Prepared for

Shell Refining (Australia) Pty Ltd

Preliminary Environmental Assessment

Proposed Upgrade of Hydrodesulphurization (HDS) Unit at Clyde Refinery



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Executive Summary

Introduction

This Preliminary Environmental Assessment (Preliminary EA) has been prepared for the Department of Planning (DoP) on behalf of Shell Refining (Australia) Pty Ltd (Shell) to support a Part 3A Major Projects Application. This Preliminary EA provides a detailed description of the proposed upgrade to the Hydrode-sulphurisation (HDS) Unit located at Shell's Clyde Refinery Rosehill, NSW and identifies the potential environmental impacts associated with the proposed upgrade.

This Preliminary EA has been prepared in accordance with the *Environmental Planning and Assessment Act* 1979 (EP&A Act).

Proponent

Shell Refining (Australia) Pty Ltd (Shell) is the proponent which is a subsidiary of Shell Australia Limited. Shell Australia Limited is part of the Royal Dutch/Shell Group of Companies. In Australia, Shell is engaged in the oil, gas, chemicals and other selected businesses.

Site Description

Clyde Refinery is located at Camellia, Sydney. The Clyde Refinery produces approximately 1.7 million tonnes or 2.3 billion litres of gasoline grades per annum. This equates to a supply of approximately 50% of petroleum products in NSW and has a production of all product grades of about 5,000ML per annum.

Description of Proposal

The Proposal seeks to comply with the Federal Government's *Fuel Quality Standards Act* 2000 (FQS Act) by upgrading the HDS Unit to reduce the sulphur content in diesel from 50ppm to 10 ppm by the 1st January 2009. The main scope of the Proposal is expected to be completed by Q4 2008 with final activities associated with equipment sparing concluding by Q2 2009 subject to approval and has a capital investment value of approximately $35 million.

Need for the Proposal and Alternatives

The need for this Proposal is based upon the Federal Government's FQS Act which requires a reduction of sulphur content in diesel from 50ppm to 10ppm by the 1st January 2009.

Alternative options included reducing the sulphur content without upgrading the HDS Unit. This would result in a decrease in the capacity of the HDS Unit to produce diesel, reducing supply to the Sydney and NSW markets.

It was concluded that an upgrade to the HDS Unit would meet the Federal Government's new specifications, maintain existing levels of supply to the Sydney and NSW market and improve the reliability and efficiency of the HDS Unit.

Planning and Legislative Requirements

The EP&A Act and the EP&A Regulations provide the framework for the assessment of the environmental impact of development projects in NSW. The Proposal triggers the provisions of a 'Major Project' under State Environmental Planning Policy (Major Project) 2005 (SEPP 2005). The capital investment involved would exceed $30 million and the Proposal is for the purpose of "petroleum related works (including processing plants)" within Clause 6, Schedule 1 of SEPP 2005. As a Major Project, the Minister for Planning must give his approval for the Proposal.

Preliminary Environmental Assessment

The objectives of the HDS Unit upgrade Proposal are to comply with the Federal Government's FQS Act while maintaining existing levels of diesel production. The preliminary environmental assessment assesses a number of issues including:

- Air Quality;
- Noise;
- Hazard assessment;
- Transport and traffic;
- Fauna and flora;
- Water quality;
- Socio-economic;
- Waste;
- Visual amenity and land use; and
- Indigenous and non-indigenous heritage.

The preliminary assessment has identified air quality and hazard assessment as the key environmental issues associated with the HDS Unit upgrade. However they are expected to have a low potential for impact upon the environment.

Conclusion

This Preliminary EA has been submitted as a precursor to the preparation of an Environmental Assessment for the proposed HDS Unit upgrade. Once the DoP is satisfied that the Proposal is a "Major Project" and has issued the Environmental Assessment Requirements (EARs), they will be addressed and incorporated into the final Environmental Assessment for the Proposal.

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Glossary

Basell	Basell is a Polypropylene Plant located next to the Refinery site
Catalyst	A substance that enables a chemical reaction to proceed at a usually faster rate without being consumed by the reaction
Catchment Area	The area drained by a stream or body of water.
Diesel	A hydrocarbon stream used as fuel for diesel engines
Feedstock	Intake of Crude Oil or other hydrocarbons for processing.
Flare	To incinerate surplus waste gases.
Fuel Gas	Gas produced in refinery processes for use as fuel in furnaces and boilers
Fuel Oil	Heavy hydrocarbon stream used as fuel for shipping and large industrial engines
Groundwater	Water found in soil, rock or in pores, crevices etc.
Hazard	A possible source of danger or risk.
Hydrocarbon	Chemical or organic compound of hydrogen and carbon.
Hydrology	Study of the properties of the earth's water, especially of its movement in relation to land.
Hydrodesulphurisation Unit	Unit utilised by Shell to remove sulphur from diesel fuel.
Light Cycle Oil	A diesel feedstock produced by the Catalytic Cracking Unit
pH	A measure of the acidity or alkalinity of a soil. A pH of 7 denotes neutrality, higher values indicate alkalinity and lower values indicate acidity.
Precinct	Enclosed or clearly defined area.
Ramsar Wetlands	The Ramsar Convention definition of wetland includes artificial and modified wetlands.
Reactor	An equipment/vessel which allows for mixing and reaction between catalyst and feedstocks to form products.
Stack	Chimney used to disperse and discharge exhaust gasses from the combustion processes.
Stripper	An equipment/vessel where steam is injected to strip residual hydrocarbons from the catalyst.
Threshold	Limit below no reaction occurs.
Waste Water	Industrial water or process water.
Wetland	Habitats where the influence of surface or groundwater has resulted in development of plant or animal communities adapted to aquatic or intermittently wet conditions.

Abbreviations

CO_2	Carbon dioxide
DA	Development Application
DoP	Department of Planning
DUAP	Former Department of Urban Affairs and Planning
EA	Environmental Assessment
EARs	Environmental Assessment Requirements
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPA	Environmental Protection Authority (now Department of Environment and Conservation – DEC)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
FCCU	Fluidised Catalytic Cracking Unit
FQS Act	Fuel Quality Standards Act 2000
HDS	Hydrodesulphurization
HSEQ	Health, Safety, Environment, Quality
km	Kilometre
L	Litre
LEP	Local Environmental Plan
ML	Mega Litre
MS	Management System
M^3	Cubic Metre
NEPM	National Environmental Protection Measure
NES	National Environmental Significance
NPW Act	*National Parks and Wildlife Act 1974*
NO_x	Oxides of Nitrogen
NSW	New South Wales
OH&S	Occupation Health and Safety
PCB	Polychlorinated Biphenyls
PCC	Parramatta City Council
POEO Act	Protection of the Environment Operations Act (NSW) 1997

ppm	Concentration expressed in parts per million
Preliminary EA	Preliminary Environmental Assessment
RAP	Remedial Action Plan
REP	Regional Environmental Plan
SEPP	State Environmental Planning Policy
Shell	Shell Refining (Australia) Pty Ltd
SRU	Sulphur Recovery Unit
SO_x	Oxides of sulphur
T	Tonne
TSC Act	*Threatened Species Conservation Act*
VOC	Volatile organic compounds

1 Introduction

This Preliminary Environmental Assessment (Preliminary EA) has been prepared for the Department of Planning (DoP) on behalf of Shell Refining (Australia) Pty Ltd (Shell) to support a Part 3A Major Projects Application. This Preliminary EA provides a detailed description of the proposed upgrade to the Hydrodesulphurisation (HDS) Unit located at Shell's Clyde Refinery Rosehill, NSW and identifies the potential environmental impacts associated with the proposed upgrade.

The Preliminary EA has been prepared in accordance with Part 3A of the *Environmental Planning and Assessment Act 1979* (the EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation) to assist the DoP in its determination as to whether the proposed upgrade is a Major Project and its subsequent preparation of tailored Environmental Assessment Requirements (EARs).

1.1 Background

The Hydrodesulphurisation Unit (HDS Unit) within the Clyde Refinery was commissioned in 1962. The function of the HDS Unit is to remove sulphur from diesel fuel.

Previously the Australian Federal Government, through its *Measures for a Better Environment* (1997) and other initiatives, announced policy intentions to reduce sulphur in diesel standards from a national 5000 parts per million (ppm) to the equivalent of *Euro 4* Standard of 50 ppm. This resulted in the Federal Government's *Fuel Quality Standards Act* 2000 (FQS Act). As a transitional measure, the intermediate standard of 500 ppm was introduced from the end of 2002.

In September 2001 a Statement of Environmental Effects entitled "Proposed Upgrade of Hydrodesulpherisation (HDS) Plant at Clyde Refinery" (HDS Plant Upgrade, 2001) was prepared by CH2M HILL Australia Pty Ltd (CH2M HILL) on behalf of Shell to upgrade the HDS Unit. Identified as State Significant Development, the upgrade was approved by the Minister for Planning and completed in 2002.

In 2006, the standard of 500 ppm was again reduced to 50 ppm, with an additional reduction in the standard to 10 ppm scheduled for 2009. The proposed HDS Unit upgrade is Shell's response to comply with the Federal Government's FQS Act.

1.2 Location

Clyde Refinery is located at Camellia, Sydney (see **Figure 1.1)**. The site is described as Lot 1 DP 109739, Lot 2 DP 224288, Lot 101 DP 809340, Lot 398 DP 41324 and Lot 1 DP 383675 (PCC, Section 149 Planning Certificate, November 2003). The HDS Unit is located within Lot 1 DP 383675. **Figure 1-2** shows an aerial view of the Refinery.

The Refinery site has a road frontage to Grand Avenue, Durham Street, Devon Street and Colquhoun Street and is bounded to the north-east and south-east by the Parramatta River and Duck River respectively. The HDS Unit is located on the southern half of the Refinery south of Devon Street (see **Figure 2-1)**.

1.3 Outline of the Proposal

The main objective of this Proposal is to comply with the Federal Government's FQS Act while maintaining the diesel production capacity of the HDS Unit. The upgraded HDS Unit is expected to achieve similar production rates while producing diesel with only 10ppm of sulphur content in compliance with the federal legislation with adequate light cycle oil processing capabilities.

New equipment would be installed as part of the Proposal to facilitate achieving the stated objectives of the Proposal. This new equipment would include:

- new additional reactor approximately 1.5 times the size of the existing reactor;
- catalyst fill;
- quench oil system/pump;
- flare header (if necessary);
- feed and product analysers;
- new spare Fresh Gas Compressor;
- new spare feed pump; and
- reactor cool down facilities.

In addition, the Proposal would involve the demolition of some existing, redundant components of the HDS Unit, including:

- one old reactor (idle since 2002);
- one old furnace stack; (idle since 2002);
- one old furnace (idle since 2002); and
- old reciprocating compressors and associated motors.

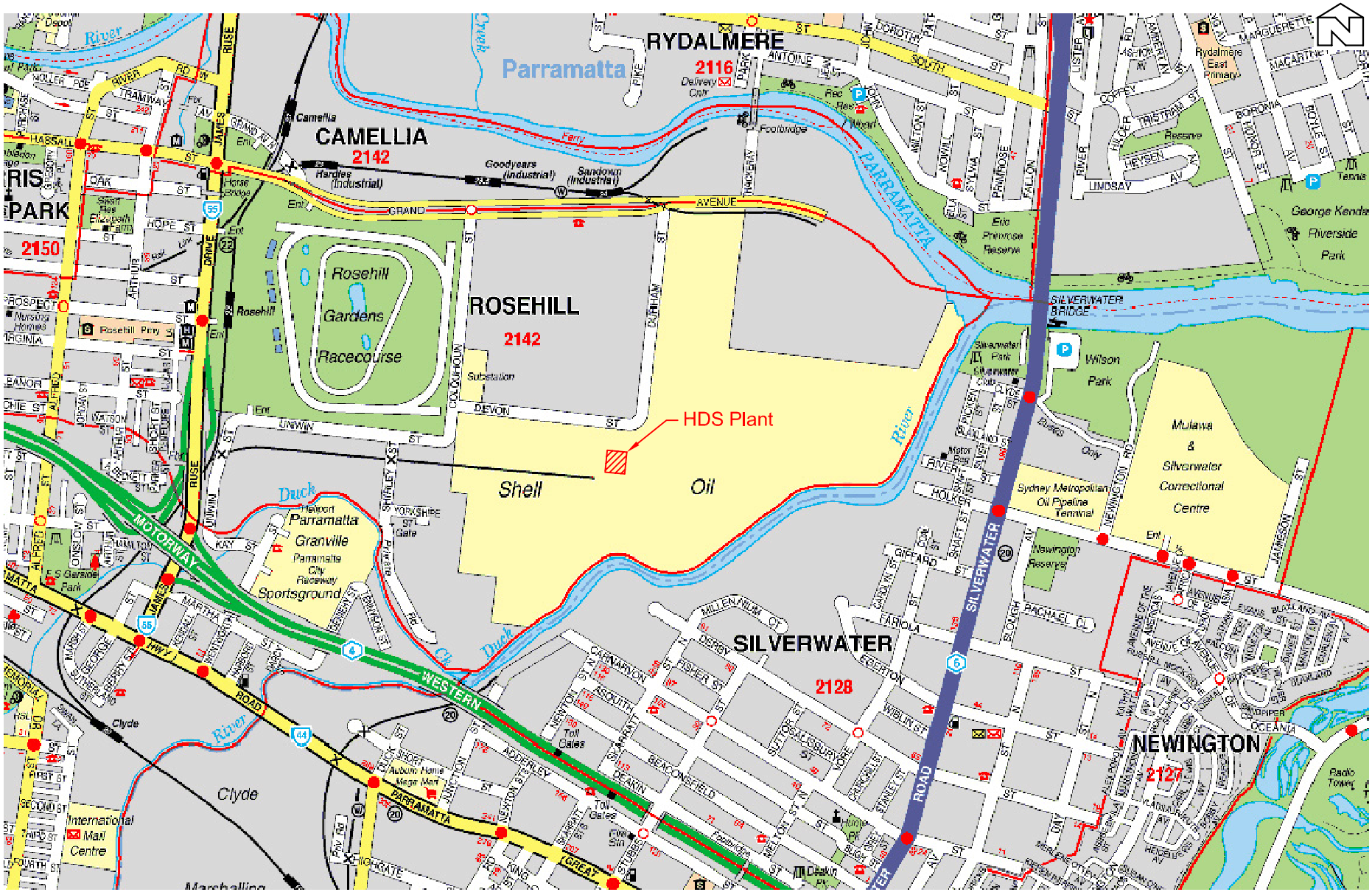

Figure 1.1
Regional Location of Clyde Refinery

Figure 1.2
Aerial Photography of Clyde Refinery

1.4 The Proponent and Land Owner

Shell Refining (Australia) Pty Ltd (Shell) is the land owner and proponent of the proposed HDS Unit upgrade. Shell is a subsidiary of Shell Australia Limited which is part of the Royal Dutch/Shell Group of Companies. In Australia, Shell is engaged in the oil, gas, chemicals and other selected businesses.

Clyde Refinery is the longest operating oil refinery in Australia. Due to substantial investment over the years, the Refinery is among the most complex of the seven refineries currently operating in the country. Built initially in the early 1920s, and purchased by Shell in 1928, Clyde Refinery supplies approximately 40% of Sydney's petroleum requirements and about 50% of NSW's needs. Clyde Refinery directly employs approximately 270 employees and 100 contractors and contributes AUD$60 million into the Sydney economy each year.

1.5 Proposal Objectives

- The objectives of the Proposal are:
- To install new equipment that is more reliable to maintain the diesel production capacity of the Clyde Refinery;
- To reduce the sulphur content in diesel produced from 50ppm to 10ppm in accordance with the Federal Government's FQS Act;
- To ensure the continuous supply of diesel to meet the demand of consumers within the Sydney market; and
- To strengthen the long term viability of the Clyde Refinery.

2 Site and Surrounds

2.1 Site Description

In 1908 the entire site was owned by the Commonwealth Oil Corporation. In 1913 John Fell & Co (a shale oil company) acquired the assets of the Commonwealth Oil Corporation. Shell acquired the site from John Fell & Co. in 1928 and the land use has remained the same to this day.

The HDS Unit is located south of Devon Street east of tank farm N and west of the Fluidised Catalytic Cracking Unit (FCCU).

2.2 Existing Facilities and Operations

2.2.1 General Description of Shell Clyde Refinery

The Clyde Refinery produces approximately 1.7 million tonnes or 2.3 billion litres of gasoline grades per annum. This equates to a supply of approximately 50% of petroleum products in NSW and has a production of all petroleum grades of about 5,000ML per annum. The throughput of approximately 14ML per day comprises of the products as outlined in **Table 2.1**.

Table 2.1 Breakdown of Daily Throughput of Approximately 14ML/day

Product	Percentage (%)	ML/day
Petrol	45	6.30
Diesel	25	3.50
Jet fuel	23	3.22
Fuel oil	4	0.56
LPG (2/3 is feedstock to Basell Polypropylene Plant located on the refinery site)	3	0.42
TOTAL	**100%**	**14ML/day**

About 90 ships transport between 55,000 to 100,000 tonnes of crude oil each year for the Refinery. Crude oil, fuel oil and other feedstock and products are offloaded into tanks at the Gore Bay Terminal. An underground pipeline carries products in both directions between the Clyde Refinery and Gore Bay Terminal.

Virtually all of the Refinery output is distributed to NSW customers, approximately forty percent is distributed to BP and Mobil. Products are distributed by road tanker, by rail to inland NSW, by pipeline to Newcastle and the Sydney Airport (Clyde's largest single consumer), by pipeline to Gore Bay, and by ship from Gore Bay to coastal ports.

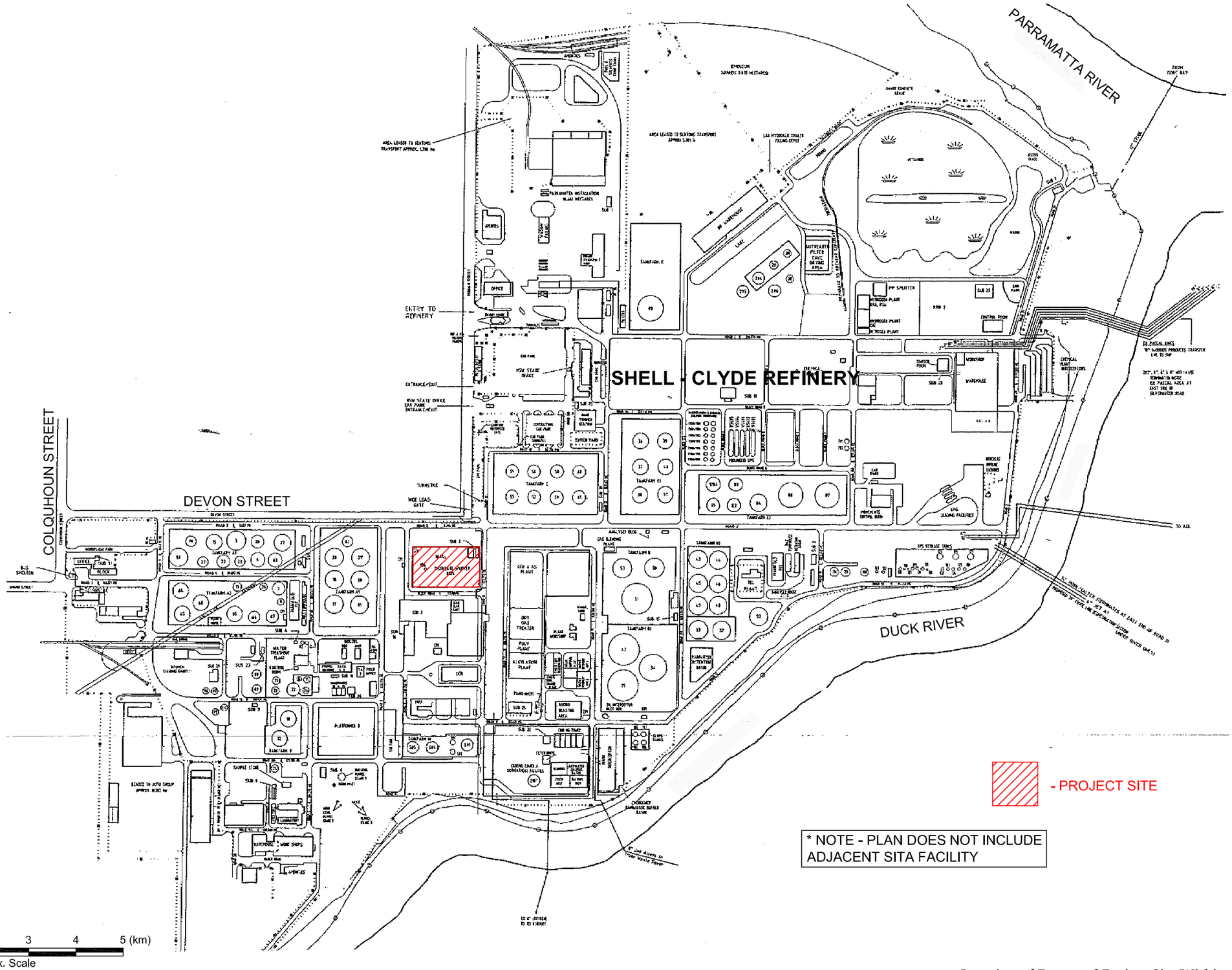

Figure 2.1
Location of Proposed Project Site Within Clyde Refinery

In addition, the Refinery receives technical support from Shell Global Solutions International, who provide 'front end designs' of Refinery equipment, as well as undertaking fire safety review, technical support, process safety reviews and design reviews.

The Clyde Refinery is managed in accordance with the local legal requirements, Shell global standards as well as the Refinery's Management System (MS) which has been developed to comply with:-

- ISO 9001. Quality Management – externally certified;
- ISO14001. Environmental Management – externally certified;
- AS 4801. Occupational Health and Safety Management System – externally certified; and
- Worksafe National Standard for Control of Major Hazard Facilities.

2.2.2 General Oil Refinery Operations and Systems

Clyde Refinery is a semi-complex refinery with major process units consisting of:

- one crude distiller;
- hydrotreater;
- HDS Unit;
- a platformer and benzene reduction unit;
- high vacuum distillation unit;
- fluidised catalytic cracking unit;
- Alkylation plant;
- sulphur recovery plant;
- numerous treating units; and
- extensive utilities complex.

Crude oil is received by Clyde Refinery from the Gore Bay Terminal via a 16km 300mm diameter underground pipeline. Clyde Refinery's primary processing capacity is approximately four million tonnes of crude oil each year. From this, approximately 2,300ML of motor gasoline, 1,100ML of aviation fuels and kerosene, and 1,300ML of diesel are produced.

Product is dispatched to the market through the Parramatta Distribution Terminal on the Refinery site by road tankers and rail, and by pipeline connection to Sydney Airport, Newcastle oil company's distribution terminals, and an oil company at Silverwater. Clyde Refinery also provides propylene feedstock and other services to Basell's Polypropylene Plant which is located next to the Refinery site.

There are 94 storage tanks in operation at the Refinery. The current storage of petroleum products at Clyde Refinery is approximately 670,000m^3, of which approximately 88,000m^3 is unleaded petrol.

2.2.3 Operating Hours and Staffing

Clyde Refinery operates 24 hours per day with a rotating 12 hour shift. The support functions operate five days per week from 7:30am to 4:00pm. Each operations shift is made up of twenty-two employees. This includes a shift controller and a fully trained emergency services officer. The security centre is manned twenty-four hours per day. In total, the Refinery employs 300 permanent employees and over 100 contractor employees.

2.3 Overview of the Existing HDS Unit

2.3.1 Site Layout and Access

The HDS Unit and ancillary components are shown in **Figure 2-2**.

Normal road access to the site is only by the Security Gate, Gate 5 Durham Street, Rosehill. Pedestrian access to the Refinery is possible via security turnstiles for safety inducted employees and contractors. Access to the HDS Unit requires a clearance from operational staff and completion of a safety induction.

2.3.2 Description of Existing HDS Process

Hydrodesulphurisation is the process of removing sulphur from diesel oil. Diesel oil is combined with hydrogen at elevated pressures (30-80 times atmospheric pressure) and temperature (300 to 380^{o}C) which is then passed over a solid catalyst. A chemical reaction between the hydrogen and sulphur atoms takes place allowing the sulphur to be removed as hydrogen sulphide from the fuel. Hydrogen sulphide-rich gas and the liquid product streams are subject to further treatment to concentrate the hydrogen sulphide, which is then substantially recovered to liquid sulphur in special plants called Sulphur Recovery Units (SRUs).

The HDS process consists of the following components:

- A feed pump to deliver liquid from tankage into the high pressure reaction system, and a compressor to boost the hydrogen pressure.
- A large battery of eight heat exchangers which efficiently recover heat from the reactor products back into the combined feed, reducing the load on the feed heater;
- A gas fired furnace with alloy tubes within which the liquid-gas feed mixture is warmed to reaction temperature is known as the feed heater.

Figure 2.2
Existing HDS Plant

- The reactor, within which the chemical processes described above occur, in Clyde's case at about 50 atmospheres of pressure and 360 degrees Celsius.
- A separation system wherein the desulphurised product and the hydrogen sulphide and hydrogen rich gases are separated, with the latter being partially bled away to further processing in the amine treaters but the bulk of the gas is recycled to economise on hydrogen demand.
- A product 'workup' section where steam stripping and vacuum drying are employed to remove residual light materials, dissolved hydrogen sulphide, and water from the product, which is then saleable diesel fuel.

A diagram of the process and its environmental aspects is shown below in **Figure 2-3**.

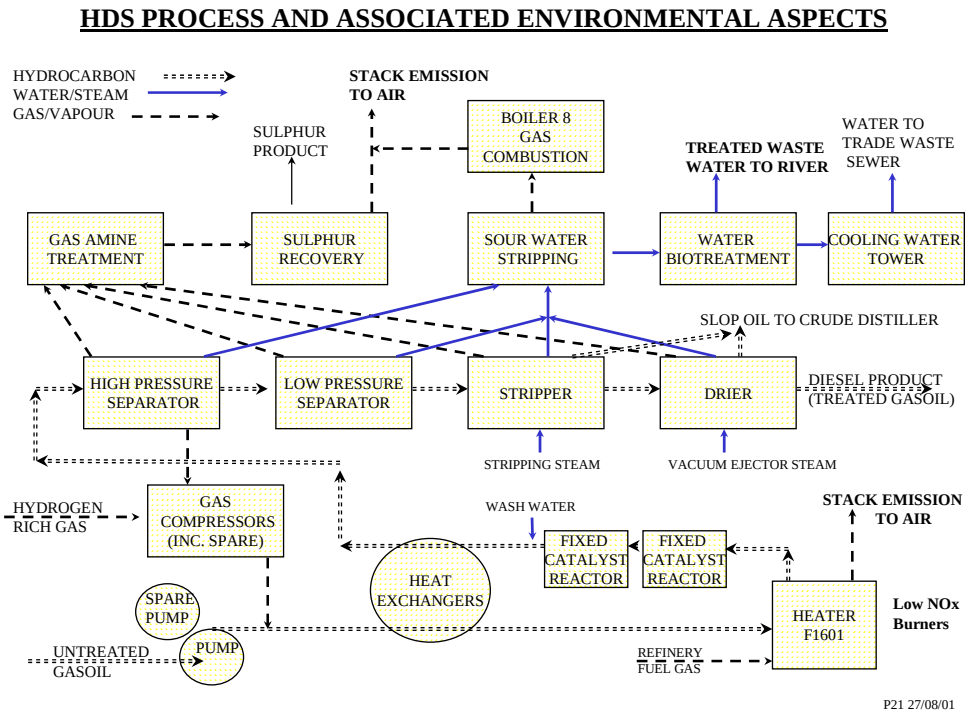

Figure 2-3 Flow diagram of the HDS Process and Environmental Aspects

The gas and vapour stream is directed to the amine treaters where H_2S containing gas is contacted with an amine liquid solution which preferentially absorbs the H_2S. The hydrogen sulphide gas is then recovered and sent to the sulphur recovery unit. The hydrogen sulphide is then converted to elemental sulphur. The trace concentrations of hydrogen sulphide gas that remain are passed over a catalyst to ensure conversion to sulphur dioxide before being directed into the FCCU stack.

The water streams from the process units are sent to the sour water strippers where the ammonia and sulphide are stripped by the use of steam. The resulting stripped gas is sent to a heat recovery boiler where the gases are burnt and the heat generated is used to produce steam. The residual gases combine with the gases from the SRU and exit via the FCCU stack where sulphur dioxide emissions are measured on a

continuous basis. The remaining ammonia is converted in the Refinery's water treatment plant.

2.4 Inputs and Outputs at Existing HDS Unit

2.4.1 Inputs

Inputs into the existing system include:

- untreated gas oil;
- cycle oil;
- hydrogen rich gas;
- steam;
- wash water;
- fuel gas;
- electricity;
- diesel fuel additives; and
- fixed bed hydrotreating catalyst.

2.4.2 Outputs

The main output of the HDS Unit is treated diesel fuel. Emissions to air occur from the stack associated with the existing heater. The oxides of nitrogen emissions represent less than 1% of the site emissions. The removed sulphur in the form of hydrogen sulphide gas is sent to the SRUs for recovery or alternatively, leaves the plant via the refinery fuel gas system. The inputs of wash water leave the process as sour water and are directed to the sour water strippers. The catalyst ($90m^3$) is removed every two years and sent for regeneration and recycling. The new reactor will have $240m^3$ of catalyst that will be removed every 1.5 years and sent for regeneration and recycling.

3 Description of the Proposal

3.1 Overview

The Proposal seeks to upgrade the HDS Unit to reduce the sulphur content in diesel produced from 50ppm to 10ppm. As only the HDS Unit is impacted by this Proposal, this document focuses on this specific unit within the Refinery, as other areas of the Refinery are unaffected by these modifications.

The Proposal seeks predominantly to modify the existing HDS Unit to achieve the required 10 ppm of sulphur in diesel product quality while maintaining current capacity and increasing the Unit's reliability and product quality control. Given the importance of this Unit in meeting the legislative requirements regarding concentrations of sulphur in diesel products during the production of diesel for the Sydney market, this Proposal would enable the on going viability for the site and its approximate 350 employees. The main scope of the Proposal is expected to be completed by Q4 2008, with final activities associated with sparing of equipment completed by Q2 2009 subject to approval, with a capital investment value of approximately $35 million.

The operation of the existing HDS Unit will remain essentially unchanged as the proposed upgrade primarily enlarges the existing catalyst volume to achieve the more stringent product quality specification. Slightly higher reactor operating temperatures are also envisaged (which increases fuel consumption and hence stack emissions), and the system inventory increases (slightly increasing the associated process hazard, and the quantity of catalyst employed).

3.2 Timing and Staging

The timing of the Proposal is outlined as follows:

- Demolition works to commence in Q4 2007;
- Pre-construction works commence Q1 2008;
- Startup of new reactor system to commence in Q4 2008; and
- Startup of spare equipment, advanced controllers, analyzers to be completed by Q2 2009.

3.3 Scope of the Proposal

The HDS Unit upgrade would involve the following:

- Installation of new (additional) HDS Reactor;
- Installation of new (spare) fresh/recycle gas compressor for improved reliability, with some piping changes to allow optimization of the hydrogen system. This spare compressor would normally be in shut down mode;

- Modification to the system used for blending kerosene into diesel, to avoid contamination of diesel with higher sulphur imported kerosene;
- Installation of new product quality analysers and implementation of advanced control system to enable the tight product quality requirements to be met;
- Modifications to existing piping, instrumentation and safeguarding to accommodate previously stated changes; and
- Demolition of existing redundant equipment to make space for the new reactor and compressor.

3.4 Construction Phase

Construction activities would include the following scope of works:

- Demolition of equipment using qualified contractors;
- On site works to prepare foundations, and where practical, provide "tie-in" points for new process equipment;
- Off site works (at equipment fabricators and/or contractors) to construct the new reactor, piping, catalyst, pumps, compressors and other instrumentation with an intent to maximise the amount of off site pre-fabrication;
- Transportation of reactor and other equipment to site (via truck or by barge), and installation of this onto its foundations;
- Connection of new reactor section equipment to the existing process at the "tie in" points; and
- Final connection of spare equipment and advanced control and analyses.

4 Proposal Need and Alternatives

4.1 Need for the Proposal

At present the HDS Unit is designed to produce diesel that has a maximum concentration of 50 ppm of sulphur. To meet the 10 ppm sulphur in diesel specification that is to come into force by 2009, an upgrade of the current plant is needed. This upgrade would enable the HDS Unit to produce diesel in compliance with the Federal Government's FQS Act which requires a reduction of 50ppm to 10 ppm of sulphur in diesel produced. In addition, the modification of the HDS Unit would maintain the current good reliability and product quality control, which would otherwise be expected to reduce with the change to 10 ppm.

4.2 Benefits of the Proposal

The upgrade of the current HDS Unit is expected to result in the following benefits:

- continued and reliable operation of the HDS Unit;
- maintaining the existing volume of petrol production and supply to the Sydney and NSW market;
- more reliable design reducing the amount of downtime due to maintenance and/or repairs;
- simple integration of the proposed changes into the existing unit;
- enable the on going viability for the site and its approximately 350 employees;
- improved capability to remove a greater concentration of sulphur from diesel products leading to reduced sulphur air emissions; and
- low emission diesel fuel serves as a platform enabling advanced emission control technologies in diesel engines, which are expected to lead to reductions in particulate, volatile organics, Sox and NOx exhaust emissions.

4.3 Alternatives

4.3.1 "Do nothing" Option

An alternative to this Proposal is the "do nothing" option which involves keeping the existing HDS Unit. The consequence of this option is either:

- a decrease in production of diesel that is compliant with 10 ppm of sulphur; or
- the inability to meet 10ppm S in product while maintaining existing levels of diesel production, resulting in export of all Clyde diesel at 50 ppm.

Either option under the 'do nothing' alternative will reduce the local supply of diesel fuel in NSW.

4.3.2 Alterntaive Design Options

Consideration was given to the following:

- Complete new high pressure HD, optimized to make 10 ppm S diesel, replacing the existing 50 ppm S unit;
- Retain existing 50 ppm S diesel HDS Unit, but operate it at a reduced throughput at 10 ppm S in product. Build a smaller capacity 10 ppm S diesel HDS Unit to process the worst feedstock components.

The "do nothing" and alternate design options are more expensive than the proposed revamp, and offer no clear environmental benefits (for example, higher pressure unit will require less catalyst, and probably less fuel gas firing, but will have higher pressure inventory – being a process hazard and consume more energy in compression.

5 Planning and Legislative Requirements

5.1 The Approvals Process

The EP&A Act and the EP&A Regulations provide the framework for the assessment of the environmental impact of development projects in NSW. A summary of the approvals process for a Part 3A Major Project is described below.

5.1.1 Planning Approval

The Proposal triggers the provisions of a 'Major Project' under *State Environmental Planning Policy (Major Project) 2005* (SEPP 2005). The capital investment value would exceed $30 million and the Proposal is for the purpose of "petroleum related works (including processing plants)" within Clause 6, Schedule 1 of SEPP 2005. A Preliminary Application and Preliminary EA must be sent to the Minister for Planning to make a determination. If the Minister declares that the Proposal is a 'Major Project', the DoP will issue Environmental Assessment Requirements (EARs) and the approval process will be undertaken in accordance with Part 3A of the EP&A Act. If the Minister for Planning deems the Proposal to be a 'Major Project', the approval of the Minister must be obtained.

5.1.2 Licensing and Permits

Under section 55 of the POEO Act, Shell is the holder of the existing Environmental Protection Licence (No. 570) (EPL) for a Scheduled Activity (Premises Based). Details of this licence are discussed below.

Shell Refining Environment Protection License

Under section 55 of the POEO Act, Shell Refining is the licensee of EPL No. 570 for Scheduled Activities (Premises). This licence is issued by DEC and controls activities undertaken by Shell at the Clyde Refinery.

Several conditions of the license are relevant to the Proposal. These conditions and their interaction with the Proposal are outlined below.

L3 Concentration Limits – HDS stack (discharge point No.15) must not exceed the prescribed air pollutant limits as follows:

Table 5.1 Environmental Protection Licence Concentration Limits

Pollutant	Units of Measure	100%ile concentration limit
Nitrogen Oxide	mg/m^3	200
Hydrogen Sulfide	mg/m^3	5
Total Solid Particles	mg/m^3	100
Sulfuric Acid mist and sulphur trioxide (as SO_3)	mg/m^3	100

L5 Waste – Permits catalyst waste and waste water, hydrocarbons/water mixtures or emulsions to be generated and/or stored at the premises.

L5.8 Waste - The quantity of prescribed waste generated and/or stored on the premises must not exceed 50,000 tonnes at any one time.

L5.9 Waste – The quantity of prescribed wastes generated, stored, treated, or processed at the premises must not exceed 60,000 tonnes per year.

L6 Noise Limits – There are no prescribed noise limits in the EPL.

O1 Operating Conditions

O1.1 Activities must be carried out in a competent manner.

O2 Maintenance of Plant and Equipment

O2.1 All plant and equipment must be maintained in a proper and efficient condition and operated in a proper and efficient manner.

O4 Processes and Management

O4.1 All waste generated, stored or treated, disposed or reprocesses at the premises is to be assessed and classified in accordance with the EPA Environmental Guidelines.

M2 Requirement to Monitor Concentration of Pollutants Discharged

M2.1 The HDS stack must be monitored for the prescribed pollutants as outlined in the EPL.

M4 Recording of Pollution Complaints

M4.1 All complaints must be recorded in relation to pollution arising from any activity to which the license applies.

E1.1 (b) By 1 December 2007, testing for the HDS stack discharge point must be completed.

E4 Special Condition - An occupational acoustical report was submitted to the EPA in accordance with condition E4. The survey assessed operator noise exposure levels, identified noise sources and determined hearing protection zones as well as providing general advice for noise control and hearing protection necessary to comply with WorkCover Regulations.

5.2 NSW Planning Instruments

Environmental and planning decision making in NSW is made with respect to state, regional and local Environmental Planning Instruments (EPIs) which fall under Part 3 of the EP&A Act, including:

- State Environmental Planning Policies (SEPPs);

- Regional Environmental Plans (REPs); and
- Local Environmental Plans (LEPs).

The following sections provide an assessment of EPIs that may apply or be related to the proposed development.

5.2.1 State Environment Planning Policies

There are four SEPPs that apply to the Proposal:

- SEPP (Major Projects) 2005;
- SEPP 33 – Hazardous and Offensive Development;
- SEPP 55 – Remediation of Land; and
- SEPP 56 - Sydney Harbour Foreshores and Tributaries.

These SEPPs are discussed in detail below.

SEPP (Major Projects) 2005

State Environmental Planning Policy (Major Projects) 2005 (SEPP 2005) classifies certain development of industrial infrastructure as a "Major Project". If a proponent believes the provisions of the SEPP are triggered, a Primary Application and Preliminary Assessment must be sent to the Minister for Planning. If the Minister is in agreement that the Proposal falls within the SEPP, the DoP will issue EAR's and the development assessment and approval process will be undertaken in accordance with Part 3A of the EP&A Act. This requires the approval of the Minister for Planning. This SEPP ensures that only major projects suitably located, constructed and operated safely will proceed.

Under Clause 6 Schedule 1 of SEPP 2005, a proposed development would be deemed a Major Project under Part 3A of the EP&A Act if:

> *Development for the purpose of petroleum related works (including processing plants) that:*
>
> *(a) is ancillary to or an extension of another Part 3A project, or*
>
> *(b) has a capital investment value of more than $30 million or employs 100 or more people.*

As the Proposal is a development for the purpose of petroleum related works and has an estimated cost of AU$34.5 million (US$27 million), greater than AU$30 million, SEPP 2005 applies and the development and approval process must follow Part 3A of the EP&A Act.

SEPP 33 – Hazardous and Offensive Development

This SEPP links the permissibility of an industrial development project to its safety and environmental performance. Certain activities may involve handling, storing or

processing a range of materials, which, in the absence of controls, may create risk outside of operational borders to people, property or the environment. Such activities would be defined by SEPP 33 as a 'potentially hazardous industry' or 'potentially offensive industry'. SEPP 33 applies to any industrial development projects which fall within these definitions.

Under clause 3, a development is deemed part of a potentially hazardous industry if it satisfies the definition:

> "*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 minimize 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.*"

The Department of Urban Affairs and Planning (DUAP) (1997) guideline "Applying SEPP 33" provides a risk screening procedure to help determine if a proposed development should fall within the SEPP. If, under this screening test SEPP 33 is triggered, clause 12 of SEPP 33 requires that any project to carry out a potentially hazardous development must be supported by a Preliminary Hazard Analysis (PHA).

As the Proposal falls within the definition of a "potentially hazardous industry", a PHA would be undertaken in accordance with the relevant DUAP (now Department of Planning) risk guidelines.

SEPP 55 – Remediation of Land

The objective of SEPP 55 is to provide for a coordinated state wide planning approach to the remediation of contaminated land. SEPP 55 aims to promote the remediation of contaminated land with the objective of reducing the risk of harm to human health or other aspects of the environment.

Clause 7 of SEPP 55 imposes an obligation on the consent authority to have regard to certain matters before granting development consent. These matters include:

- whether the land is contaminated;
- whether the land is, or will be, suitable for the purpose for which development is to be carried out; and
- if remediation is required for the land to be suitable for the proposed purpose, whether the land will be remediated before the land is used for that purpose.

This obligation would apply to the consent authority in deciding whether to grant consent to the Proposal. SEPP 55 also imposes obligations to carry out any remediation work in accordance with relevant guidelines and to notify the DoP of certain matters in relation to any remediation work. There is expected to be very minimal soil disturbance as a result of the proposed upgrade. In addition, soil samples were analysed and a report entitled, 'Soil Quality Assessment Report Clyde HDS (U-1650) Revamp to 3000 TPD' (Soil Quality Assessment) was completed in September 2001 as part of the previous 2002 HDS Unit upgrade. It concluded that,

> "*given that there is unlikely to be any contamination above the NEPM HIL (F) – Commercial/Industrial [from petroleum hydrocarbons and metals] in the excavated soil, no remedial action plan (RAP) is required, and any soil not used in the construction can remain on site*".

5.2.2 Regional Environment Plans

Sydney Regional Environment Plan No.22 – Parramatta River

Sydney REP No. 22 provides a framework for future planning, development and management of open space and recreation areas in the Parramatta River region. The Plan applies to waterways and foreshores from Balmain and Hunters Hill west to Parramatta, including Clyde Refinery. Sydney REP No. 22 planning aims that are relevant to the Proposal are:

(a) to establish a framework which encourages a consistent and co-ordinated approach to the planning, development and management of the waterway, and foreshore open space and facilities of the Parramatta River;

(b) to establish an efficient and effective development control system for the Parramatta River and its foreshores;

(e) to recognise, protect and enhance the natural, scenic, environmental, cultural and heritage qualities of the land to which this plan applies in future planning and development control;

(h) to identify, conserve and enhance the environmental heritage of the region; and

(i) to ensure that consistent guidelines are applied to the assessment of development of the Parramatta River and its foreshores.

Matters relevant to the Proposal for consideration by the consent authority in determining development applications include;

(a) the appearance of the development from the waterway and the foreshores;

(b) whether the development will cause pollution or saltation of the waterway to an extent that would jeopardise any existing or potential uses of the waterway;

(c) whether the development will have an adverse effect on wetlands or flora or fauna habitats;

(d) the noise likely to be generated by the development and any adverse effect that any such noise would have on existing uses of the waterway or nearby land;

(e) whether the development will have an adverse effect on drainage patterns or cause shoreline erosion;

(m) any other relevant plan of management, urban design or other development control guidelines that apply to Parramatta River and its foreshores and which has been notified to the consent authority by a public authority; and

(n) the effects of the development on the heritage significance of a heritage item, its site, its vicinity or on a conservation area.

The Proposal is consistent with the aims of the Parramatta River REP No. 22.

Sydney Regional Environment Plan No.28 – Parramatta

Sydney REP No. 28 – Parramatta identifies eight precincts within the Parramatta Primary Centre. The Shell Refinery falls within the Camellia Precinct.

The following planning aims of the Sydney REP No. 28 for the Camellia Precinct apply to this Proposal:

(a) to protect and support the integrity of the Camellia Precinct as one of Sydney's significant industrial hubs,

(c) to promote industrial development in the Camellia Precinct that demonstrates innovation and environmental management best practice,

(f) to ensure that development along the foreshore is of a scale and character in keeping with its foreshore location and that the unique visual and ecological qualities of the waterways and foreshore are protected and enhanced,

(k) to achieve environmental management best practice that protects and promotes the natural assets of Camellia,

(l) to improve environmental performance that minimises energy and resource use as well as off-site air quality, noise, odour, dust, water, soil and contamination impacts,

(m) to protect and enhance local and regional biodiversity, particularly maximising the extent and integrity of aquatic and natural land areas along the Parramatta River, Duck River, Duck Creek and A'Becketts Creek corridors.

Sydney REP No. 28 notes that these aims must be considered by the consent authority in assessing development applications. The Proposal would be consistent with the aims of the SREP No. 28 for the following reasons:

- it is an industrial land use and therefore consistent with the industrial nature of the precinct;
- the scale and character are in keeping with the foreshore location;

- the Proposal would not adversely affect the natural assets of Camellia, such as surface water quality;
- the Proposal is not expected to affect local and regional biodiversity of aquatic and natural land areas along the Parramatta River, Duck River, or Duck Creek corridors.

Under Part 11 of SREP No. 28, the following other provisions have the potential to apply to the Proposal:

- **clause 76** - Development on flood liable land. The risk of flooding is negligible as the Proposal is replacing components already in existence. Most of the site is above the 1 in 100 years flood area and the development is expected to have a minimal impact on stormwater run off as most of the existing study area is already hard surfaced.
- **clause 77** – Excavation and filling of land. The upgrade to the HDS Unit involves minor excavation for new foundations. The Soil Quality Assessment completed on site as part of the 2002 HDS Unit upgrade concluded that "*given that there is unlikely to be any contamination above the NEPM HIL (F) – Commercial/Industrial [from petroleum hydrocarbons and metals] in the excavated soil, no remedial action plan (RAP) is required, and any soil not used in the construction can remain on site*".
- **clause 83** – Acid Sulphate Soils. The Proposal would involve only minor excavation and is unlikely to disturb any acid sulphate soils. In addition, no new footings will be required.

Sydney REP (Sydney Harbour Catchment) 2005

This plan has the following aims with respect to the Sydney Harbour Catchment:

(a) to ensure that the catchment, foreshores, waterways and islands of Sydney Harbour are recognised, protected, enhanced and maintained:

(i) as an outstanding natural asset, and

(ii) as a public asset of national and heritage significance, for existing and future generations,

(b) to ensure a healthy, sustainable environment on land and water,

(c) to achieve a high quality and ecologically sustainable urban environment,

(d) to ensure a prosperous working harbour and an effective transport corridor,

(e) to encourage a culturally rich and vibrant place for people,

(f) to ensure accessibility to and along Sydney Harbour and its foreshores,

(g) to ensure the protection, maintenance and rehabilitation of watercourses, wetlands, riparian lands, remnant vegetation and ecological connectivity,

(h) to provide a consolidated, simplified and updated legislative framework for future planning.

The Proposal would not impact on Parramatta River or the Parramatta River foreshore unless there is a need to bring in equipment by barge. As part of the Proposal, an old concrete reactor is to be demolished and replaced by a smaller clad reactor. In addition, the HDS Unit is embedded well within the Shell Refinery boundary and therefore the Proposal would have a minimal visual impact from the foreshore and would not change the nature of the industrial landscape.

In addition, operation of the HDS Unit is not expected to affect the water quality of Parramatta River.

5.2.3 Local Planning Instruments

Parramatta Local Environmental Plan (LEP) 2001

Parramatta Local Environment Plan s4(2) states that it does not apply to "land within the Camellia Precinct or Rydalmere Precinct within the meaning of Sydney Regional Environmental Plan No 28— Parramatta" As the HDS Unit is situated within the Camellia Precinct, the Parramatta Local Environment Plan does not apply.

5.2.4 Development Control Plan

Parramatta Development Control Plan 2005

Parramatta Development Control Plan 2005 does not apply to the HDS Unit as it is zoned under Sydney Regional Environmental Plan No. 28 - Parramatta (SREP No. 28).

5.3 State Planning Legislation

5.3.1 Protection of the Environment Operations Act 1997

Under section 55 of the *Protection of the Environment Operations Act* 1997 (the *POEO Act*), Clyde Refinery is the holder of the existing Environmental Protection Licence (No. 570, file number 501034) (EPL). This licence is issued by DECC (the fomer DEC) and controls activities undertaken by Shell at the Refinery.

5.3.2 Protection of the Environment Operations (Clean Air) Regulations 2002

The Protection of the Environment Operations (Clean Air) Regulations prescribes emission concentration limits which apply to "Petroleum Refining" industries. Under the regulation, as the Clyde Refinery will be in operation post September 2005, Group 6 emission concentration limits apply.

5.4 Commonwealth Legislation

5.4.1 Fuel Quality Standards Act 2000

The *Fuel Quality Standards Act* 2000 (FQS Act) regulates the quality of fuel supplied in Australia in order to reduce the level of pollutants and emissions arising from the use

of fuel that may cause environmental and health problems. It facilitates the adoption of better engine technology and emission control technology and allows for the more effective operation of engines. It also ensures that, where appropriate, information about fuel is provided when the fuel is supplied.

In accordance with the Fuel Standard Determinations made under the FQS Act, in 2002 Shell upgraded its HDS Unit to comply with and meet the required 50ppm of sulphur in diesel. Shell now seeks to upgrade its HDS Unit to meet and comply with the required 10ppm of sulphur in diesel by the 1st January 2009.

5.4.2 Energy Efficiency Opportunity Act 2006

The *Energy Efficiency Opportunity Act 2006* establishes an Energy Efficiency Opportunities program which requires corporations who are large energy users to assess the potential to improve their energy efficiency and report publicly on their assessment.

Corporations who exceed the threshold of 0.5 petajoules per year must apply to be placed on the Register of Corporations for the Energy Efficiency Opportunities Scheme. Registered corporations under Part 4 will then have 18 months to submit an assessment plan which, valid for 5 years, will assess areas for possible improvement.

Shell is aware of the provisions of this Act which commence on the 1st July 2006 and will abide by any legal requirements that may arise.

5.4.3 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) commenced operation on 16 July 2000. The EPBC Act requires approval from the Commonwealth Minister for the Environment for certain actions which, have, may have, or are likely to have a significant impact on a matter of national environmental significance (NES). An action that requires this Commonwealth approval is called a "controlled action".

As part of the Preliminary EA process, an assessment of potential impacts on matters of NES was undertaken. Based on the assessment summarised in, it is considered the EPBC Act does not apply to the Proposal.

Table 5.2 EPBC Act Applicability Assessment

Matters of National Environmental Significance	Assessment
Declared World Heritage Areas	There are no World Heritage Properties in the vicinity of the Camellia area. The nearest World Heritage Property is the Greater Blue Mountains area located about 50km west of the site
National heritage places	There are no National heritage places in the vicinity of the proposed development. The nearest National heritage place is First Government House, located in Sydney, approximately 20km west of the area.
Declared Ramsar wetlands	There are no Ramsar wetlands in the vicinity of the proposed development. The nearest Ramsar Wetland is Towra Point Nature Reserve located about 30km east of the area
Listed threatened species and ecological communities Listed migratory species	The Camellia area is characteristically industrial with very little undeveloped land. The Refinery area is mostly covered by operational facilities (ie. buildings, plants, roads, storage areas, etc) and there is only limited landscape vegetation cover in the site. The existing environment in the Refinery and surroundings has been extensively modified for industrial purposes and it is considered that no flora or fauna of significance could reasonably be expected to occur at the site for the proposed development. A number of threatened and migratory species have been identified as potentially occurring in the region. It was concluded that the Proposal would not have any significant impacts on flora and fauna.
Nuclear actions	The Proposal is not a nuclear action.
The environment of Commonwealth marine areas	There are no Commonwealth marine areas or land in the vicinity of the proposed site.

6 Preliminary Environmental Assessment

The objectives of the HDS Unit upgrade are to comply with the Federal Government's FQS Act by reducing the sulphur content in diesel from 50ppm to 10ppm while maintaining existing diesel production capability to meet market demand.

The Clyde HDS Unit was previously upgraded in 2002 in accordance with the Federal Government's FQS Act. The current Proposal aims to

- modify the existing unit to achieve the required 10 ppm diesel product quality by the addition of a new reactor ; and
- Increase the unit reliability and product quality control.

This Preliminary EA has identified a number of environmental impacts which have the potential to be impacted as a result of the proposed HDS Unit upgrade. They are outlined below.

6.1 Key Issues

6.1.1 Air Quality

Potential impacts to air quality as a result of the Proposal are discussed in **Table 6.1**.

Table 6.1 Potential Impacts to Air Quality

Characteristics of Impact	Type of Potential Impact	Size, Scope and Intensity of Potential Impact	Potential Significance of Extent
Air quality impacts (eg dust, smoke, grit, odours, precursors to photochemical smog, fumes, toxic or radioactive gaseous emissions) with economic, health, ecosystem or amenity considerations	More flue gas Leaks /fugitive emissions/ flare.	<5 t/d more fuel over run results in ~ 15 t/d additional CO2, on a total refinery emission of 2465 t/d (so HDS Unit upgrade represents 0.6% additional increase). Potentially 1.7 times flare rate for this process unit, in fire or emergency depressuring case only due to additional reactor inventory (frequency of use is <1 in 10 years). Potential increase in fugitive emissions (mainly H_2) from this unit due to increased flange count.	Low
Greenhouse implications – direct or indirect impacts • direct emissions • use of carbon energy • vegetation clearing	More Flue Gas	<5 t/d more fuel means ~ 15 t/d more CO2 emission, on a total refinery emission of 2465 t/d (so HDS Unit upgrade represents 0.6% additional increase).	Low
Ozone implications consideration bridges	More Flue Gas		Low
Other air impacts	Reduced transport fuel emissions from diesel in NSW	Reduction in diesel S from 50 to 10 ppm for ~ 3000 t/d diesel reduced SO2 emissions by 0.24 t/d. Platform reduces diesel engine particulates, SO_x and NO_x emissions.	Low/Medium but positive/beneficial impact.

	Potential dust / odour/ asbestos emissions from stack demolitions	Controlled by demolition procedures and licensed contractor	Low with controls in place.
	Potential release of asbestos fibres during demolition	All demolition to be undertaken by appropriately qualified, AS1 licensed contractor.	Low with controls in place.

6.1.2 Noise

A number of potential noise impacts were initially assessed as part of this Preliminary EA. Potential noise impacts include:

- An increase in noise and/or vibrations to unacceptable levels for the surrounding communities
- Affects sensitive properties (educational, hospitals, residential, heritage)
- Any other impacts from noise, blasting or vibration

The demolition and construction period would result in a temporary increase in noise and vibration. Due to the study area being embedded well within the Refinery boundary and the temporary nature of the noise impacts, it is not expected to have a significant impact on residential areas.

There is no expected increase in noise level from the unit during normal operation as the main change is associated with the addition of a new static reactor. Though additional rotating equipment will be installed, with the exception of the quench oil pump, the remainders are all spare equipment and hence will not be run while the existing is on line. Therefore, the spared equipment will not add to existing noise levels. The new quench pump is a small low head pump and hence noise contribution is expected to be small. This will be assessed during the next phase of the Environmental Assessment.

6.1.3 Hazard and Risk Assessment

To reduce potential impacts to the environment from the release of hazardous substances during construction and operation phases of the Proposal a Construction Management Plan and Hazard and Operability Study would be undertaken. This assessment would include:

- Identification of potential hazards that may occur as a result of construction and operational activities;
- Any nearby sensitive areas(if identified);
- Any sensitive fauna and flora (if identified);
- An initial risk assessment of activities associated with construction and operation of the HDS Unit that have the potential to impact on any identified sensitive receptors; and
- Document spill response emergency procedures to facilitate appropriate management of any spills or leaks of hazardous substances during construction works or on going operational activities.

In addition, a Preliminary Hazard Analysis would be undertaken in accordance with SEPP 33 to identify any risks to current land uses outside of the Refinery boundary.

6.2 Moderate Issues

Two aspects of the environment are considered to have a moderate level of significance have been identified as part of this Preliminary EA. These issues are presented in the following sections.

6.2.1 Traffic and Transport

A number of potential impacts to traffic and transport were assessed as part of this Preliminary EA. Impacts to traffic and transport included the potential for:

- impacts on existing transportation systems (rail, water, road, air or pedestrian both public and private), altering present patterns of circulation, modal split or movement of people &/or goods;
- encouraging additional traffic (directly or indirectly) during construction and/or operation;
- degradation of infrastructure such as roads, bridges;
- increasing demand for parking (off and on street including in residential areas); and
- Other impacts on transport or traffic.

Transport of new equipment, construction materials and the removal of redundant equipment and building debris would temporarily impact on the local traffic network. A one-off transport of equipment via barge may be required. In addition, traffic movements would increase owing to the presence of construction personnel. As the Refinery is accessed via major roads including James Ruse Drive, Grand Ave and Durham Street, residential streets and sensitive road users would not be impacted.

During operation, transport of fresh/spent catalyst increased approximately 12 trucks per 18 months. This is not expected to impact upon the local road network.

In addition, the number of temporary workers used during the construction phase of the proposed upgrade to the HDS unit is less than that involved with the normal 4-6 year turnarounds where a large temporary workforce is employed.

The initial review of the potential impacts to traffic and transport concluded that significant impacts are unlikely as a result of the proposal works.

6.2.2 Drainage, Flooding, and Water Quality

A number of potential impacts to water quality were assessed as part of this Preliminary EA. Impacts to water quality assessed included the potential for:

- impacts from the use of surface or groundwater;
- impacts from changes to natural waterbodies, wetlands or runoff patterns:

- impacts from changes to flooding or tidal regimes; and
- impacts from change in water quality with economic, health, ecosystem or amenity considerations eg salinity, colour, odour, turbidity, temperature, dissolved oxygen, nutrients, pH factors or pollutants (intentional or unintentional releases of oil, fuels, toxins (including heavy metals and anti-foulants), spoil.

The initial review of the potential impacts to water quality concluded that significant impacts are unlikely as result of the Proposal as most of the work would be undertaken above ground and only a very small footprint of the surface would be affected, comprising of material removed for the footings. Standard mitigative measures would be used during construction to ensure that any contaminated material removed would be handled and disposed of in an appropriate manner.

There may be a need to bring the major components of the HDS Unit by barge from Sydney Harbour along Parramatta River to the Refinery, which could have a greater potential to affect water quality. Nevertheless, no removal of sediments in Parramatta River is expected to be required for the Proposal as this activity was undertaken recently as part of the Mogas improvement Project, in 2005.

The Proposal would not affect the draining patterns of the area, and would not change cause additional flooding impacts.

6.3 Low Issues

6.3.1 Visual and Landscaping Issues

This Proposal includes the demolition and removal of one concrete stack which is to be replaced by a shorter clad reactor. In addition, the HDS Unit is embedded well within the Shell Refinery boundary and therefore the Proposal is expected to have a minimal visual impact from the foreshore and is not expected to change the nature of the industrial landscape.

6.3.2 Socio-Economic Impacts

A number of socio-economic impacts were assessed as part of this Preliminary EA. They included the potential for:

- impacts which result in a change in the demographic structure of the community;
- any environmental impact that may cause substantial change or disruption to the community (loss of neighbour cohesion, access to facilities, links to other communities, community identity or cultural character);
- any impacts which result in some individuals or communities being significantly disadvantaged;
- any impacts on the health, safety, security, privacy or welfare of individuals or communities because of factors such as:

    a) air pollution or odour,

b) noise, vibration, blasting, electromagnetic fields or radiation;

c) release of disease or genetically modified organisms;

d) lighting, overshadowing or visual impacts;

- any impacts that result in a change in the level of demand for community resources (eg facilities, services and labour force);
- any impacts which result in a decrease to net economic welfare;
- any impacts that result in a decrease in the economic stability of the community;
- any impacts which result in a change to the public sector revenue or expenditure base; and
- any other economic impacts.

There are not expected to be any long term changes to the demographic structure of the local community. During the demolition and construction phase, a temporary increase in workers would be required.

Construction noise has the potential to temporarily impact upon the nearest receptors within the Refinery boundary. Appropriate hearing protection would be provided by Shell.

The Proposal would result in air quality improvements including reducing emissions from diesel engines and supporting reductions in SO_x, NO_x, VOCs and particulates.

The Proposal would allow Clyde to continue producing similar quantities of diesel. If the HDS Unit is not upgraded, this would result in the need to import more diesel, export high sulphur diesel which would increase the cost of diesel supply to country areas.

The initial review of the potential socio-economic impacts concluded that significant impacts are unlikely as result of the proposed works.

6.3.3 Waste

The potential impacts of waste were assessed as part of this Preliminary EA during the demolition, construction and operation phase. General construction and demolition waste will be classified and managed according to the *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes* (NSW EPA, 2004). Where possible, consideration of recycling and reuse will be addressed. Catalyst waste generated during the operation phase will be handled and disposed of in accordance with Shell's EPL and the NSW EPA (2004) Guidelines.

Asbestos waste is expected to be generated during demolition of the insulation and redundant stack. This waste will be managed by appropriately qualified AS1 licensed contractors and therefore significant impacts are unlikely as result of the proposed works.

6.3.4 Flora and Fauna

A number of potential impacts to both flora and fauna were assessed as part of this Preliminary EA. Impacts to fauna and flora assessed included the potential for:

- Significant impact on threatened species, populations or ecological communities, or their habitats (as outlined in section 5A of the EP&A Act)
- any displacement or destruction of species of fauna (including animals, birds, frogs, reptiles, insects, fish or crustaceans);
- any reduction of important habitat for fauna;
- any significant barriers to fauna movement; and
- any other impacts.

In addition impacts to flora assessed included the potential for:

- any displacement or destruction of unique species of flora (including trees, shrubs, grasses, herbs or aquatic plants);
- impacts from the clearing or modifying of extensive areas of relatively undisturbed native vegetation or wetlands;
- any reduction of important habitat for native flora; and
- any other impacts.

A search of the National Parks and Wildlife Atlas would be undertaken to determine whether there is any flora or fauna within the vicinity of the proposed works which have the potential to be impacted as a result of the proposed HDS Unit upgrade. In addition, an assessment on the impact on threatened species, populations or ecological communities, or their habitats as outlined in section 5A of the EP&A Act will be further considered.

On completion of an initial review of the potential impacts to both fauna and flora described above it is expected that impacts to fauna and flora are unlikely as result of the proposed works.

6.3.5 Indigenous and Non Indigenous Heritage

A search of the National Parks and Wildlife Register for items of Aboriginal heritage revealed that 26 sites have been recorded within a 5km radius of the study area. The closest site is approximately 2.5km North West of the study area. No impact to indigenous heritage is expected. Therefore this impact is not considered to be a key environmental issue.

Statutory registers including the NSW Heritage Register and Register of the National Estate provided no listing of heritage items on the proposed development site or the Clyde Refinery. The Proposal is not expected to impact on non-indigenous heritage. This impact is not considered to be a key environmental issue.

7 Conclusion

Shell Refining (Australia) Pty Ltd proposes to upgrade the unit located at Shell's Clyde Refinery Rosehill, NSW. The proposed HDS Unit upgrade is Shell's response to the Federal Government's FQS Act in which diesel standards were reduced from a national 5000 parts per million (ppm) to the equivalent of *Euro 4* Standard of 50 ppm. As a transitional measure, the intermediate standard of 500 ppm was introduced from the end of 2002. In 2006, the standard of 500 ppm was again reduced to 50 ppm, with an additional reduction in the standard to 10 ppm scheduled for 2009.

As defined in *State Environmental Planning Policy (Major Projects) 2005,* the proposed upgrade is a "Major Project". This Preliminary EA is to be submitted to the DoP for review and approval from the Minister of Planning as required under Part 3A of the EP&A Act.

On completion of this review, Environmental Assessment Requirements, (EARs) will be issued by the DoP and will be incorporated into the detailed Environmental Assessment (EA) for the Proposal.

This Preliminary EA identifies and describes potential environmental impacts associated with the proposed HDS Unit upgrade. These elements include for both the construction and operation phase:

Table 7.1 Potential Environmental Impacts

Potential Environmental Impact	Issues Rating	Likelihood of impact by the Proposal
Air Quality	Low	Likely
Noise	Low	Likely
Hazards	Low	Likely
Transport and Traffic	Moderate	Likely (construction)
Water Quality	Moderate	Unlikely (depends on construction method)
Fauna and Flora	Low	Unlikely
Socio-economic	Low	Unlikely
Waste	Low	Unlikely
Visual Amenity	Low	Unlikely
Land Use	Low	Unlikely
Indigenous and Non Indigenous Heritage	Low	Unlikely

This Preliminary EA is submitted as a precursor to the preparation of an Environmental Assessment for the proposed HDS Unit upgrade. Once the DoP has issued the EARs they will be incorporated into the Environmental Assessment for the Proposal.

8 References

CH2M HILL Pt Ltd (2001) *Proposed Upgrade of the Hyrdodesulphurization (HDS) Plant at Clyde Refinery - Statement of Environmental Effects.* September 2001.

DIPNR (2005) *Floodplain Development Manual, the management of flood liable land.*

Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (NSW EPA, 2004).

Shell Engineering Pty Ltd, *Soil Quality Assessment Report Clyde HDS (U-1650) Revamp to 3000 TPD* September 2001

Legislation - Commonwealth

Fuel Quality Standards Act 2000

Environment Protection and Biodiversity Conservation Act 1999

Energy Efficiency Opportunity Act 2006

Legislation - NSW

Environment Planning and Assessment Act 1979

Environmental Planning and Assessment Regulation 1994

Protection of the Environment Operations Act 1997

National Parks and Wildlife Act 1974

Energy and Utilities Administration Act 1987

State Environment Planning Policies (SEPP)

SEPP (*Major Projects*) 2005

SEPP 33 - *Hazardous and Offensive Development*

SEPP 55 - *Remediation of Land*

Regional Environment Plans

Sydney Regional Environment Plan No.22 – Parramatta River

Sydney Regional Environment Plan No.28 – Parramatta

Sydney REP (Sydney Harbour Catchment) 2005

Local Planning Instruments

Parramatta Local Environment Plan 2001

Parramatta Development Control Plan 2005