative or quantitative.

Estimation of Societal Risk

The risk to the public from each potentially hazardous activity is estimated by combining the estimated consequences to humans and the probabilities of major accidents. The details of the calculations are provided in **Appendix 8**.

The matrix of frequency and consequence for the facility is shown in **Appendix 8**. The societal risk curve for the facility is also shown in **Appendix 8**. The figure presents the cumulative risk presented by the facility compared to the indicative criteria shown in Figure 9 of *Manual for Classification of Risk* (IAEA 1993).

The results shown in the indicative societal risk curve indicate that the risks with regard to the storage of methanol, biodiesel, sulphuric acid and potassium hydroxide are below the 'negligible' criteria line. This indicates that the facility does not generate a significant risk due to flammable or explosive events or toxic releases.

The PHA indicates that the risks from all activities are considered to be 'negligible' except for the transport of methanol (refer to **Appendix 8**).

In order for a Level 1 qualitative assessment to be sufficient, there should be no events with off-site consequences with a frequency of greater than 1×10^{-7} i.e. one in 10,000,000. This criterion is not satisfied, and is exceeded by the class 3 PG II substances i.e. the transportation of methanol. Consequently, both a Level 1 qualitative assessment and a Level 2 semi-quantitative assessment are required. These assessments are outlined below.

5.8.4 Level 1 Qualitative Assessment

A Level 1 assessment was completed for the facility to determine the risk of each identified hazard. All hazards associated with the development were identified and then ranked against qualitative criteria in *Hazardous Industry Planning Advisory Paper (HIPAP) No 4 Risk Criteria for Land Use and Safety Planning 1992*.

The Level 1 assessment identified the following events have the potential for off-site impacts on people and require further assessment as part of a Level 2 assessment. These can be generally classified as:

- tank fire/bund fire associated with methanol storage; and
- release of methanol vapour leading to explosion.

5.8.5 Level 2 Semi-Quantitative Assessment

A Level 2 assessment is required whenever a Level 1 assessment cannot demonstrate that the development will have no significant off-site risk to people. The risk screening and classification process and the Level 1 assessment have identified events with potential off-site consequences. It is noted however, that these events have low likelihoods of occurrence.

The criteria for Level 1 qualitative analysis applies to these assessments, however they must also demonstrate that the relevant numerical criteria will not be exceeded. This requires that the cumulative impacts of those risks with significant consequences outside the site boundary are quantified and shown to be below the appropriate criteria.

As part of the Level 2 assessment, quantified consequence analysis has been undertaken for each of the credible hazard scenarios, with potential off-site effects, listed in **Section 5.8.4**. The consequences of each incident are assessed using the generalised data from *HIPAP No. 4* (DUAP, 1992) to assess the effect of fire radiation, explosion overpressure and toxicity to an individual. If it can be shown that the identified events causing hazards off-site do not cause unacceptable impacts at the site boundary, the risk posed by these hazards is considered to be acceptable.

Fires

The credible, potential fire hazardous event associated with usage and storage of methanol are pool fires associated with the methanol storage tank or the bunded area. The thermal radiation produced as a result of any potential fire in the methanol tank is expected to be substantially less than that produced by a bund fire, therefore only the bund fire scenario has been modelled.

Fires associated with the combustible substances are not considered hazardous as they are stored in separate bunded areas from the class 3 substances.

Fires in the transfer pipeline have also been considered. The size of any potential fire and the potential damage which may result is expected to be limited as the pipeline is maintained in an empty state when not in use and both the wharf and terminal will be manned during use of the pipeline and in the event of a loss of containment the transfer process will be stopped.

The scenario modelled to represent the potential fire event associated with the methanol bunded area is detailed in **Table 5.21**. Ethanol may be substituted for methanol in the biodiesel production process as it has similar properties. Ethanol has been modelled in the fire scenario as

its heat of combustion is slightly higher than that of methanol, and the calculations will therefore provide a conservative estimate of the consequences associated with fires in the bund

Table 5.21 - Distance to Specified Levels of Radiant Heat for Methanol Bund Fire

Equivalent Pool Fire Diameter, m	Heat Release Rate, kW	Distance to Specified Radiant Heat Level *(from base of flame), m*			Distance to Nearest Neighbour's Boundary, m*
		23 kW/m^2	12.6 kW/m^2	4.7 kW/m^2	
16.5	8.6E+04	9.0	15.0	30.0	34.0

It is noted that the pool fire model is a conservative evaluation of a bund fire as it does not take into account the 2.1 metre high bund wall around the tank that would confine the fire, i.e. it models an unconstrained fire.

Table 5.21 indicates that the critical thermal radiation levels do not enter the neighbouring site. The 12.6 kW/m^2 and 23 kW/m^2 radiation level represents the level at which unprotected steel on adjacent tanks or structures could suffer thermal stresses resulting in structural failure over different exposure periods. The results in **Table 5.21** indicate that these radiation levels are confined to within 15 metres and 9 metres respectively of the base of the flame. The 12.6 kW/m^2 thermal radiation load will encroach upon the proposed adjacent biodiesel plant within the site and may cause structural damage, but fire protection systems will be in place on this structure to minimise impacts of any thermal radiation impacts.

The 4.7 kW/m^2 radiation level represents the level at which injury to people could occur. **Table 5.21** indicates that this radiation level is confined to within 30 metres the base of the flame. This is approximately 4 metres within the site and from the boundary with the nearest neighbour. These predictions of thermal load are conservative as a potential fire will be confined by a 2.1 metre high bund wall and a significant proportion of the thermal radiation from the pool fire will be shielded from the adjacent neighbouring property by the biodiesel plant.

The boundary fence along the north arm of the Hunter River is approximately 18.9 metres from the methanol storage area. The thermal radiation from an unconfined pool fire 18.9 metres from the base of the fire would be approximately 9.2 kW/m^2. The resulting impact of a confined bund fire on an unoccupied area is not considered to be significant.

Combustion Product Impacts

When hydrocarbons burn, a mixture of water vapour, carbon dioxide and carbon monoxide is produced. Depending upon the nature of the combustion, ratios of carbon dioxide to carbon monoxide can vary between 10:1 and 200:1. In the situation where an adequate supply of oxygen is available then ratios in the range of 100:1 to 200:1 are expected, i.e. less than 1 per cent of carbon will be converted to carbon monoxide. It is also proposed that the methanol stored at the facility will be pure. On this basis there will be no scope for production of sulphur and nitrogen oxides that might be formed from combustion of flammable liquids such as petrol or diesel. Based upon the above discussion, and the buoyancy of the plume of combustion products, the toxicity effects from carbon monoxide are considered to be insignificant. Therefore this hazard has not been further addressed.

Explosions

The credible potential explosion hazardous events identified are associated with the storage of methanol and could occur as a result of a release of methanol as a vapour.

Explosion Scenarios Associated with Methanol

For the proposed facility, the potential for an explosion involving methanol vapour producing significant off-site impacts is considered to be very low. Generally several tonnes of vapour must be present to obtain detonation of a vapour cloud and produce significant off-site impacts. While the inventory of methanol to be stored on site is large, the headspace within the tank is minimised by the use of a floating roof. Additionally, the methanol is stored at temperatures substantially below its boiling point, all of which ensures that significant quantities of vapours will not be generated. It is also considered that insufficient quantities of methanol could potentially escape from the biodiesel plant to cause a major unconfined vapour cloud explosion because of the low methanol vapour pressure.

Based on this assessment it is not anticipated that detonation of methanol vapours could occur and explosion involving methanol is considered to be extremely unlikely.

Interactions with Existing Wharf Activities

The potential for an explosion involving ammonium nitrate and a fuel spillage on the wharf during the fuel unloading process has also been considered. The potential for this event is considered to be extremely low. For the scenario to be plausible ammonium nitrate would have to be present on the wharf where the unloading was taking place at the same time as a spillage occurred. For an explosion to occur the ammonium nitrate would have to be sensitised and then detonated.

Operationally diesel and ammonium nitrate ships can not occupy the same berth at the same time and thus there is no potential interactions due to the shipping operations. There are however two potential interactions associated with the materials handling operations in which diesel and ammonium nitrate could potentially come into contact, both of which are unlikely:

1. if ammonium nitrate was consolidated/stockpiled at the berth while fuel was being unloaded. Our understanding is that ammonium nitrate is not consolidated/stockpiled at the berth; and

2. trucks transporting ammonium nitrate were to enter the berth from an entrance other than that designated for the berth where ammonium nitrate loading is taking place. While this is possible operationally this would require the trucks to gain entry via a more distance point of entry to the relevant berth.

It is noted that diesel and ammonium nitrate ships transfer operations can however be undertaken on adjoining berths i.e. K2 and K3 concurrently. Similarly concurrent operations on adjoining berths do not pose any hazard and thus there are no limitations imposed on the operation of the berth by the proposal, as a result of the physical separation of the adjoining berths and the truck transport arrangements as outlined above.

Based on this assessment it is believed a spillage of fuel on the wharf leading to an explosion involving ammonium nitrate would be extremely unlikely.

5.8.6 Risk Analysis

The Level 2 assessment found that the credible hazardous events at the facility are pool fires associated with the storage of methanol in the tank and bunded area. The hazards associated with methanol fires were assessed and the consequences modelled. The resulting thermal radiation impacts associated with methanol fires were considered to be insignificant. Therefore there is negligible risk of injury or fatality in residential areas associated with the thermal impacts of methanol fires, and the risk of fatality and injury due to

radiant heat are considered to be acceptable. Therefore a Level 3 assessment is not required.

5.8.7 Propagation Analysis

A potentially hazardous event within a plant can cause further hazardous events in the same plant or other plants. The Level 2 assessment indicated that the major risk contributor at the facility is fire.

Propagation Due to Fire

It is not anticipated that heat radiation impacts from a pool fire in the methanol storage bund will propagate to storage tanks off-site. The assessment has indicated that there is a low risk of fire occurring on site, and the heat radiation levels associated with structural damage may extend to the adjacent biodiesel plant, however structural damage will be minimised by the implementation of fire protection systems on the structure (refer to **Table 5.21**). The consequence modelling was also conservative, in that it did not account for the 2.1 metre high bund wall around the methanol tank which will confine the fire. Fire fighting services will also be provided to keep adjacent tanks cool in the event of a fire.

Propagation off site to other industrial facilities in adjacent occupied developments is considered to be negligible as the critical thermal radiation levels for structural damage will be restricted to within site boundaries, and the distance between the bunded area and adjacent facilities is significant compared to the extent of thermal radiation impacts.

Propagation Due to Explosion

The likelihood of explosion at the proposed development is considered to be highly unlikely. Therefore it is predicted that the risk of propagation due to explosion overpressure will be negligible and is considered to comply with the *HIPAP No. 4 – Risk Criteria for Land Use Safety Planning* (DUAP, 1992) criteria.

5.8.8 Control and Mitigation Measures

The preliminary hazard analysis (refer to **Appendix 8**) identified a range of technical control measures and non-technical safeguards and procedures that will be put in place to reduce the level of risk associated with the operation of the facility:

Technical safeguards are those controls that are incorporated into the process or control system hardware, software, or firmware. Non-technical controls are management and operational controls, such as security policies, operational procedures, maintenance procedures and training. Technical and non-technical safeguards can also be divided into preventive controls which inhibit or prevent hazardous events from occurring and detective controls such as control system alarms that warn of unacceptable process deviations, or security monitoring systems that initiate an alarm in the event of violations of security protocols.

The PHA has recommended that the following technical control measures be implemented by Manildra Park:

- design of tanks, plant, bunding and piping in accordance relevant standards and codes;
- design of surface drainage systems to prevent contamination of surrounding waterways;

- equipment selected for respective hazardous area classification to control ignition sources;
- provision of emergency isolation valves, shut down system and backflow prevention devices;
- reversion of valves, process equipment and control systems to fail safe positions;
- auto shutdown of plant on high temperatures or pressures;
- install tank level device(s) as appropriate and provision of high level alarms;
- physical barriers including bunding and bollards;
- ensuring biodiesel and methanol is stored at suitable conditions to prevent fires and explosions, including venting, internal floating roofs on the methanol storage tanks and nitrogen blanketing on the methanol process tank in the biodiesel facility;
- control of ignition sources;
- storage of dangerous goods in dangerous goods compliant stores;
- inlet and outlet flow monitoring during ship transfers;
- implementation of leak detection system;
- provision of pump deadhead instrumented protection and recycle lines;
- provision of flame arrestors on vent systems;
- installation of oil/water separators to remove contamination prior to discharge; and
- provision of fire detection system and fire suppression including fire water ring main, cooling water system and foam deluge fire fighting system.

The PHA has also recommended that the following non technical safeguards and procedures be implemented by Manildra Park:

- conducting HAZOPs of process designs, site layout and design changes;
- equipment and plant inspection and maintenance procedures;
- operating procedures, including manual tank transfers, and training;
- cessation of operations in adverse weather conditions;
- operator monitoring of control conditions such as inlet and outlet flow monitoring during ship transfers;
- leak detection systems;
- Hot Work/Safe Work Procedure;
- implementation of site speed limit and driver training;

- provision of security measures include 'person proof' fencing, CCTV, intruder beams, security patrols, operator/driver vigilance, security access pass for after hours access;
- isolation of the tank farm from the truck loading area when the facility is not manned via fencing i.e. access to tank farm prohibited. Trucks and drivers will only access the truck loading area via a swipe card arrangement;
- development of spill response procedures and management plan;
- provision of PPE and safety shower/eye wash;
- appropriate training a supervision of operations;
- provision of on-water pollution response equipment and plan;
- ensure no flammable class 3 liquids are stored in the same bund area as the combustible C1 substances;
- preparation of a Fire Safety Study;
- procedures are in place for the storage and handling of dangerous goods;
- the handling of contaminated soil and groundwater from the Orica arsenic contamination plume will be undertaken in accordance with the Environmental Management Plan prepared by URS (2006); and
- preparation of an Emergency Response Plan in accordance with HIPAP 1 that coordinates onsite activities and defers authority to the Local Emergency Operations Controller once external support is sort is response to the emergency. The Local Emergency Operations Controller is the position as defined in the *Newcastle Disaster Plan Newcastle City Council 2005*.

Manildra Park will also implement the following safeguards as recommended by the PHA for the management of the hazards associated potential methanol fires:

- conducting a HAZOP of the process design to minimise the potential for the loss of containment of methanol on site;
- the design, inspection and maintenance of the facility to ensure that infrastructure is fully secure and operational;
- access to foam fire fighting systems to control and mitigate any fires encountered; and
- control of ignition sources.

5.9 Soil and Groundwater Contamination

A soil and groundwater contamination assessment has been undertaken by Douglas Partners (2007). A summary of the contamination report is provided below, with the full report included in **Appendix 9**.

5.9.1 Existing Environment

The project is located on Kooragang Island on the lower reaches of the Hunter River approximately two kilometres north of Newcastle. Originally Kooragang Island was a series of deltaic islands (including Ash, Dempsey, Moscheto and Walsh Islands). Kooragang Island was created in the early 1900s by the reclamation of Dempsey, Moscheto and Walsh Islands, by the infilling of tidal mud flats and creeks. It is understood that Kooragang Island was reclaimed using dredged river sediments. This position is consistent with historical photos and maps of the area (see **Figure 1.3**).

Newcastle City Council's records show that a Building Application was issued in 1969 to Eastern Nitrogen for the construction of two naphtha storage tanks, a site office, together with foam and test stations.

In 1993 Council issued a Development Approval for a proposed petroleum terminal with connecting parallel underground pipelines and wharf upgrade. As part of this 1993 Development Approval AGC Woodward-Clyde undertook a site contamination investigation during September 1991, for Ampol. The assessment was undertaken to determine whether soil and groundwater contamination was present on the site as a result of Eastern Nitrogen's use of the site between 1969 and the early 1980's for the storage of naphtha within the existing tanks that currently occupy part of the site. The assessment included a historical review, excavation of 19 test pits, installation of four groundwater monitoring bores and the analysis of soil and groundwater samples.

The soil and groundwater sample program implemented for this investigation was as per **Table 5.22**.

Table 5.22 - AGC Woodward-Clyde Soil and Groundwater Sample Analysis Program (1991)

	Soil	Groundwater
Total Recoverable Hydrocarbons (TRH)	✓	✓
Benzene, Toluene, Ethylbenzene and Xylene (BTEX)	✓	✓
Trace Metals Total Lead, Cadmium, Copper and Zinc	✓	✓
Phosphate, Nitrate, Sulphate, pH and Conductivity		✓

The test results showed that Total Recoverable Hydrocarbons recorded in the bore located at the north western corner of the site exceeded adopted guideline levels. Subsequent sampling at this location indicated Total Recoverable Hydrocarbons result below detection limits. Nitrate and phosphate levels were also elevated, however this may be indicative of elevated levels in the region or be due to a local influence (refer to **Appendix 9**).

It is noted that at the time of the AGC Woodward-Clyde report there were no uniformly accepted guidelines for the assessment of contaminants in soil or groundwater. As such, the report is not in strict accordance with the current DECC guidelines.

In 2007 Douglas Partners undertook a subsequent site contamination investigation/baseline contamination assessment of the site (refer to **Appendix 9**). The investigation was undertaken in accordance with the relevant DECC guidelines and included:

- a review of the site history which comprised:
  - a search of Newcastle City Councils records;
  - discussions with Orica employees;
  - a review of historical aerial photographs;
  - historical title search; and
  - searches with the NSW DECC;
- an inspection of the site;
- soil sampling and analysis at 14 locations; and
- groundwater sampling and analysis at the four bores.

Figure 5.13 shows the location of the test pits and groundwater monitoring bores.

The soil and groundwater sample program implemented for this investigation was as per **Table 5.23**.

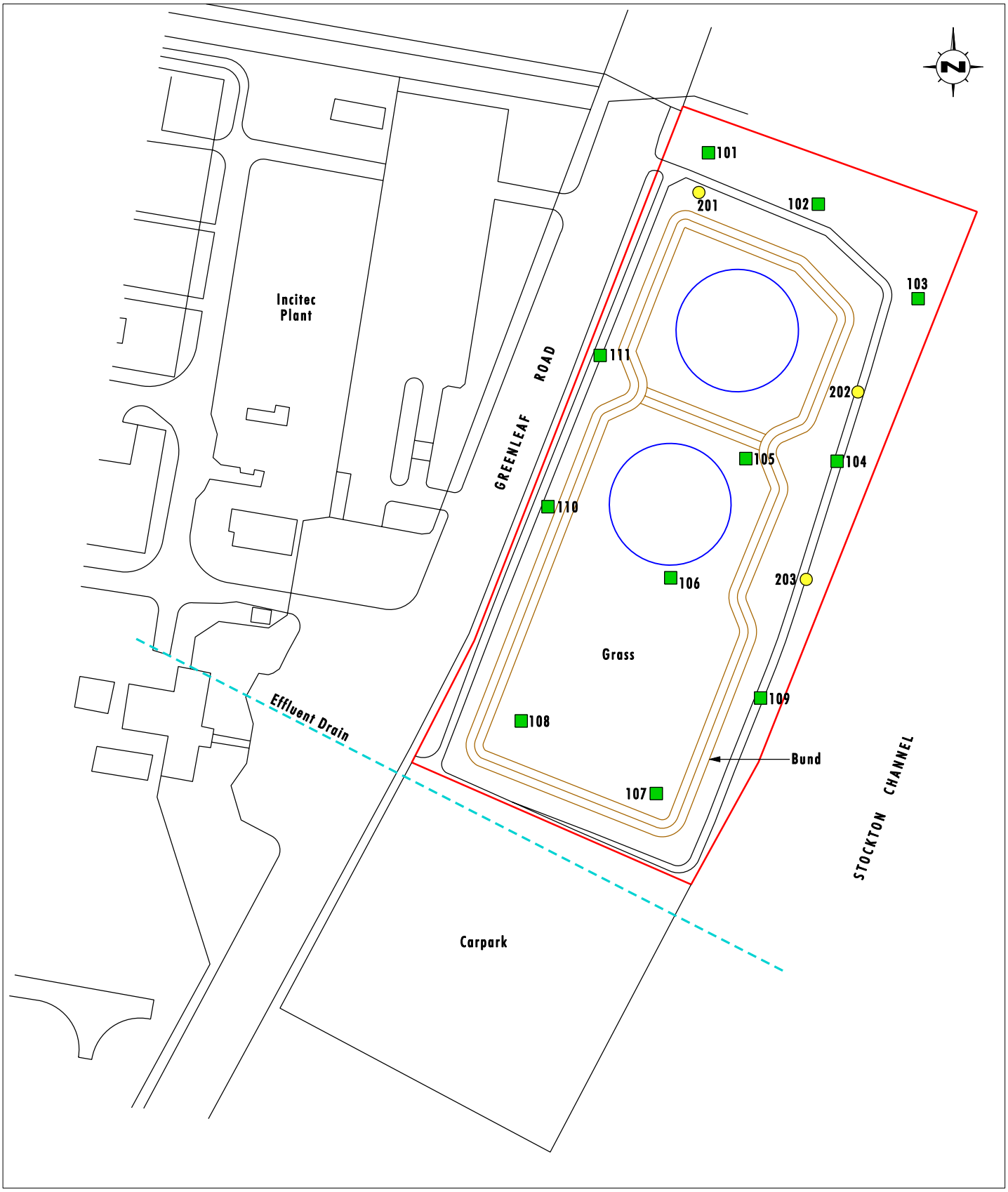
Table 5.23 - Douglas Partners' Soil and Groundwater Sample Analysis Program 2007

	Soil	Groundwater
Total Recoverable Hydrocarbons (TRH)	✓	✓
Benzene, Toluene, Ethylbenzene and Xylene (BTEX)	✓	✓
Trace Metals Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc	✓	✓
Polycyclic Aromatic Hydrocarbons (PAH)	✓	✓
Organochlorine Pesticides (OCP)	✓	
Organophosphorus Pesticides (OPP)	✓	
Polychlorinated Biphenyls (PCB)	✓	
Phenols	✓	
Ammonia		✓

The review of the NSW DECC register indicated that the site has no statutory notices issued under the provision of the *Contaminated Land and Management Act*.

It is, however, noted that the Orica site located immediately to the west of the terminal (refer to **Figure 5.10**) has the following notices issued:

- Note of Existence of Voluntary Remediation proposal (current);
- Declaration of Remediation site (current); and
- Note of Existence of Voluntary Remediation Proposal (former).



Source: Douglas Partners (2007)

0 25 50 100m
1:2 000

Legend

- Site Area
- Approximate Test Pit Location
- Approximate Test Bore and Groundwater Monitoring Well Location

FIGURE 5.13

Location of the Test Pits and Groundwater Monitoring Bores

The declaration of the remediation site notes that arsenic and ammonia contaminated groundwater from the adjacent Orica site has migrated off the site and may continue to migrate (refer to **Figure 5.14**).

An Environmental Management Plan (EMP) has been prepared for portions of the Orica site and adjacent lands not owned by Orica, which are potentially affected by arsenic in the soil and groundwater. A series of investigations have been undertaken since the late 1990's at the Orica site. Based on the investigations completed, arsenic was identified in the groundwater and soil down gradient (towards the South Arm of the Hunter River) of a former sludge disposal pit, located near the northern boundary of the Orica Site (URS 2006). The EMP outlines the nature and extent of contamination and the management measures required when undertaking activities within the identified affected areas. The extent of contamination is shown in **Figure 5.14**.

The proposed transfer pipeline will traverse the zone of contamination associated with Orica. Analysis in this area between 2004 and 2006 showed the arsenic concentrations in the soil within the saturated zone (beneath the groundwater table) adjacent to Heron Road (eastern side) contained less than 500 mg/kg of arsenic, while the soil to the west of Heron Road contained were less than 150 mg/kg of arsenic (URS 2006). Soil located above the saturated zone (top 1m) contained arsenic concentrations generally less than 50 mg/kg (URS 2006). These levels are less than the health based criteria for commercial/industrial land use (i.e. NEHF F). All works undertaken within the affected zone will however be undertaken in accordance with the requirements detailed in the Orica EMP.

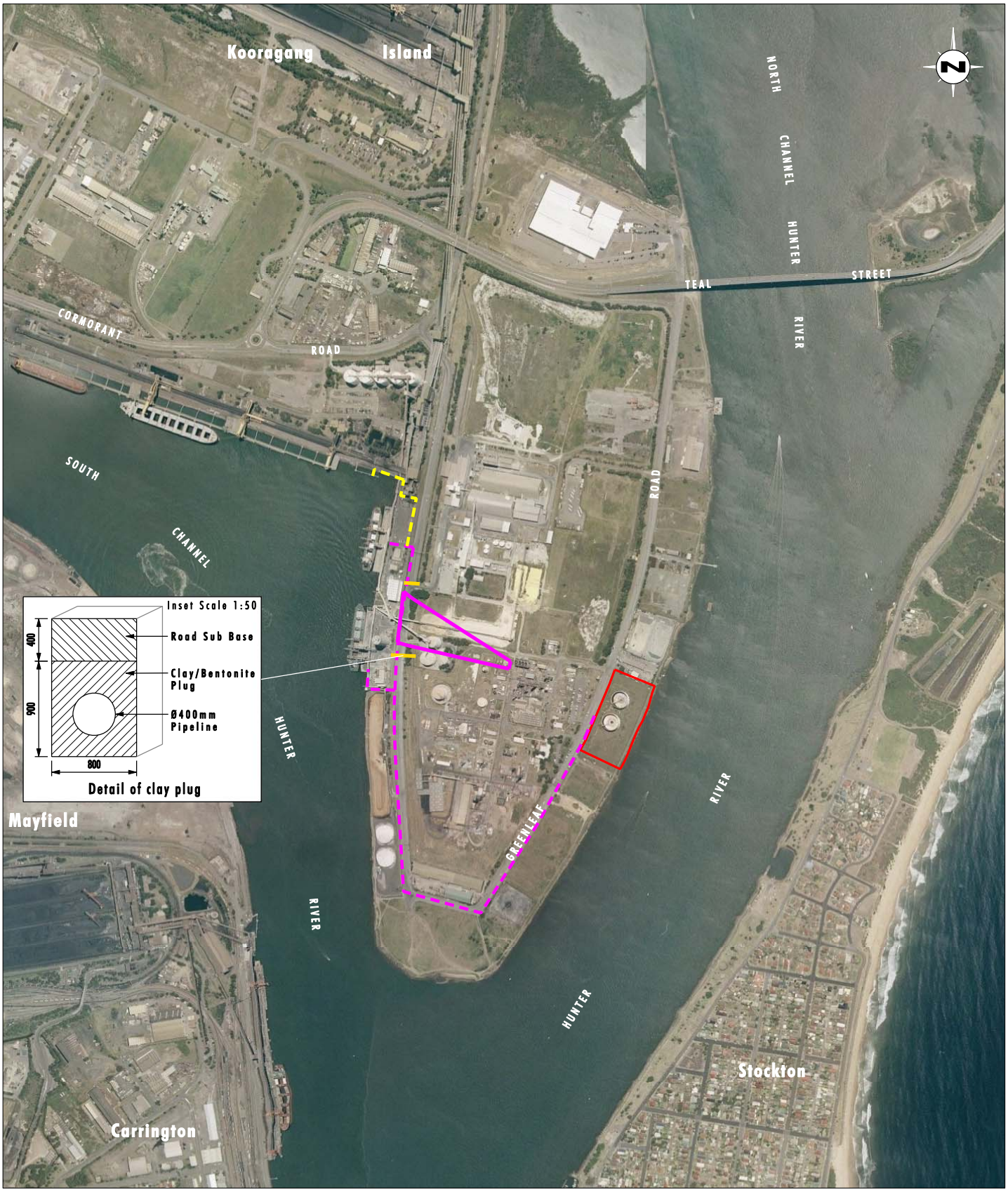
Arsenic concentrations in the groundwater ranges from 30 mg/L to 125 mg/L between the former pit and Heron Road, with the concentrations decreasing on the western side of Heron Road to less than 22 mg/L (URS 2006). It is anticipated that the pipeline will be constructed above the groundwater table and thus there will be no requirement to manage arsenic contaminated groundwater as outlined in the Orica EMP. If this is not possible the management requirements outlined in the Orica EMP will be adopted.

The former sludge pit is located west of a groundwater hydraulic divide that runs centrally along the southeast peninsular of Kooragang Island. Elevated arsenic is not observed to be present to the east (up-gradient) of the sludge pit with the concentrations of arsenic in groundwater in this area being less than 0.1 mg/L (URS 2006), i.e. elevated arsenic levels are note expected to occur at the terminal. This is consistent with the findings of the contamination assessment (refer to **Appendix 9**) in which the level of arsenic recorded in the groundwater at the terminal ranged between 5.5 µg/L and less than the level of detection.

During the visual inspection of the site undertaken as part of the contamination assessment (refer to **Appendix 9**) by Douglas Partners in 2007 dark grey/black sand sized granular material was observed at the base of the existing storage tanks. The material was restricted to the soil surface. No other evidence of contamination was observed on the site (visual staining or odour).

A total of 17 soil and 14 groundwater samples were collected for analysis, including material from the base of the storage tanks as noted above. The samples were collected based on the likely presence of contamination, material type, visual or olfactory evidence of possible contamination (i.e. staining or odour), proximity to a known source of contamination and whether generally representative of soil/fill conditions.

No visual or olfactory evidence was observed during the collection of the soil and groundwater samples. This indicates that it is unlikely for gross hydrocarbon contamination of the soils or groundwater to be present. Photoionisation detection screening undertaken on



Source: Aerial Photo: Port Waratah Coal Services
Note: All dimensions are in mm unless specified otherwise

0 200 400 800m
1:15 000
0 1.0 2.0 3m
Inset Scale 1:50

Legend

- Greenleaf Road Terminal
- Orica Contamination Zone (URS 2006, Environmental Management Plan)
- Clay Plug
- Receival and Distribution Pipeline
- Barge Refuelling Pipeline

FIGURE 5.14

Orica Contamination Zone

soil and groundwater samples in the field also suggests that there is no evidence of hydrocarbon contamination (refer to **Appendix 9**).

The results for the soil samples collected were within the health based criteria for commercial/industrial land use (i.e. NEHF F) and the NSW DECC sensitive land use criteria for TRH and BTEX with the exception of the sample collected from the base of the tanks which recorded elevated lead levels. The sample collected from the base of the storage tanks is expected to be contaminated as a result of previous sandblasting operations which has removed lead based paint (refer to **Appendix 9**).

Analysis of the groundwater samples shows that the results generally comply with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (slightly to moderately disturbed systems), with the exception of elevated zinc and ammonia levels. The elevated zinc levels are likely to be consistent with regional groundwater quality in the area (refer to **Appendix 9**). The potential source of the ammonia contamination is unknown and is unlikely to be associated with the Orica plant due to the hydraulic divide and the low levels of arsenic recorded at the terminal.

Acid Sulphate Soils (ASS) are typically associated with estuarine floodplains, coastal lowlands such as mangrove tidal flats, salt marshes or tea tree swamps. The soils/sediments which are of most concern are those which formed within the last 10,000 years, after the last major sea level rise. When the sea level rose and inundated the land, sulphate in the seawater mixed with land sediments containing iron oxides and organic matter. Under these anaerobic conditions, lithotrophic bacteria such as Thiobacillus ferrooxidans form iron sulfides (pyrite).

While no specific tests were undertaken to investigate the presence of acid sulphate soils, no evidence (olfactory or visual) of ASS were observed during the collection of soil and groundwater samples at the facility.

5.9.2 Impact Assessment

Construction

With the exception of the Orica arsenic contamination plume, there are no known areas of soil or groundwater contamination which may be disturbed during the construction of the facility. Earthworks associated with the construction of the terminal with the exception of the transfer pipeline, oil separation and spill pits, are not expected to exceed 0.5 metres and thus there will be no interaction with groundwater on the site. The oil separation and spill pits may intersect the groundwater table. The maximum expected dimensions of the oil separator pit is 20 metres long, 5 metres wide and 5 metres deep, while the spill pit is 5 metres long, 3 metres wide and 2 metres deep. These structures will be constructed of concrete and be located inside a pit lined with a 2 millimetre thick polyethylene liner. These structures are impermeable and are not considered to pose a significant risk to the groundwater. Construction of the terminal will not impact on the Orica plume as the plume is associated with the use of a former sludge disposal pit. The pit is located west of a groundwater hydraulic divide that runs centrally along the southeast peninsular of Kooragang Island.

In relation to the construction of the pipeline across the Orica arsenic contamination plume, URS (2006) state that ‘works undertaken in the surface 1 to 1.5 metres of soil are unlikely to come into contact with the contamination, because contamination is primarily present in the groundwater zone which is below this depth.’ Recent investigations by Douglas Partners (2007) at the proposed project site encountered the groundwater table at 1.5 to 1.9 metres below ground level. Similarly investigations undertaken by RCA (2007 in HLA 2007 Environmental Assessment Bulk Liquids And Fuel Storage Facility Greenleaf Road

Kooragang Island) approximately 300 metres to the south of the proposed project site indicated the depth to groundwater is between 1.5 metres and 2.3 metres. As the pipeline will be located within 1.3 metres of the ground surface it is therefore unlikely that contact with contaminated soil or groundwater will occur. It is noted that groundwater may be encountered on extreme occasions, particularly during high tides and/or during rainfall events. If this occurs works will either cease until the groundwater table subsides or the groundwater management measures outlined in the ORICA EMP and summarised below will be implemented. With the control measures implemented no adverse impact on the groundwater and/or the migration of contaminants will result.

Prior to exposing and/or disturbing soils within the contamination zone, Manildra Park will follow the process outlined in the Orica EMP. In summary this includes:

- *Determining the depth of excavation to be undertaken in the identified area. Works undertaken within 1 to 1.5 metres of the surface are unlikely to come into contact with contamination, because the contamination is primarily present in the groundwater zone which is below this depth;*

- *planning works which involve exposing and or disturbing contaminated soil and or groundwater and implementing appropriate health and safety measures;*

- *notification of Orica of the proposed works – this notification will discuss the scope of works to be undertaken, the likelihood of generating excess spoil or water and the management of this material;*

- *minimise the requirement to expose and/or disturb contaminated soil;*

- *ensure contractors are aware of the potential for contaminated materials to be encountered;*

- *preparation of a health and safety plan for the proposed works;*

- *consideration of equipment use to minimise potential exposure;*

- *preparation of a work method statement which includes soil and water management protocols and contingency plans;*

Earthworks

- *separate excavated material that are suspected to be contaminated from potentially uncontaminated soil. Contaminated material is likely to be soil located immediately above or below the groundwater table;*

Disposal of Excess Spoil

- *Excess spoil generated from the excavation will be assessed/classified in accordance with the DECC's guidelines for the Assessment, Classification and Management of Liquid and Non Liquid Wastes for off site disposal to a licensed landfill facility;*

- *Classification of the excess spoil may involve temporary storage. In this case the following measures will be implemented:*

    - *Placement of material on a sealed or plastic lined surface;*
    - *Installation of sediment control fences around the stockpile; and*
    - *Dust suppression*

Disposal of Groundwater

- *Given the sandy nature of the area and the depth to the water table, the preferred engineering methodology would avoid the requirement for shoring and dewatering regardless of the presence of contamination. Any extracted groundwater will be stored, assessed and classified prior to disposal. Disposal must be in accordance with the DECC's guidelines for the Assessment, Classification and Management of Liquid and Non Liquid Wastes*

It is unlikely that ASS are present in the dredge sediment fill, as none of the key indicators associated with ASS, as outlined in **Table 5.24**, were observed during the excavation of the test pits. This is despite the excavation of test pits at depths of up to 2.6 metres which encountered natural material and bores which extended up to 4.5 metres below the ground surface.

Table 5.24 – Potential and Actual ASS Characteristics

Potential ASS	Actual ASS
Contain black sulfidic material, are waterlogged and anaerobic	Contain a sulphuric horizon because pyrite is oxidised to sulphuric acid (pH <3.5-4).
Contain pyrite (typically framboidal)	Iron sulphate-rich minerals form, commonly as pale and bright yellow or straw-coloured mottles containing jarosite, natrojarosite or sideronatrite.
Have high organic matter content	Water of pH < 4 in adjacent streams, drains, ground water, etc.
Have pH 6-8	Unusually clear or milky blue-green drain water flowing from or within the area (due to aluminium released by the ASS).
Waterlogged greyish or black sediments	Iron stains on drain or pond surfaces, or iron-stained water.
	Sulphurous (H2S) smell after rain following a dry spell or when the soils are oxidised or disturbed.
	Scalded or bare low lying areas.
	Corrosion of concrete and/or steel structures.

The potential to encounter ASS is further limited by the depth of excavation associated with the construction of the facility, i.e. the excavation is above the groundwater level and construction activities will be limited to the layer of dredge sediment with the possible exception being the oil separation and spill pits. As this section of Kooragang Island was reclaimed with dredged sediment from the Hunter River over 40 years ago it is considered unlikely that this material poses any potential or actual acid sulphate soil risk (refer to **Appendix 9**).

Operation

During the operation of the facility hydrocarbon spills may result in contamination of the soil, groundwater and/or marine environment. A comprehensive suite of control measures will be implemented by Manildra Park as detailed in **Section 5.4.1**. These control measures reduce the likelihood and consequence of these events and the potential of soil and/or groundwater contamination. The operation of the facility will therefore not result in any adverse impact on the soil and/or groundwater.

5.9.3 Management and Mitigation Measures

Should any potential or actual ASS and/or contaminated material be encountered, the following management measures will be implemented:

- **Pipeline Construction:**
  - Prior to exposing and/or disturbing soils within the contamination zone, Manildra Park will follow the process outlined in the Orica EMP.
  - To minimise the potential migration of contaminated groundwater traversing along the pipeline excavation a physical barrier such as a clay/bentonite plug will be constructed around the pipeline at the northern and southern extents of the contamination zone (see **Figure 5.14**).
- **Materials Handling:**
  - separate stockpiles for different materials;
  - stockpiles to be located within a bunded area;
  - liming of the stockpile ground prior to the stockpiling of ASS material; and
  - the stockpile will be treated with lime as required.
- **Testing:**
  - testing of ASS and treatment with lime as required; and
  - classification of material prior to disposal.

Where possible, ASS material will be treated and re-used for the backfilling of pipeline trenches, or other construction activities on site. Contaminated material may also be encapsulated within the on site earthen bunds or used as backfill in the trench. In the event that the material cannot be successfully treated and or reused it will be removed from site.

While it is not anticipated that contaminated groundwater or soil or acid sulphate soils are expected to be encountered, a number of mitigative measures have been included in the Environmental Assessment as a precautionary measure. Fundamentally however, the construction of the proposed facility will not add to or alter the existing conditions.

5.10 Ecology

A comprehensive ecological assessment has been undertaken by Umwelt to assess the ecological impacts associated with the project.

The ecological assessment investigated potential direct and indirect impacts on any threatened species, endangered populations, EECs, or their habitat that may occur in, or in the general vicinity of the project area. The ecological assessment was conducted by Umwelt and is contained in full in **Appendix 10** and summarised below.

5.10.1 Existing Environment

Kooragang Island was created by the reclamation of a number of islands, using material dredged from the Hunter River. The objective of the reclamation was to create land for industrial uses. Within the Kooragang Island industrial area, there are considerable areas of vacant industrial land. The infrastructure associated with the project with the exception of the terminal are located within already occupied lands with little if any ecological value or potential. The terminal site has been cleared and is currently unoccupied. The existing vegetation is highly modified, largely comprising introduced species, most likely as a result of the previous industrial use of the site.

Kooragang Island is locally and regionally significant in terms of its ecological values. The project is located approximately 1 kilometre to the south of the Hunter Estuary National Park, formerly the Kooragang Nature Reserve (KNR). Parts of Kooragang Island were internationally recognised as a RAMSAR site in 1984, following an investigation which recorded a number of migratory and threatened species listed in the EPBC Act and the recognition of the environmental importance of the KNR. The KWRP was created in 1993, with ongoing support from government, local industries and the community. The project includes work on Ash Island, to the north-west of the proposal, Stockton Sandspit to the north-east and Tomago wetlands to the north.

A site inspection was undertaken by an ecologist on 13 February 2007. Due to the highly disturbed nature of the proposed site, detailed ecological surveys were not deemed appropriate for the purposes of this project. The aims of the site inspection were to:

- describe the ecological characteristics of the proposed site, including vegetation communities present, floristic composition, and fauna habitat values;

- identify any EECs or threatened flora and fauna species, listed under the *Threatened Species Conservation Act 1995* (TSC Act) or the EPBC Act, occurring within or with potential to occur within the proposed site; and

- identify any EPBC Act listed matters of national environmental significance potentially impacted by the proposed development that may require EPBC referral to the Minister.

Particular attention was paid to the green and golden bell frog (*Litoria aurea*) which is known to occur elsewhere on Kooragang Island, as well as migratory bird species, including those listed under the bilateral agreements with Japan (JAMBA) and China (CAMBA).

5.10.2 Ecological Impact Assessment

The ecological assessment confirmed the highly modified nature of the site. The floristic diversity of the proposed site is very low, with only 17 flora species recorded during the site inspection, including 11 introduced species. The fauna habitats of the proposed site are also highly disturbed and very limited.

No threatened species, endangered populations or EECs were recorded or have been previously recorded within the project area. A search of ecological databases and relevant literature has found eight threatened flora species and two EECs have previously been recorded, or may potentially occur (based on DEWR modelling), within a 10 kilometre radius of the project area (refer to **Appendix 10**).

Of the threatened flora species and EECs recorded in the surrounding area, none were found to have potential to occur within the proposed site. While the threatened flora species

Zannichellia palustris is known to occur elsewhere on Kooragang Island, no suitable habitat for this species occurs within the proposed site. It is possible that the EEC *Coastal Saltmarsh* may have once occupied the project area (prior to it being reclaimed), however no evidence of this EEC currently occurs on site, and it is unlikely that regeneration of this EEC would occur, as the current ground level is well above the zone of tidal influence and the likely level of ongoing disturbance associated with the maintenance and operation of the facility.

No bird species were observed within the proposed site during the site inspection. Based on the DEWR modelling, 45 threatened fauna species (excluding marine and pelagic species) have been recorded in, or with the potential to occur, within a 10 kilometre radius of the proposed site (refer to **Appendix 10**). Despite this, no threatened fauna species were found to have potential to occur within the proposed site. While the green and golden bell frog (*Litoria aurea*) is known to occur elsewhere on Kooragang Island, no suitable habitat for this species occurs within the proposed site.

There are many important habitat areas for migratory waders located on Kooragang Island and elsewhere in the Hunter Estuary. The project area however, does not provide foraging or roosting opportunities for these birds. The height of the facility's components will be approximately 24 metres, which is the same as the existing storage tanks which currently occupy the site. This height is not likely to interfere with the flyway routes of any migratory bird species.

Due to the proposed site comprising a highly modified environment, with limited native flora and fauna diversity, there will be no direct or indirect impacts on any threatened species, endangered populations, EECs or their habitats as a result of this proposed development.

5.10.3 Commonwealth EPBC Act

The EPBC Act is triggered if the proposed development is likely to have a significant impact on any Matters of National Environmental Significance (MNES), as listed under the EPBC Act, i.e. a 'controlled action'. These seven MNES are listed in **Table 5.25**, which also provides a discussion of the potential for the proposed development to have a significant impact on any of these MNES.

Table 5.25 - Relevance of any EPBC Act MNES to the Proposed Development

Matters of National Environmental Significance	Potential to Occur within the Proposed site	Potential for Significant Impact
The World Heritage values of declared World Heritage properties.	There are no World Heritage sites within the project area.	No World Heritage Sites will be impacted upon as a result of the proposed project.
The National heritage values of places on the National Heritage List.	There are no National Heritage places within the project area.	No National Heritage places will be impacted upon as a result of the proposed project.
The ecological character of declared RAMSAR wetlands.	The Hunter Estuary Wetlands RAMSAR Wetland site is located approximately 1.2 kilometres from the project area. This RAMSAR site comprises Hunter Estuary National Park and Shortland Wetlands.	The proposed development will not have a significant impact on the Hunter Estuary Wetlands RAMSAR site.

Table 5.25 - Relevance of any EPBC Act MNES to the Proposed Development (cont)

Matters of National Environmental Significance	Potential to Occur within the Proposed site	Potential for Significant Impact
Threatened species (other than extinct and conservation dependent species) and ecological communities (other than vulnerable ecological communities) listed under the EPBC Act.	There are no EPBC Act listed threatened species or ecological communities occurring within or with potential to occur within the project area.	The proposed project will not have a significant impact on any EPBC Act listed threatened species or ecological communities.
Migratory species listed under the EPBC Act.	A search of the EPBC Act Protected Matters Database identified 55 migratory species with potential to occur within a 10km radius of the project area. Due to the highly modified environment of the project area, and the lack of native vegetation, there is no potential foraging or nesting habitat for any EPBC Act listed migratory species. The proposed project will not interfere with the flyway routes of any migratory bird species.	The proposed project will not have a significant impact on any EPBC Act listed migratory species.
Nuclear actions that are likely to have a significant impact on the environment.	The proposed project does not involve any nuclear actions.	The proposed project does not involve any nuclear actions that may have a significant impact on the environment.
The Commonwealth marine environment.	The loading and unloading of goods between the storage facility and marine vessels is not likely to significantly impact on the Commonwealth marine environment. Detailed risk assessment and extensive control measures are in place to ensure that no spillage or other adverse impact will occur on the marine environment as a result of the proposed project.	The proposed project will not have a significant impact on any areas of the Commonwealth marine environment.

While located in close proximity to a RAMSAR wetland, the project is located entirely within an area previously disturbed by industrial activities and does not directly or indirectly impact on the nearby wetland. In summary from **Table 5.25**, the proposed development will not have a significant direct or indirect impact on any matters of national environmental significance, and therefore the project will not trigger the 'controlled action' definition.

5.11 Aboriginal Archaeology

The indigenous inhabitants of the Kooragang Island area are the Worimi tribal group (Umwelt, 2003a). The areas that were traditionally inhabited by the Worimi group include the region north of the south arm of the Hunter River along with Stockton Bight and the Williams

and Patterson River valleys. The Awabakal tribe neighboured the Worimi tribe and occupied areas south of the Hunter River extending across Lake Macquarie, Maitland and Newcastle.

Originally Kooragang Island was a series of deltaic islands (including Ash, Dempsey, Moscheto and Walsh Islands). Kooragang Island was created in the early 1900s by the reclamation of Dempsey, Moscheto and Walsh Islands, by the infilling of tidal mud flats and creeks (Resource Strategies 2006). It is understood that Kooragang Island as we know it today was reclaimed using dredged river sediments (Douglas and Partners 2007). The progression of the land reclamation operations i.e. the amalgamation of the original islands is shown in **Figure 1.3**.

Kooragang Island, including the proposed site, has been heavily disturbed and modified by historical land uses including grazing, land reclamation and the long term disposal of dredge spoil and industrial waste. Land reclamation activities are supported by the bore and test pit logs recorded by Douglas Partners at the proposed terminal site.

This conclusion is also consistent with the Newcastle Acid Sulphate Soil Risk Map prepared by the Department of Land and Water Conservation (now the Department of Natural Resources) which indicates that the site is within an area of disturbed terrain, indicative of filled areas that have been reclaimed as part of urban development.

While the original extent of the tidal mud flats is unknown, the mud flats together with the creeks may have only provided areas from which to source food. It is unlikely that they would have provided a suitable environment for any more permanent type of occupation, as they were subject to tidal influence.

Searches of the Department of Environment and Conservation Aboriginal Heritage Information Management System (AHIMS) undertaken in August 2006 and June 2007, revealed 63 previously recorded aboriginal archaeological sites located within a search area of 14 kilometres (east-west) by eight kilometres (north-south) around the project area (AMG coordinates 376000E to 390000E and 6356000N to 6364000N). The AHIMS search identified two sites (shell middens) registered on Kooragang Island; one located adjacent to the Tourle Street Bridge, while the other is located in the Hunter Estuary National Park approximately 3 kilometres to the north of the terminal (see **Figure 5.15**). Both sites are well outside the project area and will not be impacted by this project either directly or indirectly.

Previous surveys within the Kooragang Industrial Area for recent development proposals have not identified any remaining archaeological evidence of aboriginal occupation. Consultation with the Aboriginal community for previous development proposals has not identified any significant cultural heritage values in the Kooragang Port and Industrial Area (Resource Strategies 2006). Given the reclaimed nature of the site and the lack of cultural heritage evidence within the vicinity of the site, there is negligible potential for discovering evidence of aboriginal occupation within the project area.

5.12 Greenhouse Gas

The DGRs for the Project require a full greenhouse gas assessment, including a quantitative analysis of the Scope 1, 2 and 3 emissions from the Project, and a qualitative assessment of the impacts of these emissions, to be undertaken.

SEE Sustainability has undertaken a detailed quantitative analysis of the greenhouse gas emissions associated with the Project, including Scope 1, 2 and 3 emissions associated with the combustion of fuel (refer to **Appendix 11**). This section provides a summary of the

Source: Aerial Photo: Port Waratah Coal Services

0 0.5 1.0 2.0km
1:35 000

Legend

- Greenleaf Road Terminal
- Artefact Site Location

FIGURE 5.15

AHIMS Registered Sites

detailed analysis along with a qualitative assessment of impacts of the greenhouse gas emissions associated with the Project.

5.12.1 Greenhouse Assessment Policy Context

In NSW there are a number of policies in place that outline the methodologies for undertaking a greenhouse gas emissions assessment (GHG assessment) as part of the preparation of an EA. The primary policies include:

- the World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) Greenhouse Gas Protocol 2004 (GHG Protocol); and

- the Australian Greenhouse Office (AGO) Factors and Methods Workbook December 2006 (Workbook) (AGO Workbook).

The GHG Protocol establishes an international standard for accounting and reporting of GHG emissions by entities. Under the GHG Protocol the establishment of operational boundaries involves identifying emissions associated with an entity's operations, categorising them as direct or indirect emissions, and identifying the scope of accounting and reporting for indirect emissions.

Three 'Scopes' of emissions (Scope 1, Scope 2 and Scope 3) are defined for GHG accounting and reporting purposes. These scopes are briefly outlined below.

Scope 1 emissions refer to direct emissions associated with a development. Direct GHG emissions are defined as those emissions that occur from sources that are owned or controlled by the entity. Direct GHG emissions are those emissions that are principally the result of the following types of activities undertaken by an entity:

- generation of electricity, heat, or steam. These emissions result from combustion of fuels in stationary sources, e.g. boilers, furnaces, turbines;

- physical or chemical processing. Most of these emissions result from manufacture or processing of chemicals and materials, e.g. the manufacture of cement, aluminium, adipic acid and ammonia, or waste processing;

- transportation of materials, products, waste, and employees. These emissions result from the combustion of fuels in entity owned/controlled mobile combustion sources, e.g. trucks, trains, ships, aeroplanes, buses and cars; and

- fugitive emissions. These emissions result from intentional or unintentional releases, e.g. equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; HFC emissions during the use of refrigeration and air conditioning equipment; and methane leakages from gas transport.

Scope 2 emissions are a category of indirect emissions that account for GHG emissions from the generation of purchased electricity consumed by the entity.

Purchased electricity is defined as electricity that is purchased or otherwise brought into the organisational boundary of the entity. Scope 2 emissions physically occur at the facility where electricity is generated. Entities report the emissions from the generation of purchased electricity that is consumed in its owned or controlled equipment or operations as Scope 2.

Scope 3 emissions are defined as those emissions that are a consequence of the activities of an entity, but which arise from sources not owned or controlled by that entity. Some examples of Scope 3 activities provided in the GHG Protocol are extraction and production of purchased materials, transportation of purchased fuels, and use of sold products and services.

In order to achieve a harmonisation of the international reporting of GHG emissions the AGO Workbook (December 2006 version) has adopted the emissions categories outlined in the GHG Protocol. In this context the AGO workbook provide that the scope of emissions that are reported by an entity include both direct (Scope 1) and indirect emissions from a project (Scope 2 and Scope 3 emissions).

The current policy framework has historically regarded the assessment and reporting of Scope 3 emissions to be optional and only to be included along with Scope 1 and Scope 2 emissions where an organisation believes that Scope 3 emissions are a significant component of the total emissions inventory.

Recent interpretations of the application of GHG assessment to the EA process have indicated that where a project has a direct link to the contribution of GHG emissions beyond its immediate boundaries, these emissions need to be included in the GHG assessment.

To date the NSW government has not developed policy to further define the application of the assessment of indirect GHG emissions on a project basis. In this context, the emissions that result from the road transport of fuels and the consumption of diesel and biodiesel products, have been included in the emissions inventory for the Project.

In addition the AGO Workbook (2006) defines an additional emissions category not provided in the GHG Protocol. The full fuel cycle emissions provide an estimation of the emissions released per unit of energy for the entire fuel production and consumption chain. These emissions are the Scope 3 emissions associated with the production, transport and consumption of fuels and electricity in on site (i.e. Scope 1 and 2) activities. The Scope 3 emissions associated with on site diesel and electricity use have been included to provide the full fuel cycle estimation of emissions form the Project.

As such, the detailed greenhouse gas assessment has included the quantification of Scope 1, 2 and 3 emissions associated with activities within the Project site, the transportation of fuels handled by the Project and the emissions associated with the end use of fuels produced by the Project.

The use of biodiesel results in less greenhouse gas emissions than an equivalent amount of standard diesel. In addition, the Project will result in the substantial reduction in transport distances for fuel products as the Port of Newcastle and Hunter Valley markets are currently serviced from Manildra Park's existing operations located at Port Kembla. As such, the Project will result in a reduction in greenhouse gas emissions.

5.12.2 Energy Consumption

The Greenhouse assessment indicates that the majority of the Project's estimated annual energy usage is associated with the biodiesel production process during Phase 3 of operations. The biodiesel production process is predicted to account for approximately 90 per cent of the total energy use. Energy usage for the biodiesel production process is dominated by diesel consumption (75 per cent) associated with steam production for the biodiesel process and electricity usage (15 per cent).

Other sources of energy usage as part of the Project include electricity usage associated with the storage and distribution of fuels, administration facilities, and diesel usage associated with ship refuelling via the barge. These sources of energy usage respectively account for 1 and 9 per cent of the of energy use associated with the Project, respectively.

5.12.3 Greenhouse Gas Emissions

5.12.3.1 Greenhouse Gas Emissions Associated with On-site Activities

The Greenhouse assessment includes an estimation of the volume of greenhouse gas emissions generated by on-site activities associated with the Project. The majority of greenhouse gas emissions associated with the on-site activities of the Project is from the consumption of electricity and diesel to produce steam associated with the biodiesel production process. In addition the Greenhouse assessment also includes the Scope 3 emissions associated with on site electricity and diesel use to provide a full fuel cycle estimation of greenhouse gas emissions associated with the Project. Overall it was estimated that the full fuel cycle emissions from on site activities will be approximately 4519 TCO_2-e per year at full Project capacity.

5.12.3.2 Greenhouse Gas Emissions Associated with Product Transport

The Greenhouse assessment included an estimation of the volume of greenhouse gas emissions generated by the transport of fuels produced by the Project. These Scope 3 emissions will be generated through the consumption of diesel associated with the road transport of diesel and biodiesel products to bulk end fuel users in the Hunter Valley. Note that the greenhouse gas emissions associated with the transport of marine fuel oil and diesel to the Port of Newcastle have been included in emissions inventory associated with on-site activities. Overall it was estimated that the full fuel cycle emissions from the road transport of fuel products will be approximately 1379 TCO_2-e per year at full Project capacity.

5.12.3.3 Reduced Emissions Associated with Product Transport

As outlined in **Section 5.12.1**, the Project will result in substantial reductions in the distances required to transport and distribute marine fuel oil, diesel and biodiesel. Currently, Manildra Park transports Marine Fuel Oil (MFO) to ships in Newcastle from its Port Kembla facility (a return truck trip of approximately 550 kilometres). It is proposed to supply MFO from the Kooragang Island depot, eliminating the need for trucks and therefore reducing the consumption of diesel. However, diesel will still be consumed by a barge that will be used to transfer MFO from the terminal to the ships.

Although the diesel consumed by the barge is significantly less than the diesel used to truck the same amount of MFO from Port Kembla, the Project is proposing to considerably increase the volume of MFO distributed by Manildra (from approximately 33 ML pa to 280 ML pa). Despite this increase in the volume of MFO distributed, the Greenhouse assessment indicates that the Project will result in a substantial reduction in greenhouse gas emissions associated with distribution of MFO and diesel transport to ships (refer to **Table 5.26**).

Diesel is currently transported to Hunter Valley bulk fuel users from Sydney to Singleton – a return trip of approximately 500 kilometres. The Project proposes to supply diesel and biodiesel to Hunter Valley bulk fuel users from the Kooragang Island terminal – a trip of approximately 160km. The reduction in the trip distance will result in a substantial reduction in greenhouse gas emissions associated with the distribution of fuel products to Hunter Valley bulk fuel users (refer to **Table 5.26**).

A summary of the reduction in greenhouse emissions associated with product transport are provided in **Table 5.26**.

Table 5.26 – Total Reductions in Annual Greenhouse Gas Reduction Associated with Product Transport

	Expected Change in Annual GHG Emissions	
	Compared with Current Distribution Operations	**Compared with Distributing Proposed Volumes using Existing Manildra Park Facilities**
GHG emissions associated with diesel consumption for marine fuel distribution (TCO_2-e per year)	-318 (-56%)	-5,057 (-95%)
GHG emissions associated with diesel consumption for diesel distribution to hunter region bulk fuel users (TCO_2-e per year)	-2,929 (-67%)	-3,499 (-71%)
Total GHG emissions associated with product transport (TCO_2-e per year)	**-3,247 (-66%)**	**-8,556 (-84%)**

5.12.3.4 Greenhouse Emissions Associated with End Use of Fuels

Greenhouse emissions will result from the combustion of MFO and diesel from the Project. The Greenhouse assessment has estimated the energy consumption and emissions associated with the end use of the marine fuel oil and diesel distributed by the Project. It is important to note that the end use of biodiesel has less greenhouse gas emissions compared with using standard diesel, so these emissions are offset, as discussed in **Section 5.12.3.5**.

The Full Fuel Cycle greenhouse gas emissions from the end use of the fuel distributed by the Project are estimated to be 1,659,000 TCO2-e per annum when the project is operating at full capacity.

5.12.3.5 Reduced Emissions Associated with Biodiesel

The use of biodiesel results in less greenhouse gas emissions than using an equivalent amount of standard diesel. While the carbon dioxide emissions from the combustion of biodiesel do not add to the carbon dioxide in the atmosphere (as an equivalent amount of carbon dioxide is absorbed to grow the crop), there are upstream emissions associated with the production of biodiesel (such as agricultural activities associated with growing the crop, extracting and processing the oil etc) which result in not all of the emissions being offset.

The net greenhouse gas benefit from the use of biodiesel manufactured from canola oil instead of standard diesel is shown in **Table 5.27**. The value for Greenhouse gases emitted in the production of biodiesel from canola oil is taken from the AGO biofuels calculator. Note that different feedstock oils will have different upstream emissions associated with their production.

The use of biodiesel also has other environmental and health benefits. Recent studies commissioned by Camden City Council (2005) found biodiesel to achieve the following reduction in exhaust emissions:

- smoke reduced by 79 per cent;

- particulates reduced by 91 per cent;
- Hydrocarbons reduced by 68 per cent (These include many known or suspected cancer causing substances, such as benzene, arsenic and formaldehyde. It is believed that there is no safe level of exposure to these chemicals, as cell mutations which can lead to cancer can occur at very low levels (EPA 2002));
- Carbon-dioxide reduced by 4 percent; and
- Sulfurous (SOx) emissions are essentially eliminated with pure biodiesel. The exhaust emissions of sulphur oxides and sulphates are major components of acid rain.

Table 5.27 - Greenhouse Gas Offset Associated with the End Use of Biodiesel

Greenhouse gases emitted in the production and combustion of biodiesel from canola oil (TCO_2-e per kL)	2.18
Greenhouse gases emitted in the production and combustion of standard diesel (TCO_2-e per kL)	3.0
Net greenhouse reduction (TCO_2-e per kL biodiesel)	-0.82
Proposed annual production of biodiesel (ML)	52
Annual net greenhouse gas reduction (TCO_2-e)	**-42,640**

5.12.4 Summary of Greenhouse Gas Emissions

The total Scope 1, 2 and 3 emissions for the Project operating at peak capacity are summarised in **Table 5.28**.

Table 5.28 – Summary of Greenhouse Gas Emissions (Scope 1, 2 and 3)

Emissions Scope	**Sources**	**Estimated Emissions (Per Annum at Peak Production During Phase 3)**
Scope 1	On-site diesel use for steam production and barge transport	2278tCO_2-e[a]
Scope 2	On-site electricity use	1661tCO_2-e[a]
Scope 3	Full Fuel Cycle emissions associated with on site diesel and electricity use	580tCO_2-e[a]
Scope 3	Diesel use associated with transport of diesel and biodiesel to Hunter Valley bulk users	1379tCO_2-e[b]
	Total Emissions associated with on-site and transport activities	**5898tCO_2-e[a,b]**
Scope 3	Emissions from diesel and marine fuel oil use	1 659 000tCO_2-e[c]
	Total Scope 3 Emissions	**1 659 000tCO_2-e**

Note a: Refer to Appendix 11 Table 2
Note b: Refer to Appendix 11 Table 3
Note c: Refer to Appendix 11 Table 5

Based on the emissions outlined in **Table 5.28**, the Greenhouse assessment (refer to **Appendix 11**) for the Project has found that:

- The total greenhouse gas emissions associated with the Project of 5898 TCO_2-e pa (including product distribution). This represents less than 0.001 per cent of Australia's total greenhouse emissions of around 559 million TCO_2-e pa (Australian Greenhouse Office, National Greenhouse Inventory 2005); and

- The estimated greenhouse gas emissions associated with the end use of the distributed fuel is 1,659,000 TCO_2-e pa. This represents approximately 0.003 per cent of Australia's total greenhouse emissions of around 559 million TCO_2-e pa (Australian Greenhouse Office, National Greenhouse Inventory 2005). It is important to note this usage is currently being supplied by transport activities that are less greenhouse efficient;

The Project will result in an overall decrease in greenhouse gas emissions of 45,887 TCO2-e compared with current distribution operations, and an overall decrease of 51,196 TCO_2-e when compared with expanding distribution volumes to the proposed levels using existing Manildra Park facilities.

5.12.5 Greenhouse Impact Assessment

The weight of scientific opinion supports the generally held view that the world is warming due to the release of emissions of greenhouse gases (GHG) from human activities, including industrial processes, fossil fuel combustion, and changes in land use, such as deforestation (Pew Center 2006).

The Earth has warmed by 0.6 ºC (plus or minus 0.2 ºC) on average since 1900 (CSIRO 2001). This warming is predicted to have environmental consequences for the world apart from the fact of average temperature increase itself. It is predicted that a continuation of historical trends of GHG emissions will result in additional warming over the 21st century, with current projections of a global increase of between 1.4 ºC and 5.8 ºC by 2100 (NSW Greenhouse Office 2005). The environmental consequences of such a temperature rise are less certain, but are likely to include additional sea-level rise (due to polar ice cap melting), changes in precipitation patterns, increased risk of droughts and floods, threats to biodiversity and a number of potential challenges for public health (NSW Greenhouse Office 2005).

On a national scale a number of potential climate change impacts have been predicted for Australia including:

- In Australia, the climate has been projected to become warmer and drier, with warming projected to be approximately 0.4 °C to 2 °C over most of the continent by 2030 (NSW Greenhouse Office 2005). There is also projected to be more variation in rainfall patterns. Where average rainfall increases, there are likely to be more extremely wet years, and where average rainfall decreases, more droughts are anticipated. Less snowfall and greater fire risk are also likely.

- Australian research has predicted that the bio-climates of some species of plants and vertebrates will disappear with a warming of just 0.5 °C to 1.0 °C (Australian Greenhouse Office 2005b). Warmer conditions associated with climate change have contributed to the movement of many animals and plants. Rapid warming and other stresses, such as habitat destruction, could possibly lead to extinctions of some species (Australian Greenhouse Office 2005b).

- Sea-level rise will have impacts on soft sediment shorelines and intertidal ecosystems, which will be especially vulnerable to change with additional impacts from extreme events. Low-lying coastal terrain may become inundated, beaches eroded, coastal infrastructure damaged or destroyed, and people injured or killed. Warmer ocean waters and sediment transport following heavy rainfall will affect fisheries and coastal ecosystems (CSIRO 2001).

- A 2 ºC rise in temperature in Australia would be likely to have a number of negative environmental impacts, such as the regular bleaching of near-shore coral reefs and a reduction in the total area in which some plants and animals naturally occur, particularly in the Southern Alps. Above a 2 ºC rise, the risk of more severe impacts becomes high, including a 12 to 25 per cent reduction in river flow in the Murray Darling Basin (Australian Greenhouse Office 2005b).

If the full fuel cycle GHG emissions are considered, the direct and indirect emissions (including the end use of the diesel and MFO products) from the Project equates to approximately 0.003 per cent of Australia's GHG emissions. Although insignificant in a global context, it may be argued that the GHG emissions may contribute to climate change.

In assessing any impact there must be consideration of the benefits brought by the Project. A range of benefits including state and local economic and employment impacts are discussed in **Section 5.14**.

A key environmental benefit of the Project is the reduction in GHG emissions through the use of biodiesel relative to the use of standard diesel fuels, and the reduction in transport distances associated with fuel product distribution. A summary of the estimated reductions in GHG emissions associated with the Project is provided in **Table 5.29**.

Table 5.29 - Total Annual Greenhouse Gas Reductions Associated with Project

	Expected Change in Annual GHG Emissions	
	Compared with Current Distribution Operations	**Compared with Distributing Proposed Volumes using Existing Manildra Park Facilities**
GHG emissions associated with diesel consumption for marine fuel distribution (TCO_2-e per year)	-318	-5,057
GHG emissions associated with diesel consumption for diesel distribution to hunter region bulk fuel users (TCO_2-e per year)	-2,929	-3,499
Total GHG emissions associated with product transport (TCO_2-e per year)	**-3,247**	**-8,556**
Use of biodiesel (TCO_2-e per year)	- 42, 640	- 42,640
Total Change in GHG emissions (TCO_2-e per year)	**- 45,887**	**-51,196**

The reductions in GHG emissions associated with the Project (refer to **Table 5.29**) occurs despite an approximate 9 fold increase in the distribution of fuel associated with the Project relative to current distributional arrangements. As such, the Project will provide for the reduction in GHG emissions whilst meeting projected market demand for diesel, MFO and biodiesel within the Port of Newcastle and amongst Hunter Valley bulk users.

These reductions are primarily as a result of reduced transport distances associated with the distribution of fuel products. For example a 95 per cent reduction in emissions occurs as a result of distributing fuel from the project to ships via barge rather than meeting market demand from Manildra Park's existing Port Kembla operations. Similarly, a 70 per cent reduction occurs with the distribution of fuel to bulk fuel users in the Hunter Valley from the Project relative to meeting market demand via Manildra Park's existing Port Kembla operations.

The reductions in emissions from the Project are consistent with existing aspirational greenhouse gas emissions reduction targets. The development of emissions reduction targets are the key policy tool to manage greenhouse gas emissions. For instance the NSW Greenhouse Plan (NSW Government 2005) advocates medium term stabilisation of emissions to 2000 levels by 2025, and a long term emissions reduction goal of 60 per cent reduction of 2000 level emissions by 2050. This project will contribute to meeting such goals.

5.12.6 Greenhouse Gas Management

Manildra Park will assess the viability of the following approaches to improve energy efficiency and reduce greenhouse emissions from the Project:

- use of energy management systems; and
- seeking continuous improvement in energy efficiency in the on-site processes.

Manildra Park will continue to assess and implement energy and greenhouse management initiatives during the design and operation of the Project.

5.13 Waste Management

5.13.1 Management Principles

Waste materials generated by the construction and operation of the facility will be managed in accordance with the following principles:

- waste avoidance;
- waste reuse;
- waste recycling; and
- waste removal.

The principles identified above can be addressed through the following processes:

- design;
- procurement of construction materials and purchasing;
- identification and segregation of reusable and recyclable materials;
- processing materials for recycling; and
- considering environmental impacts for waste removal processes.

Waste streams addressed under this section include:

- construction waste;
- office waste;
- domestic waste;
- ablution waste; and
- operational waste.

5.13.2 Waste Streams

Construction

The construction of the tanks and office and amenity facilities will involve predominantly modular/prefabricated components, which are assembled off site and transported to the site for installation. These construction activities are therefore not expected to generate a significant amount of waste material. Similarly the earthworks phase of construction are also expected to generate only minimal volumes of waste as excavated material will be reused on site within the earth bunds, where possible. Construction of the internal road system is also not expected to generate significant volumes of waste as the amounts of steel and concrete required to construct this component can be easily quantified and ordered.

Contaminated material which may be encountered during the installation of the pipeline linking the terminal to the berths will be reused as either backfill within the trench or the earth bund and/or disposed of off site to an approved landfill facility.

Office

The main type of office waste is waste paper, comprising general office paper, photocopy paper, computer paper, office stationery and paper from other sources. Other office waste includes toner cartridges from printers, photocopiers and facsimile machines, and printer ribbons.

The quantity of office waste generated at will be minimal, as only a small number of administrative personnel are associated with the operation of the facility.

Domestic Waste

Domestic waste includes food scraps, aluminium cans, glass bottles, plastic and paper containers and putrescible waste. Domestic waste will be generated by staff at the site and recycled where practicable.

Ablution Waste

Ablution waste will include waste from toilets, kitchen sinks and basins. An on-site sewage treatment facility will be designed and installed to treat wastewater from the office and amenity buildings.

Operational Waste

Workshop and maintenance activities associated with the operation of the facility will generate wastes such as rags, gloves, general packing material, empty drums, pipe off cuts,

used replacement parts, oils, lubricants, paints, and these wastes will be disposed of via a licence land fill facility.

The biodiesel process will create two by-products; glycerine and salt. The facility will generate approximately 7225 tonnes of glycerine per year. This material can be:

- passed through an additional biodiesel production process to generate additional biodiesel; and/or
- on sold as crude glycerine to other industries.

The biodiesel process will generate approximately 1873 tonnes of salt per year which will be on sold.

Approximately 11 ML of waste water effluent will be generated by the biodiesel process each year. This material will be treated within the on site sewage treatment facility and disposed of in accordance with the environment protection licence issued for the site by the DECC. Alternatively the wastewater could be transported off site for disposal.

5.14 Socio Economic Assessment

5.14.1 Social Considerations

Newcastle is located in the Lower Hunter Region of NSW, approximately 160 kilometres from Sydney and is the states second largest urban centre and largest export port.

Newcastle was historically known as Australia's 'Steel City' due to its large steel manufacturing industry. However, the city's largest steel manufacturing plant, operated by BHP, closed in 1999. Newcastle currently supports a range of industrial and manufacturing activities and has over 2,500 hectares of zoned industrial land. The city still supports a strong steel manufacturing industry and other industrial activities include manufacturing, chemical processing and a range of light industrial and port activities.

Population

The Australian Bureau of Statistics (ABS) collects census data every five years and gives population estimates for in-between years. The ABS has released population data from the 2006 census however, employment data was unavailable at the time of writing.

The estimated population for the Hunter Region for 2006 is approximately 589,239, with about 141,752 of these people residing in the Newcastle LGA. Of the people living in Newcastle, roughly 67 per cent are aged between 15 and 64, with a lower portion of people under 14 years of age than the state average and a substantially higher number of people over 64 – 16 per cent compared to the state average of 14 per cent. Approximately 11 per cent of the population were born overseas, which is considerably lower than the state average of 24 per cent (ABS 2007).

The population of Newcastle grew by an average of 0.8 per cent per year between 1981 and 2001, however this is expected to slow to 0.7 per cent per year between 2001 and 2021. This is slower than the growth rate for Sydney which was 1.2 per cent per year between 1981 and 2001. Sydney's growth rate is also predicted to slow to 0.9 per cent per year between 2001 and 2021 (Department of Infrastructure, Planning and Natural Resources 2004).

The Lower Hunter Regional Strategy (Department of Planning 2006) identifies Newcastle as providing 4,400 new dwellings by 2031, with most of these to be created through new high-density residential developments and urban consolidation.

Employment

In 2001, about 33,000 people were employed full-time and 20,000 part-time in the Newcastle LGA. Approximately 7,000 people were seeking employment, giving an unemployment rate of 11.1 percent, which was substantially higher than the state average of 7.4 percent (ABS 2001). Newcastle's unemployment rate has recently fallen to 6.5 per cent due to more favourable economic conditions (Newcastle City Council 2007).

The five key employment sectors in Newcastle are manufacturing (11 percent of the workforce), health (14 per cent), education (9 per cent), retail (16 per cent) and property and business services (11 per cent) (Newcastle City Council 2007).

The Lower Hunter Regional Strategy (Department of Planning 2006) identifies Newcastle as providing 13,100 new jobs by 2031, with the majority of these to be located within the Newcastle CBD.

Census data from 2001 shows that approximately 42 per cent of households in Newcastle had a weekly income of between $200 and $699, which exceeded the state average by about 8 per cent. Although, the number of households earning over $700 a week was approximately 8 per cent less than the state average.

Social Issues

Consultation with community stakeholders and those potentially affected by the proposal has been undertaken during 2007 and is discussed in detail in **Section 4.0**. Issues raised during this consultation have been considered in project design and in the detailed studies outlined in this EA. The benefits of the proposal include the creation of more jobs and the benefits of using biodiesel. The key issues raised by the local community focused on noise, traffic and hazard/safety aspects of the proposal. These are discussed further in **Sections 5.2**, **5.3** and **5.8** respectively.

5.14.2 Impact Assessment

Construction

The proposal is expected to create 23 full-time positions during peak construction periods. In addition to directly creating incomes, the proposal would also generate indirect incomes through the purchase and transport of construction materials, petrol, diesel, truck parts, tyres, stationery, accommodation and a number of other requirements that would be sourced from local suppliers.

Construction of the proposal therefore has the potential to increase economic activity in the region.

Operation

The proposal is estimated to require 37 full-time staff members to operate. The majority of operational positions would require semi-skilled staff such as those employed in the manufacturing and processing industries and it is expected that such employees would be available in Newcastle, where such industries are already considerably established.

The proposal would create an efficient and cost effective supply of biodiesel in the Hunter Region and reduce the region's dependence on fuels transported from Sydney or Wollongong. The proposal would also create an additional fuel supply service for ships within Newcastle Harbour. This would increase economic activity in the region, both through the generation of wages and by reducing costs associated with fuel transport. The proposal would also generate indirect incomes through the purchase of various services and materials required to operate and maintain the facility and ship refuelling operation.

The reduction in transportation of fuels from Sydney or Wollongong will directly reduce greenhouse gas emissions (refer to **Section 5.12**). It may also result in the reduction of available work for the transportation operators who currently service the Hunter fuel market from Sydney and Wollongong. Although, due to the expansion of port services at both Port Botany and Port Kembla and the environmental benefits of reduced transportation between the Hunter Region and Sydney or Wollongong, this impact is considered to be negligible.

The proposal would also generate revenues for Newcastle City Council and the State and Commonwealth governments through Council rates, land tax, GST and fuel excise.

Under the Commonwealth's *Fuel Excise Reform* (2004), excise on biodiesel will be phased in from 1 July 2011 at 3.8 cents per litre. This will increase to 19.1 cents per litre by 1 July 2015. The excise on regular diesel is currently 38.143 cents per litre and will remain at this level under the *Fuel Excise Reform*. Although the retail price of biodiesel will be determined by individual retailers, its reduced excise rate, particularly for the short-term, is likely to result in it having a lower cost to consumers.

Fuel sold to international ships will not attract fuel excise or GST.

Biodiesel

The proposal would create a reliable local source of biodiesel for the Hunter Region. Biodiesel has several advantages over regular diesel. Firstly the combustion of biodiesel is more complete/efficient than traditional mineral petroleum based diesel, as fewer unburnt fuel emission result. The improved combustion is a result of the increased oxygen content of biodiesel. B100 biodiesel (i.e. 100 per cent biodiesel) contains approximately 10 per cent oxygen by weight (GHD 2007). Recent studies commissioned by Camden City Council (2005) found biodiesel achieved the following reduction in exhaust emissions:

- smoke reduced by 79 per cent;
- particulates reduced by 91 per cent;
- hydrocarbons reduced by 68 per cent (These include many known or suspected cancer causing substances, such as benzene, arsenic and formaldehyde. It is believed that there is no safe level of exposure to these chemicals, as cell mutations which can lead to cancer can occur at very low levels (EPA 2002)); and
- carbon-dioxide reduced by 4 per cent.

These studies focused on Council garbage collection trucks using 100 per cent biodiesel fuel (B100). With this fuel a 17 per cent reduction in power was noted on a dynometer at 80 kilometres per hour. B100 is a slightly stronger solvent than regular diesel and its use in some standard diesel engines may require engine modifications such as strengthening of rubber seals. It is likely that the B100 produced by the proposal will be blended by retailers with regular diesel at a ratio of 20/80 respectively to produce a fuel known as B20 that can be used in standard diesel engines without modification.

Some vehicle emissions are toxic to human health. Using B100 biodiesel can eliminate up to 90 per cent of these toxic emissions and by 20 – 40 per cent if using B20. The positive effects of biodiesel on air toxics are heavily supported by numerous studies (US Department of Energy: pp 5: 2006).

Biodiesel can also compliment fuels that have low sulphur contents. Emissions of sulphur oxides and sulphates are a major component of acid rain. Low sulphur mineral petroleum based diesel experiences significant reductions in their lubricant properties. Biodiesel, in contrast, has high level of lubricity and a blend of 1-2 per cent in low sulphur fuel brings lubricity back to a specified value (Pramanik and Tripathi: pp 53: 2005).

Another advantage of biodiesel is that it is produced from renewable resources such as vegetable oils. Therefore much of the carbon released by its use is offset by the growing of future biodiesel crops, although some fossil fuels are used in its production and distribution. It is estimated that fossil fuel use during the production and distribution of biodiesel accounts for up to one-third of the carbon captured during the growing of biodiesel crops (US EPA 2007). This figure is dependent on production methods and the distance the fuel is transported. An advantage of the proposal is that it would reduce the distance required to transport biodiesel to the Hunter Region, thereby reducing the carbon emissions caused by its distribution.

5.14.3 Summary of Social and Economic Benefits

The proposed facility will create a number of social and economic benefits in Newcastle and throughout the Hunter Region. These benefits include:

- creation of 23 full-time jobs during construction and 37 full-time jobs during operation;
- generation of indirect incomes through the purchase of construction materials and other materials and services required to construct and operate the facility;
- creation of additional marine fuel supply and storage service for the port of Newcastle;
- creation of a local biodiesel production facility for the Newcastle area;
- environmental benefits associated with the use of biodiesel, including reduced carbon dioxide, particulate and hydrocarbon emissions; and
- generation of revenues for local, State and Commonwealth governments.

5.15 Cumulative Impacts

Potential cumulative impacts associated with the construction and operation of the Project have been discussed throughout **Section 5.0** and are addressed in each of the relevant specialist reports included as appendices to this EA. The key points from these assessments are outlined below.

As outlined in **Section 1.1.1**, industry and port facilities are located on the southern part of Kooragang Island. Industrial land uses on Kooragang Island include a range of large scale operations associated with coal handling, cement production, concrete batching and recycling, concrete building products, oilseed processing, fertiliser manufacturing and distribution, and ammonium manufacturing. In addition, surrounding industrial land use includes a hazardous waste management facility, LPG gas distribution facilities, a scrap

metal reclamation facility, a licensed landfill and a number of engineering and fabrication operations. Recently the NCIG gained approval for the construction and operation of the third coal loader on the southern extent of Kooragang Island.

There are a number of port facilities within close proximity to the facility, including the Kooragang Coal Terminal. These port facilities are primarily utilised for the handling of raw materials, including coal, alumina, petroleum coke, wood chips, phosphate rock, and a number of agricultural products, most of which are utilised in the range of manufacturing operations associated with the heavy industry land uses within the area.

As shown on **Figure 1.1**, there are a number of receiver areas surrounding the Project site. The nearest urban areas are Stockton located approximately 600 metres to the east; and Carrington located approximately 1.6 kilometres to the south-west. The former BHP steelworks and current One Steel operations are located to the west, across the South Arm of the Hunter River.

Potential cumulative noise impacts have been assessed in relation to both existing and proposed industrial land uses on Kooragang Island. The noise assessment (refer to **Appendix 5**) determined that the noise environment of surrounding receiver areas is currently influenced by a range of factors including traffic noise and noise from industrial operations on Kooragang Island. Noise from the Project is predicted to result in a marginal increase in noise at the nearest Stockton residences during the night time period. The noise assessment (refer to **Appendix 5**) predicted that noise impacts will not exceed the maximum amenity noise amenity levels set by the INP.

Potential cumulative air quality impacts have been considered within the detailed air quality assessment for the Project (refer to **Appendix 7**). The assessment indicated that the existing air quality levels are well below the relevant criteria. The air quality assessment predicted that project related emissions will be minimal and will remain well below relevant criteria in receiver areas.

The use of biodiesel results in a net reduction in greenhouse gas emissions in comparison to an equivalent amount of standard diesel. In addition the Project will result in the substantial reduction in greenhouse gas emissions associated with product transport, as the Port of Newcastle and Hunter Valley markets are currently serviced from outside the region. Overall the project will result in a net decrease in greenhouse gas emissions.

Other potential cumulative impacts relate to impacts to the physical and natural environment with the key findings of these cumulative impacts including:

- There is sufficient capacity within the local road network to accommodate the facility and the facility will not significantly impact on traffic and road safety of the local road network.

- The Department of Urban Affairs and Planning undertook a comprehensive risk study of the Kooragang Island industrial area in 1992. The study concluded that Kooragang Island offers substantial capacity to safely accommodate new industries involving significant quantities of hazardous materials. The area offers good isolation from residential areas and good transport safety and infrastructure. Given the absence of any credible off-site effects there will be no impact from the proposed development on the existing cumulative risk levels in the Kooragang Island Industrial area, i.e. no cumulative impact.

- The incorporation of appropriate controls and the management of discharges to meet relevant water quality criteria will ensure that the facility will not detrimentally impact on water quality within the surrounding area.

- The facility is consistent with the established industrial character of the Kooragang Island area and will not detract from the visual character of the area.

The socio-economic impact assessment (refer to **Section 5.14**) has also found that the facility will make a positive economic contribution to the local, regional and state economies. This impact will be through the direct creation of employment, direct and indirect spending in the local area, as well as generating government revenue through Council rates, land tax, GST and fuel excise.

6.0 Conclusion

The DGRs seek a conclusion justifying the Project, taking into consideration the environmental impacts of the Project, the suitability of the site, and the benefits of the Project. These elements are addressed in this section.

6.1 Environmental Impacts

As detailed in **Section 5.0**, the environmental impacts of the Project have been identified and the subject of a detailed environmental assessment based on:

- assessment of the site characteristics (existing environment);
- consultation with government agencies;
- consultation with community and other stakeholders; and
- expert technical assessment.

The key issues identified, including those specified in the DGRs, were the subject of the comprehensive specialist assessments of the potential impacts of the Project on the existing environment which are detailed in **Section 5.0** and the appendices to this document.

Whilst there are many complex aspects which must be read in their entirety to fully understand these assessments, **Table 6.1** provides a broad overview of the key outcomes of the environment and social impact assessment.

Table 6.1 - Overview of Environmental and Social Impacts

Environmental/Social Issue	Overview of Key Outcomes (After proposed Management and Mitigation)
Noise	• Minor exceedance of the construction noise assessment criteria Stockton West. This will however not be discernible at this location • The predicted intrusive and amenity noise levels associated with operation of the facility at all times complies with the relevant DECC goals • The cumulative noise impacts from all proposed and approved developments are anticipated to increase ambient noise levels by up to 1 dBA under noise enhancing conditions at Stockton West
Traffic and Transport	• Local road network has existing substantial capacity • Project related traffic will not significantly impact on the level of service and road safety of the local road network
Hydrocarbon Management	• Physical controls and mitigation practices will be implemented to minimise the event of hydrocarbon spills and leaks
Hydrology	• Water controls will be installed during constructions and operation of the project to divert clean water around the site • Dirty water collected on site will be treated prior to discharge in accordance with an EPL
Air Quality	• Air quality assessment predicts emissions from the Project will be well below relevant criteria

Table 6.1 - Overview of Environmental and Social Impacts (cont)

Environmental/Social Issue	Overview of Key Outcomes (After proposed Management and Mitigation)
Visual Impacts	• The Project is consistent with the established industrial character of the Kooragang Island Industrial Area and will not impact on the visual amenity of the area
Hazard and Risk	• Preliminary Hazard Assessment has identified a range of physical controls and operational strategies to mitigate identified risks
Soil and Groundwater Contamination	• Project is unlikely to disturb any areas of contamination or potential and actual ASS within the Project site
Ecology	• The Project site is highly disturbed and provides little habitat value to species • No threatened species, populations or endangered ecological communities were identified within Project site • The Project will not have a significant ecological impact
Aboriginal Archaeology	• Given the reclaimed nature of the site and the lack of cultural heritage evidence within the vicinity of the site, there is negligible potential for discovering evidence of aboriginal occupation within the project area.
Greenhouse	• The Project will result in a net reduction in greenhouse gas emission through the use of biodiesel and reduction in transport emissions
Waste Management	• Waste products from the biodiesel production process will be appropriately managed through reuse on site or resale for use in other industries
Socio Economic	• Socio economic benefits of the Project are discussed further below
Cumulative Impacts	• Cumulative impacts associated with the Project are considered to be low

The impacts of the Project have been kept to a minimum through:

- obtaining a detailed understanding of the issues and impacts by scientific evaluation;
- proactive and appropriate strategies to avoid, minimise and mitigate or manage; and
- a thorough Statement of Commitments (refer to **Section 7.0**).

6.2 Suitability of the Site

The Project is located on the eastern tip of Kooragang Island, on the North Arm of the Hunter River, providing ready access to sea going vessels via the Hunter River and Newcastle Harbour. As shown on **Figure 1.1**, the nearest urban areas are Stockton located approximately 600 metres to the east; and Carrington located approximately 1.6 kilometres to the south-west.

As outlined in **Section 1.1.1**, industry and port facilities are located on the southern part of Kooragang Island. Industrial land uses on Kooragang Island include a range of large scale operations associated with coal handling, cement production, concrete batching and recycling, concrete building products, oilseed processing, fertiliser manufacturing and distribution, and ammonium manufacturing. In addition, surrounding industrial land use includes a hazardous waste management facility, LPG gas distribution facilities, a scrap

metal reclamation facility, a licensed landfill and a number of engineering and fabrication operations. Recently the NCIG gained approval for the construction and operation of the third coal loader on the southern extent of Kooragang Island.

There are a number of port facilities within close proximity to the Project site, including the Kooragang Coal Terminal. The port facilities are primarily utilised for the handling of raw materials, including coal, alumina, petroleum coke, wood chips, phosphate rock, and a number of agricultural products, most of which are utilised in the range of manufacturing operations associated with the heavy industry land uses within the area.

Historically the Project site and the existing tanks on the site were used by Eastern Nitrogen for the storage of naphtha (a petroleum product), which was used in the production of hydrogen and also used as a fuel. The tanks were decommissioned in the 1980's and the site has remained unoccupied since that time. As noted in **Section 1.0**, Manildra Park has an option agreement with RLMC for a long term lease over the proposed site.

The Project site and broader Kooragang Island area are established industrial areas. A detailed analysis of potential on-site and off-site impacts is provided in **Section 5.0** and an overview of environmental impacts in **Table 7.1**. This analysis demonstrates that there are no major constraints associated with the use of the site by Manildra Park.

6.3 Benefits of the Project

Section 5.14 describes a range of positive benefits at will occur at a local, regional and State level as a result of the facility. These benefits will be through the direct creation of employment, direct and indirect spending in the local area, as well as generating government revenue through Council rates, land tax, GST and fuel excise.

Manildra Park currently provides approximately 16 truck loads of fuel per week to ships within Newcastle Port out of its existing Port Kembla facility, with demand for ship fuelling services increasing annually. Similar logistical arrangements are also undertaken from terminals in Sydney and Newcastle on a regular basis. The development of this facility will satisfy the existing and future needs of vessels using the port of Newcastle.

The distribution of fuel to end users within the Newcastle region from a local terminal is also expected to result in a net reduction in the emission of greenhouse gases (refer to **Section 5.12**). There are also substantial benefits associated with the use of biodiesel in minimising greenhouse gas emissions and reduced air quality and health impacts (refer to **Section 5.14**).

The potential environmental impacts of the facility have been addressed for each project component as well as the associated cumulative impacts, as discussed throughout **Section 5.0**.

6.4 Ecologically Sustainable Development

The EP&A Act aims to encourage Ecological Sustainable Development (ESD) within NSW. As outlined **Section 3.0**, the Project requires consent from the Minister under Part 3A of the EP&A Act. As such, the Minister needs to be satisfied that the Project is consistent with the principles of ESD. This section provides an assessment of the Project in relation to the principles of ESD.

To justify the proposed project with regard to the ESD principles, the benefits of the project in an environmental and socio-economic context should outweigh any negative impacts. The ESD principles encompass the following:

- the precautionary principle;
- inter-generational equity;
- conservation of biological diversity; and
- valuation and pricing of resources.

Essentially, ESD requires that current and future generations should live in an environment that is of the same or improved quality than the one that is inherited.

6.4.1 The Precautionary Principle

The EP&A Regulation defines the precautionary principle as:

> Where 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 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.

In order to achieve a level of scientific certainty in relation to potential impacts associated with the Project, this EA covers an extensive and careful evaluation of all the key components of the Project. Detailed assessment of all key issues and necessary management procedures has been conducted and is also comprehensively documented in this EA.

The existing environment has been scientifically studied and assessed (refer to **Section 5.0**). In addition, engineering and scientific modelling has been utilised to assess and determine potential impacts as a result of the Project. To this end, there has been careful evaluation to avoid, where possible, irreversible damage to the environment.

The decision making process for the design, impact assessment and development of management processes has been transparent in the following respects:

1. Government authorities and landholders potentially affected by the project were consulted during EA preparation (refer to **Section 4.0**). This enabled comment and discussion regarding potential environmental impacts and proposed environmental management procedures.

   The community has been consulted through a number of mechanisms and provided with an opportunity to provide feedback on the project. A specific mechanism included a Community Information Day, which provided an opportunity for more detailed discussion with the community in relation to the Project. Briefings were also provided to a number of neighbouring business's and the Stockton Residents Forum. Specific meetings were also held with key government agencies to address specific environmental issues.

2. The Project will include a number of specific environmental management initiatives, including the development of an Environmental Management System and associated procedures, that seek to implement best environmental practice. The specific commitments of Manildra Park are clearly identified in this document.

3. The EA has been prepared using the best available scientific information about the Project site and surrounds. Where uncertainty in the data used has been identified, a conservative worst-case analysis has been undertaken and contingency measures have been identified to manage that uncertainty.

4. An auditing and review process is an integral component of the environmental management of operations, which provides for verification of project performance by independent auditors and relevant government agencies. The Project will incorporate relevant auditing and review process as outlined in **Section 7.0**.

6.4.2 Intergenerational Equity

The EP&A Regulation defines the Intergenerational Equity as:

> Intergenerational 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.

Intergenerational equity refers to equality between generations. It requires that the needs and requirements of today's generations do not compromise the needs and requirements of future generations in terms of health, bio-diversity and productivity.

The objectives of the Project are to provide a more efficient supply of marine fuel and diesel to a growing market within the Newcastle Port and wider Newcastle region, and to provide an effective and viable alternative biodiesel product. The environmental management measures discussed in **Section 7.0** have been developed to minimise the impact on the environment to the greatest extent which is reasonably possible.

The distribution of fuel to end users within the Newcastle region from a local terminal is also expected to result in a net reduction in the emission of greenhouse gases (refer to **Section 5.12**). There are also substantial benefits associated with the use of biodiesel in minimising greenhouse gas emissions and reduced air quality and health impacts.

The management of environmental issues as outlined in the EA will maintain the health, diversity and productivity of the environment for future generations. The Project also makes an important contribution to local, regional and state economies.

6.4.3 Conservation of Biological Diversity

The conservation of biological diversity refers to the maintenance of species richness, ecosystem diversity and health and the links and processes between them. All environmental components, ecosystems and habitat values potentially affected by the project are described in the EA. Due to the highly disturbed nature of the site, and recent land use history, the site supports very little biodiversity. In addition it is not considered that the project will impact, wither directly or indirectly, on the HENP, located approximately 1 kilometre north of the Project site.

6.4.4 Valuation and Pricing of Resources

The goal of improved valuation of natural capital has been included in Agenda 21 of Australia's Intergovernmental Agreement on the Environment. The principle of improved valuation and pricing refers to the need to determine proper values of services provided by the natural environment. The objective is to apply economic terms and values to the elements of the natural environment. This is a difficult task largely due to the intangible comparisons that need to be drawn in order to apply the values.

The project optimises the valuation and pricing of the fuel resources with minimal impact by:

- optimising the efficiency of supplying the resource to the Newcastle market relative to existing operations in Port Kembla and similar operations in Sydney;
- providing an effective and viable alternative fuel source that has comparatively lower impacts in terms of local pollutants, human health and greenhouse gas emissions; and
- project feasibility considerations have included the costs of integration of effective environmental management to minimise potential environmental impacts.

7.0 Draft Statement of Commitments

The DGRs for the Project require that the EA include a draft Statement of Commitments which details the measures proposed by the Applicant for environmental mitigation, management and monitoring.

If approval is granted under the Environmental Planning and Assessment Act 1979 for the Project, Manildra Park will commit to the following controls.

7.1 Operational Controls

7.1.1 All activities will be undertaken generally in accordance with this EA.

7.1.2 The Project will operate up to 24 hour per day 7 days per week.

7.2 Noise

7.2.1 Construction activities which are audible at any residential or other sensitive receiver will be limited to between 7.00 am and 6.00 pm Monday to Friday and 8.00 am and 1.00 pm Saturdays.

Works proposed to be undertaken outside of these hours includes:

- any works that do not cause construction noise emissions to be audible at any nearby sensitive noise receiver;
- the delivery of materials as requested by the Police or other authorities for safety reasons;
- emergency work to avoid the loss of life, property and/or prevent environmental harm; and
- any other work as agreed through negotiation between Manildra Park and potentially affected noise receivers or as otherwise agreed by the DECC.

Noise Mitigation Measures

7.2.2 During the detailed design and procurement process Manildra Park will ensure noise emissions from the facility meet the DECC goals.

7.2.3 Noise emissions from all pumps associated with Phase 3 operations will be enclosed or mitigated.

7.3 Traffic

Pipeline Construction

7.3.1 Manildra Park will provide appropriate traffic management controls during the construction of the transfer pipeline during Phase 1 of the Project. Traffic

management controls will include a one lane 'stop-go' control along Heron Road and/or the temporary closure of both Heron and Greenleaf Roads.

7.3.2 Manildra Park will consult with the RLMC, traffic management operators, Newcastle City Council and the RTA to determine the most effective traffic management measures to be implemented during the construction of the pipeline during Phase 1 of construction.

Operational Traffic Controls

Operational traffic management measures to be implemented include:

7.3.3 Provision of a minimum of 18 parking spaces on-site, where possible.

7.3.4 Overnight heavy vehicle parking will be accommodated for on-site.

7.3.5 The design of the access driveway, and internal access roads, will conform to Australian Standard *AS 2890.2:2002 - Off Street Commercial Vehicle Facilities*.

7.3.6 Provision of appropriate access driveways and circulation roadways, as well as loading areas, which will ensure that all manoeuvring occurs on site.

7.3.7 The design of on-site service areas including the refuelling, service or maintenance bays, will be in accordance with *AS 2890.2*, where appropriate. Through bays may be utilised where the vehicles do not need to manoeuvre on either approach or departure to the service area.

7.3.8 As a principle, heavy vehicles will use the route via Greenleaf Road and the Teal Street on and off ramps for access to and from the west to minimise any potential traffic flow issues.

7.4 Hydrocarbon Management

Manildra Park will manage the risk of hydrocarbon spills through the implementation of a range of physical controls and mitigation measures in the handling of hydrocarbons in the storage, transfer pipeline, refuelling barge and the road tanker loading/unloading bay. The specific physical controls and mitigation measures to be implemented include:

Storage

7.4.1 The following physical controls and mitigation measures have been incorporated into the design and operation of the terminal:

- the storage tanks and connecting pipeline infrastructure has been designed in accordance with *AS 1940:2004 - The storage and handling of flammable and combustible liquids*;
- a leak detection system has been incorporated within the base of each tank;
- the tanks are contained within a bunded area which has been designed in accordance with *AS 1940*. The bunded area has a storage capacity of approximately 110 per cent of the storage capacity of the largest tank. This capacity has also taken into account firewater and rainfall events;

- the bunded area will be lined with an impervious layer, such as bentonite (clay) or high density polyethylene (plastic), ensuring that any spills can not disperse into the soil and/or groundwater;

- an automated monitoring system will be installed in all tanks (radar gauge and Programmable Logic Control system-fuel level detector), which will automatically stop fuel pumping if the storage level in the tank exceeds its designed limits during a fuel transfer, i.e. high level alarms;

- standby emergency spill kits are available. Additional resources are available from the Newcastle Port Corporation and from Australian Marine Oil Spill Centre (AMOSC) members located in the area, such as Shell etc;

- isolation valves are physically locked when not in use; and

- valves located within secure/fenced area.

Transfer Pipeline

7.4.2 The following physical controls and mitigation measures have been incorporated into the design and operation of the transfer pipeline:

- the design, construction, operation and maintenance of the pipeline will be undertaken in accordance with *AS 2885 Pipelines – Gas and liquid petroleum*;

- the pipeline will be cathodically protected for enhanced anti-corrosion properties;

- any underground or inaccessible sections will be sheathed in polymer coating or wrapped in anti-corrosion impregnated tape;

- flexible hoses will be blown out and cleared of fuel with compressed air at end of every use, prior to disconnecting the flexible hose;

- fuel will be removed from the transfer pipeline at the conclusion of each transfer operation i.e. the pipeline will be pigged. The transfer pipeline is empty when connecting flexible hose/or not in use;

- drip trays of a size to Australian Standards will be located underneath the point of connection between the steel pipeline and flexible hose on wharf and barge. Drip trays to be removed by hand and cleaned at terminal;

- the pig points will be bunded. The capacity of the bund will exceed the capacity of the pig hatch;

- the terminal tank(s) will be dip gauged before filling the pipeline and after pigging pipeline to ensure zero fuel remains in pipeline, i.e. confirm the total volume of fuel dispatched/received;

- the volume of fuel dispatched/received will be cross checked at both ends;

- regular (every half hour) cross checks of volume dispatched from terminal to that received at the berth and visa versa;

- regular (continuous at start of pumping then every half hour) cross checks of the pressure within the pipeline at the terminal to that at the berth will be undertaken. Pressure is logged on the Product Transfer Form;

- automatic shut off of the terminal pumps will occur if the maximum operating pressure of the pipeline is exceeded;

- visual inspection of the pipeline will be undertaken prior to and during loading. Half hourly checks will be undertaken during loading;

- emergency stop buttons will be located at staffing points i.e. at terminal, berth, and refuelling barge. Staff walking the pipeline will be in contact with staff at these locations via a radio;

- multiple isolation valves are located along the pipeline, i.e. damaged sections of the pipeline to be isolated to minimise spills;

- isolation valves are physically locked when not in use;

- non-return valves used on pipeline;

- flexible hoses used for fuel tanker vessel discharge will be pressure tested prior to every discharge operation;

- pressure testing of the transfer pipeline will be undertaken at the following intervals:

    - on installation, the pipeline will be pressure tested to 1.5 times its maximum allowable operating pressure;

    - yearly hydrostatic leak and strength testing of pipeline in accordance with the existing operating procedure at Port Kembla; and

    - monthly air pressure test of pipeline in accordance with the existing operating procedure at Port Kembla;

- flexible hoses for barge and ship refuelling are pressure and continuity tested every 6 months in accordance with the existing operating procedure at Port Kembla;

- valves located within secure/fenced area;

- collision aspects have been considered in the design of pipeline. Physical protection methods e.g. bollards, armco guard rail etc and high visibility colours and signage on pipeline including emergency contact phone numbers will be included where required;

- fuel transfer operations will be undertaken in accordance with Manildra Park's existing operating procedure at Port Kembla;

- minor spills will be cleaned up using spill kit materials;

- large volume of spilt oil to be removed by a licensed waste oil contractor (e.g. Nation Wide Oil), as required;

- appropriately trained and competent operators in accordance with the existing operating procedure at Port Kembla; and

- multiple staff are located a critical locations during barge refuelling operations allowing for greater awareness and quick response to any issues.

The Refuelling Barge

7.4.3 The following physical controls and mitigation measures have been incorporated into the design and operation of the refuelling barge:

- the barge will be double hulled/double skinned;

  - if the hull of the barge is damaged the contents will be emptied to a ship or the terminal; and

  - additional water based spill control equipment and resources can be called on from the Newcastle Port Corporation and Australian Marine Oil Spill Centre (AMOSC) members e.g. Shell etc;

- Manildra Park will have an emergency response vehicle based on land and the barge will also carry oil spill response equipment (e.g. floating booms) Manildra Park's Oil Spill Response system and capability exceeds IMO & AMSA 'Marine Oil Spill & Pollution Guidelines';

- all loading operations are computer controlled using Programmable Logic Control system at terminal;

- flow meters provide readings of volumes transferred with automatic presets to stop pumps at set volumes;

- radar gauge is used to provide constant readout of barge tank capacity with alarms activated when tanks are nearing capacity;

- manual dippings and ullages (the volume remaining in the tank) at terminal tanks and barge tanks, are undertaken to confirm flow meter and radar gauge readings;

- fuel is to be loaded evenly between the barges tanks to minimise the listing of the refuelling barge;

- the barge includes a dedicated overflow/slops tank;

- radio contact between barge, terminal and staff walking the pipeline is available at all times;

- maintenance of barge is undertaken as part of overall maintenance program;

- the operation and calibration of measuring equipment is undertaken as per existing operating procedure at Port Kembla;

- minor spills to be cleaned up using spill kit materials;

- large volumes of spilt oil to be removed by licensed waste oil contractor (e.g. Nationwide Oil), as required;

- multiple staff at critical locations during barge refuelling operations allowing for greater awareness and quick response to any issues;
- emergency stop buttons located at staffing points;
- additional equipment and resources can be called for from the Newcastle Port Corporation and Australian Marine Oil Spill Centre (AMOSC) members e.g. Shell etc;
- all Manildra Park staff are trained and accredited by the Australian Marine Oil Spill Centre (AMOSC);
- procedures adhere to International Safety Guideline for Oil Tankers and Terminals (ISGOTT) Manual; and
- competent and trained operators e.g. Barge Master.

Road Tanker Loading Unloading Bay

7.4.4 The following physical controls and mitigation measures have been incorporated into the design and operation of the road tanker loading/unloading bay:

- truck loading occurs within a bunded concrete area;
- all spills/stormwater within the loading bay are directed to a 20 KL Spill Pit meeting AS 1940 requirements, which includes an impervious lining layer, such as bentonite (clay) or high density polyethylene (plastic) and provides capacity for spillage from one 8 KL road tanker compartment;
- trucks connect to a PLC system during loading, which controls the loading process via:
  - correlating volume to be loaded with truck ID Tag; and
  - The Scully system i.e. sensor which detects fuel level in tank and activates automatic shut off if triggered;
- flow meters provide readings of volumes transferred with automatic presets to stop pumps at set volumes;
- radar gauge is used to provide constant readout of tank capacity with alarms activated when nearing tank capacity;
- emergency stop buttons are located at filling bays;
- trucks fitted with brake interlocks, which prevents the truck from driving off while connected to the loading bay hoses;
- hoses are fitted with dry break couplings which prevents spills/leaks during connection/disconnection operations; and
- mobile spill kits will be available at the loading site (e.g. wheelie bins with quick response resources);

7.5 Hydrology and Water Quality

Construction

7.5.1 A Soil Water Management Plan will be developed in accordance with the requirements of the *Managing Urban Stormwater: Soils and Construction* (NSW Landcom 2004) (the Blue Book) to outline the sediment and erosion control measures implemented during the construction phase.

Operation

7.5.2 Water controls will be designed and constructed to divert clean water around the Project site.

7.5.3 Water collected from dirty areas on site will be stored within spill pits and/or bunded areas (fitted with an impervious liner, such as bentonite (clay) or high density polyethylene (plastic)) and treated. Prior to discharge off site water will be sampled and analysed to ensure it meets the relevant criteria outlined in **Table 7.1**.

Table 7.1 - Water Quality Discharge Criteria

Water Quality Parameter	Unit of Measure	Criteria 100 % Concentration Limit
pH	pH	6.5 – 8.5
Total Suspended Solids	mg/L	50
Oil and Grease	visible	none
Chemical Oxygen Demand	mg/L	40
Volume	KL	none
BOD	mg/L	No limit specified

7.5.4 The biodiesel facility will generate approximately 11 ML of wastewater per year. Given the significant and rapid technological advancements occurring with biodiesel technology and that the facility is not expected to be constructed for approximately 3 – 5 years, it is anticipated that either waterless technology and/or significant improvements in plant performance will be achieved. This may alter the wastewater characteristics. Therefore, prior to the commencement of construction of the biodiesel plant, the Soil and Water Management Plan will be revised and updated in consultation with DECC and to satisfaction of DoP. If necessary seek a variation to its EPL from the DECC if on-site treatment followed by discharge to the Hunter River is proposed. Alternatively the wastewater could be transported off site for disposal.

7.6 Air Quality

Air Quality Management and Mitigation

Manildra Park have committed to the following air quality management and mitigation measures for the Project:

Construction

7.6.1 Maintenance of appropriate dust management controls during the construction phase of the Project including minimisation of disturbed areas, watering of exposed surfaces during construction and the stabilisation of exposed areas post construction;

Operation

7.6.2 Fitting diesel, marine fuel, biodiesel and associated feedstock (vegetable oils) storage tanks with floating roofs and pressure release valves to assist in minimising vapour emissions from the tanks;

7.6.3 The biodiesel methanol process tank will be blanketed using nitrogen.

Air Quality Monitoring

7.6.4 During the operation of the biodiesel plant, Manildra Park will monitor the methanol recovery system to ensure that it is operating at least 80 per cent efficiency at all times. A shutdown procedure will be implemented if the methanol recovery system is operating at less than 80 per cent efficiency at any time.

7.7 Visual

7.7.1 The site will be landscaped to improve the visual amenity of the site. Native tree and grass species will be selected for landscaping. The species used would be endemic to the area and would complement the objectives of the Kooragang Wetland Rehabilitation Project.

7.7.2 All lighting associated with the proposed development will be designed, installed and operated in accordance with *AS 4282:1997 - Control of the Obtrusive Effects of Outdoor Lighting*.

7.7.3 A weed management plan will also be incorporated into the landscape management plan.

7.8 Hazard and Operability

The preliminary hazard analysis (refer to **Appendix 8**) identified a range of technical control measures and non-technical safeguards and procedures that will be put in place to reduce the level of risk associated with the operation of the facility.

7.8.1 The technical control measures to be implemented include:

- design of tanks, plant, bunding and piping in accordance relevant standards and codes;
- design of surface drainage systems to prevent contamination of surrounding waterways;
- equipment selected for respective hazardous area classification to control ignition sources;

- provision of emergency isolation valves, shut down system and backflow prevention devices;
- reversion of valves, process equipment and control systems to fail safe positions;
- auto shutdown of plant on high temperatures or pressures;
- install tank level device(s) as appropriate and provision of high level alarms;
- physical barriers including bunding and bollards;
- ensuring biodiesel and methanol is stored at suitable conditions to prevent fires and explosions, including venting and nitrogen blanketing;
- control of ignition sources;
- storage of dangerous goods in dangerous goods compliant stores;
- inlet and outlet flow monitoring during ship transfers;
- implementation of leak detection system;
- provision of pump deadhead instrumented protection and recycle lines;
- provision of flame arrestors on vent systems;
- installation of oil/water separators to remove contamination prior to discharge; and
- provision of fire detection system and fire suppression including fire water ring main, cooling water system and foam deluge fire fighting system;

7.8.2 The non technical safeguards and procedures to be implemented include:

- conducting HAZOPs of process designs, site layout and design changes;
- equipment and plant inspection and maintenance procedures;
- operating procedures, including manual tank transfers, and training;
- cessation of operations in adverse weather conditions;
- operator monitoring of control conditions such as inlet and outlet flow monitoring during ship transfers, leak detection systems;
- Hot Work/Safe Work Procedure;
- implementation of site speed limit and driver training;
- provision of security measures include ‘person proof’ fencing, CCTV, intruder beams, security patrols, operator/driver vigilance, security access pass for after hours access;
- isolation of the tank farm from the truck loading area when the facility is not manned via fencing i.e. access to tank farm prohibited. Trucks and drivers can only access the truck loading area via a swipe card arrangement;

- development of spill response procedures and management plan;
- provision of PPE and safety shower/eye wash;
- appropriate training and supervision of operations;
- provision of on-water pollution response equipment and plan;
- ensure no flammable class 3 liquids are stored in the same bund area as the combustible C1 substances;
- preparation of a Fire Safety Study;
- procedures are in place for the storage and handling of dangerous goods;
- management procedure for contaminated soil in accordance with Orica Management Plan; and
- preparation of an Emergency Response Plan in accordance with HIPAP 1 that coordinates onsite activities and defers authority to the Local Emergency Operations Controller once external support is sort is response to the emergency. The Local Emergency Operations Controller is the position as defined in the *Newcastle Disaster Plan Newcastle City Council 2005*.

7.8.3 Manildra Park will also implement the following safeguards as recommended by the PHA for the management of the hazards associated potential methanol fires:

- conducting a HAZOP of the process design to minimise the potential for the loss of containment of methanol on site;
- the design, inspection and maintenance of the facility to ensure that infrastructure is fully secure and operational;
- access to foam fire fighting systems to control and mitigate any fires encountered; and
- control of ignition sources.

7.9 Soil and Groundwater Contamination

Pipeline Construction

7.9.1 Prior to disturbance of soils within the identified Orica contamination zone, for pipeline construction Manildra Park will follow the processes outlined in the Orica EMP.

7.9.2 A physical barrier such as a clay plug will be constructed at the northern and southern extents of the contamination zone

Construction and Operation

7.9.3 In the event of any potential or actual ASS/contaminated material being encountered, the following management measures will be implemented:

Materials Handling:

- separate stockpiles for different materials;
- stockpiles to be located within a bunded area;
- liming of the stockpile ground prior to the stockpiling of ASS material; and
- the stockpile will be treated with lime as required.

Testing:

- testing of ASS and treatment with lime as required; and
- classification of material prior to disposal.

7.9.4 Where possible, ASS material will be treated and re-used for the backfilling of pipeline trenches, or other construction activities on site. Contaminated material may also be encapsulated within the on site earthen bunds or used as backfill material in the trench. In the event that the material cannot be successfully treated and or reused it will be removed from site.

7.9.5 A remediation action plan will be prepared for the handling of lead contaminated material that occurs in surface layer around the base of the existing tanks.

7.10 Greenhouse Management

7.10.1 Assess the viability of implementing energy management systems;

7.10.2 Seek continuous improvement in energy efficiency in the onsite processes; and

7.10.3 Assess and implement energy and greenhouse management initiatives during the design and operation of the Project.

7.11 Waste Management

7.11.1 The management of waste materials generated by the construction and operation of the Project will be managed through the design; procurement of construction materials and purchasing; identification and segregation of reusable and recyclable materials; processing materials for recycling; and considering environmental impacts for waste removal processes.

7.12 Environmental Management, Monitoring, Auditing and Reporting

Environment Management System

7.12.1 Manildra Park will develop and implement an Environment Management System to outline the environmental management practices to be implemented during the construction and operation of the Project.

Environmental Protection Licence

7.12.2 Manildra Park will obtain an Environmental Protection Licence for the Project.

Independent Environmental Audit

7.12.3 Three years after the commencement of the Project, and every four years thereafter, Manildra Park will commission and pay the full cost of an Independent Environmental Audit of the Project.

Incident Reporting

7.12.4 Within 7 days of detecting an exceedance of the limits/performance criteria in this approval or an incident causing (or threatening to cause) material harm to the environment, the Proponent shall report the exceedance/incident to the Department, and any relevant agency. The report must:

- describe the date, time, and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the exceedance/incident.

Community Enquiry Phone Number

7.12.5 Prior to the commencement of construction, Manildra Park will implement, publicise and list with a telephone company a contact phone number, which would enable the general public to reach a person who can arrange appropriate response action to the enquiry. Manildra Park will maintain a register to record details of all enquiries received and actions undertaken in response. Manildra Park will supply the DECC with a copy of the enquiries register on an annual basis.

8.0 Checklist of EA Requirements

The DGRs are included in full in **Appendix 2** and a checklist of where each requirement is addressed in the EA, is provided below.

Requirement	Section of EA
General Requirements	
The Environmental Assessment (EA) must include	
• An executive summary	**Executive Summary**
• A detailed description of the project including the:	
- Need for the project;	**Section 2.1**
- Alternatives considered; and	**Section 2.2**
- Various components and stages of the project;	**Section 2.3, 2.4 & 2.5**
• Consideration of any relevant statutory provisions	**Section 3.0**
• A general overview of the environmental impacts of the project, identifying the key issues for further assessment, and taking into consideration any issues raised during consultation	**Section 5.0**
• A detailed assessment of the key issues specified below, and any other significant issues identified in the general overview of environmental impacts of the project, which includes:	**Section 5.0**
- A description of the existing environment;	**Section 1.1.1, 1.1.2 & 5.0**
- An assessment of the potential impacts of all components of the project (including the pipework), as well as any cumulative impacts (particularly those impacts associated with other activities on Kooragang Island)	**Section 5.0**
• A description of the measures that would be implemented to avoid, minimise, mitigate, offset, manage and/or monitor the impacts of the project	**Section 5.0**
• A draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures	**Section 7.0**
• A conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and the benefits of the project	**Section 6.0**
• A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading.	**Appendix 4**
Key Issues	
• **Hazards and Risk –** including an assessment of the potential hazards and risks associated with the proposed project. A preliminary risk screening must be completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) and *Applying SEPP 33* (DUAP, 1994), and where necessary, a Preliminary Hazard Analysis (PHA) undertaken;	**Section 5.8** **Appendix 8**
• **Water and Soils –** including:	
- An assessment of the potential soil, groundwater and surface water impacts including impacts on Newcastle Harbour;	**Section 5.5 & 5.9** **Appendix 9**
- Proposed erosion and sediment controls (during construction) and the proposed stormwater management system (during operation);	**Section 5.5**

Requirement	Section of EA
- Identification of the potential for spillage of contaminants on the site, the pipeline routes and at the shipping terminal, and proposed mitigation and management measures; and	**Section 5.4**
- An assessment of contaminated groundwater and soils, and acid sulphate soils, and proposed mitigation and management measures.	**Section 5.9** **Appendix 9**
• **Air Quality -** including a comprehensive air quality assessment focusing in dust, odour and vapour (including volatile compounds)**;**	**Section 5.6** **Appendix 7**
• **Greenhouse Gas Emissions –** a full greenhouse gas assessment (including a quantitative analysis of the Scope 1, 2 and 3 emissions of the project and a qualitative analysis of the impacts of these emissions);	**Section 5.12, Appendix 11**
• **Noise** –including construction, operation and traffic;	**Section 5.2, Appendix 5**
• **Traffic** – including details of the traffic volumes likely to be generated during construction and operation, and an assessment of the predicted impacts of this traffic on the safety and capacity of the surrounding road network;	**Section 5.3, Appendix 6**
• **Visual** – including impacts from the proposed pipelines over the public road network;	**Section 5.7**
• **Waste Management –** including classification of all potential sources of liquid and non-liquid wastes; and	**Section 5.13**
• **Aboriginal Heritage.**	**Section 5.11**
References The Environmental Assessment must take into account relevant State government technical and policy guidelines. While not exhaustive, guidelines which may be relevant to the proposed modifications are included in the attached list.	**Section 9.0**
Consultation During the preparation of the Environmental Assessment, you should consult with the relevant local, State or Commonwealth government authorities, service providers, community groups or affected landowners. The consultation process and the issues raised must be described in the Environmental Assessment. In particular, you should consult with: • Department of Environment and Climate Change; • Department of Water and Energy; • Newcastle Port Corporation; • NSW Maritime; • RTA; and Newcastle City Council.	**Section 4.0**

9.0 References

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10.0 Abbreviations and Glossary

ABS	Australian Bureau of Statistics
AMOSC	Australian Marine Oil Spill Centre
ARTC	Australian Rail Track Corporation
ASS	Acid Sulphate Soils
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
Bunkering	the refuelling of ships
DA	Development Application
DCP	Development Control Plan
DECC	Department of Environment and Climate Change
DEWR	Department of the Environment and Water Resources
DGRs	Director General's Requirements
DOL	Department of Lands
DOP	Department of Planning
DUAP	Department of Urban Affairs and Planning
EA	Environmental Assessment
ECRTN	Environmental Criteria for Road Traffic Noise
EEC's	Endangered Ecological Communities
EMP	Environmental Management Plan
ENM	Environmental Noise Model
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
ESD	Ecological Sustainable Development
FN1	Fern Bay North
FW3	Fern Bay West

GHG	Greenhouse Gas
HAZOP	Hazard and Operability
HENP	Hunter Estuary national Park
HWC	Hunter Water Corporation
HIPAP	Hazardous Industry Planning Advisory Paper No 4 Risk Criteria for Land Use and Safety Planning 1992
IAEA	International Atomic Energy Agency
INP	Industrial Noise Policy
ISGOTT	International Safety Guideline for Oil Tankers and Terminals
K2	Kooragang Island Berth No 2
K3	Kooragang Island Berth No 3
K4	Kooragang Island Berth No 4
KCT	Kooragang Coal Terminal
KNR	Kooragang Nature Reserve
KWRP	Kooragang Wetland Rehabilitation Project
LGA	Local Government Area
LPG	Liquid Petroleum Gas
NCIG	Newcastle Coal Infrastructure Group
NPC	Newcastle Port Corporation
LEP	Local Environmental Plan
ML	Mega Litre
MLRA	Multi Level Risk Assessment
MNES	Matters of National Environmental Significance
MRS	Methanol Recovery System
NCC	Newcastle City Council
NPC	Newcastle Port Corporation
NSW	New South Wales
OCP	Organochlorine Pesticides

OPP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PHA	Preliminary Hazard Analysis
Pigging	flexible rubber urethane plugs used to clear a pipeline after it has been used to transfer a liquid project. The pig is loaded into the launcher prior to pumping and when fuel loading or unloading has been completed it is pushed back to the terminal using compressed air to ensure there is no product left in the line.
PKMF	Port Kembla Marine Fuels
PLC	Programmable Logic Control
PoEO Act	Protection of the Environment Operations Act 1997
PPE	Personal Protection Equipment
Providoring	The supplying of food to ships
PWCS	Port Waratah Coal Service
RBL	Rated Background Level
RLMC	Regional Land Management Corporation Pty Ltd
RTA	Roads and Traffic Authority
SEPP	State Environmental Planning Policy
TRH	Total Recoverable Hydrocarbons
TSC Act	Threatened Species Conservation Act 1995
Ullages	checking the volume remaining in the tank