STATEMENT OF ENVIRONMENTAL EFFECTS

October 2016

Report

ACS Management Project

AECOM

CALTEX

Statement of Environmental Effects

Client: Caltex Australia Petroleum Pty Ltd

ABN: 17000007876

Prepared by

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Statement of Validity

Submission of Statement of Environmental Effects

Prepared as Modification to Development Consent SSD 5544 under S.96 (2) of the *Environmental Planning and Assessment Act 1979*.

Statement of Environmental Effects prepared by:

Role	**Project Director**	**Project Manager**	**Lead SEE Author**
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In respect of

Applicant and Land Details

Applicant	Caltex Australia Petroleum Pty Ltd 2 Solander Street, Kurnell, NSW, 2231
Subject Site	Caltex is seeking approval for the ACS Modification works as a modification to development consent SSD 5544 under S.96 (2) of the *Environmental Planning and Assessment Act 1979.*
Project Summary	The ACS Modification would broadly involve the following activities within the ACS Modification works area presented in **Figure 1-2**: - Construction: · Additional soil sampling within the pipeways to further improve the accuracy of waste classification of the soil prior to placement in the containment cell or ACS biopile; · Construction of the Containment cell base and leachate collection system in the proposed cell location; · Installation of ground water monitoring wells down gradient of the proposed cell location; · Excavation and transportation of ACSs from the pipeways that have been classified as general or restricted solid waste directly to the containment cell location for emplacement; · Excavation and transportation of ACSs from the pipeways that have been classified as hazardous solid waste to be managed in one of the following ways: § Biopile the soil to process it until it can be classified as 'restricted solid waste' at a minimum and added to the containment cell; or § Removal off-site for treatment and disposal at an appropriately licenced facility in the event that biopiling does not effectively reduce the level of contaminants to a restricted level in the required timeframe.

	· Filling and compaction of the ACSs into the containment cell; · Environmental management of both the Containment cell and the temporary biopile areas; · Verifying the removal of ACS from the pipeways; and · Closure of the containment cell. - Operation: · Managing and monitoring the closed containment cell. The preferred approach to managing the ACSs that are classified as hazardous solid waste would be to biopile them on Site in order to reduce the level of hydrocarbons by biodegradation to a level where the soils can be classified as restricted solid waste. Whilst this method is expected to be successful based on previous examples, this assessment has included the option of removing this soils from the Site to a licenced waste facility as a contingency measure. All soils that would be placed within the containment cell or in the biopile would only be sourced from the Site. No material from off Site would be accepted in either the containment cell or in the biopile.
Lot and DP	Lot 56/ DP 908; Lot 57/ DP 908; Lot 62/ DP 908; Part Lot 11/ DP 7632; Part Lot 12/ DP 7632; Lot 189/ DP 7632; Lot 190/ DP 7632; Lot 43/ DP 8135; Lot 44/ DP 8135; Lot 45/ DP 8135; Lot 46/ DP 8135; Part Lot 77/ DP 8135; Lot 78/ DP 8135; Lot 79/ DP 8135; Part Lot 122/ DP 8135; Part Lot 123/ DP 8135; Part Lot 124/ DP 8135; Part Lot 125/ DP 8135; Lot 48/ DP 9564; Lot 77/ DP 9564; Lot 78/ DP 9564; Lot 81/ DP 9564; Part Lot 1/ DP 215818; Part Lot 2/ DP 215818; Lot 1/ DP 215819; Lot B/ DP 338897; Lot D/ DP 361103; Part Lot F/ DP 361103; Lot G/ DP 361103; Lot J/ DP 362655; Lot K/ DP 362655; Lot H/ DP 362655; Lot 570/ DP 752064; Lot 24/DP 776328; Lot 1/ DP 1044690; Lot 25 / DP 776328; Lot 283 / DP 752064; Lot 1 / DP126647; Lot 2 / 126647, Lot 1 / DP 132055 and Lot 2 / DP 215818.

Statement of Environmental Effects

A Statement of Environmental Effects (SEE) is attached. The SEE assesses the environmental impacts of the modification to the Project.

Declaration

I certify that I have prepared the contents of the SEE in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* and *Environmental Planning and Assessment Regulation 2000* and that, to the best of my knowledge, the information contained in this report is not false or misleading.

Signature:  **Date:** October 2016

Name: WILLIAM MILES

Table of Contents

List of Tables

List of Figures

LIMITATIONS

AECOM Services Pty Ltd (AECOM) has prepared this Statement of Environmental Effects (SEE) in accordance with the usual care and thoroughness and based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this SEE.

This SEE has been produced in accordance with the stipulations in the *Environmental Planning and Assessment Act 1979* and the *Environmental Planning and Assessment Regulation 2000*.

Where this SEE indicates that information has been provided to AECOM by third parties, AECOM has made no independent verification of this information except as expressly stated in the SEE. AECOM assumes no liability for any inaccuracies in or omissions to that information.

This SEE was prepared between July 2016 and September 2016 and is based on the conditions encountered and information reviewed at the time of preparation. AECOM disclaims responsibility for any changes that may have occurred after this time.

This SEE should be read in full. No responsibility is accepted for use of any part of this SEE in any other context or for any other purpose.

NOTES ON TEXT

As a determination of the modification to SSD 5544 will only be made after the Statement of Environmental Effects has been on public display and submissions considered, the future consolidated tense is used throughout this Assessment when describing the modification, alternatives and assessing impacts. "Would" is, therefore, used throughout the text in preference to "will".

If all approvals are given for the modification to proceed, all "would" references should be interpreted as "will", subject to final conditions of consent.

ABBREVIATIONS

Acronym	Definition
AS/NZS	Australian / New Zealand Standard
ABN	Australian Business Number
ACM	Asbestos Containing Material
ACS	Asbestos Contaminated Soil
ACT	Australian Capital Territory
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AMC	Australian Museum Consulting
AMP	Asbestos Management Plan
ANZECC	Australia and New Zealand Environment and Conservation Council
AORA Act	Australian Oil Refining Agreements Act
API	American Petroleum Institute
AQMP	Air Quality Management Plan
BASIX	Building Sustainability Index
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
BWMP	Biodiversity and Weed Management Plan
CAMBA	China-Australia Migratory Bird Agreement
CBD	Central Business District
CCTV	Closed-Circuit Television
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CLOR	Caltex Lubricating Oil Refinery
CMP	Contamination Management Plan
CMZ	Contamination Management Zone
CO	Carbon Monoxide
COPC	Contaminants of Potential Concern
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSRF	Caltex Soil Remediation Facility
CWOMP	Cooling Water Outlet Management Plan
dB	decibel
DCP	Development Control Plan
DECC	NSW Department of Environment and Climate Change
DEMP	Demolition Environmental Management Plan
DIPNR	NSW Department of Infrastructure, Planning and Natural Resources
DMP	Demolition Management Plan

Acronym	Definition
DNVMP	Demolition Noise and Vibration Management Plan
DoE	Department of Environment
DPE	NSW Department of Planning and Environment
DPI	NSW Department of Primary Industries
DWRMP	Demolition Waste and Resource Management Plan
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMR	Environmental Management Representative
EMS	Environmental Management System
ENM	Excavated Natural Material
EP&A Act	NSW Environmental Planning and Assessment Act
EP&A	NSW Environmental Planning and Assessment
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act
EPL	Environment Protection Licence
EPI	Environmental Planning Instruments
EPS	Enviropacific Services Pty Ltd
ERA	Environmental Risk Assessment
ESA	Environmental Site Assessment
ESD	Ecologically Sustainable Development
GAC	Granular Activated Carbon
GCL	Geosynthetic Clay Liner
GDE	Groundwater Dependent Ecosystems
GWMP	Groundwater Management Plan
H_2S	Hydrogen Sulphide
Ha	Hectares
HDPE	High Density Polyethylene
HIA	Heritage Impact Assessment
HMS	Heritage Management Strategy
ICNG	Interim Construction Noise Guideline
ISEPP	State Environmental Planning Policy (Infrastructure)
ISO	International Organisation for Standardisation
JAMBA	Japan-Australia Migratory Bird Agreement
JSA	Job Safety Analysis
km^2	kilometres squared
Leq	Equivalent noise level
LDAR	Leak Detection and Repair

Acronym	Definition
LEP	Local Environment Plan
LGA	Local Government Area
LNAPL	Light Non-Aqueous Phase Liquid
LOS	Level of Service
LPG	Liquefied Petroleum Gas
m	metres
m^3	metres cubed
m/s	metres per second
MEK	Methyl Ethyl Ketone
mbgl	metres below ground level
MHF	Major Hazard Facility
min	minutes
MNES	Matter of National Environmental Significance
MOD	Modification
NAPL	Non-Aqueous Phase Liquid
NEPM	National Environment Protection Measure
NHL	National Heritage List
NO_x	Oxides of Nitrogen
NOW	NSW Office of Water
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NVMP	Noise and Vibration Management Plan
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OWSS	Oily Water Sewer System
PAC	Planning Assessment Commission
PAD	Potential Archaeological Deposit
PASS	Potential Acid Sulfate Soils
PHA	Preliminary Hazard Analysis
PID	Photo-Ionisation Detector
POEO Act	Protection of the Environment Operations Act
PPE	Personal Protective Equipment
PROC	Process
PRP	Pollution Reduction Program
PSH	Phase Separated Hydrocarbon
PSSRF	Pilot Sustainable Soil Remediation Facility
PULP	Premium Unleaded Petrol

Acronym	Definition
PVC	Polyvinyl Chloride
RNE	Register of the National Estate
RNP	Road Noise Policy
secs/veh	seconds per vehicle
SCC	Specific Contaminant Concentrations
SEE	Statement of Environmental Effects
SEPP	State Environmental Planning Policy
SMP	Stormwater Management Plan
SO_2	Sulphur Dioxide
SPULP	Super Premium Unleaded Petrol
SSC	Sutherland Shire Council
SSD	State Significant Development
SSLEP	Sutherland Shire Local Environment Plan
STD	Standard
SWM	Safe Work Method
SWMP	Soil and Water Management Plan
t	tonne
TCLP	Toxicity Characteristics Leaching Procedure
TMP	Traffic Management Plan
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
TSC Act	Threatened Species Conservation Act
ULP	Unleaded Petrol
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compounds
WARR Act	Waste Avoidance and Resource Recovery Act
WHS	Work Health and Safety
WMS	Waste Management System
WRMP	Waste and Resource Management Plan
wt%	percentage by weight
WWTP	Wastewater Treatment Plant

Executive Summary

ES 1.1 Introduction

Caltex Australia Pty Ltd (hereafter referred to as Caltex) currently operates the Kurnell Terminal (the 'Site') on the southern side of Botany Bay, in Kurnell, NSW. Between 1956 and 2014 the Site was used as both an oil refinery and a fuel terminal. In July 2012, Caltex announced that it would convert the refinery to a finished product terminal (the 'Project'). In 2014 refining ceased and now the main purpose of the Site is as a fuel import terminal, although other ancillary and related operations also occur.

The objective of the Project is "*to establish a viable, safe, reliable and sustainable finished product import terminal at Kurnell*".

The Project has been divided into two phases:

1. converting infrastructure to allow the Site to operate as a terminal and shutdown the refinery (the conversion works) which has received development consent; and
2. demolition and removal of redundant infrastructure (the demolition works) which has received development consent.

During the two phases of the Project Caltex highlighted that certain parts of the Site contain Asbestos Contaminated Soils (ACSs). The ACSs are considered a potential health and safety risk for those working on parts of the Site where it is present. Potential options for managing ACSs were identified, one of which included containment on-site. ACSs contained within the pipeways are currently being managed in situ, however in order to remove the ongoing health and safety risks and related operational constraints, Caltex proposed to excavate and place ACSs within an on-site containment cell (the ACS Modification works).

Caltex is seeking approval for the ACS Modification works as a modification to development consent SSD 5544 under S.96 (2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as the works are a continuation of the conversion process, but may result in certain impacts that were not considered under the initial consent. The end result of these works would be substantially the same development as the approved Project under SSD 5544.

This Statement of Environmental Effects (SEE) has been prepared to support the application for the ACS Modification works and specifically for the construction of a containment cell at the Site. In line with the requirements of S.96 (2) of the EP&A Act, this SEE provides the information required by clause 115 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). This SEE considers a range of environmental, safety, legal, social and economic impacts related to the ACS Modification works. It describes the mitigation and management measures required to ensure that these impacts are avoided, minimised, mitigated or offset.

ES 1.2 Modification Need and Alternatives

The ACS Modification works share the objective of the Project in that the purpose of the works is to ensure that Caltex's operations within Australia remain viable whilst ensuring that the company can provide a safe, reliable and sustainable supply of petroleum fuels to NSW and the ACT.

The risks associated with working within the pipeways and other areas that may contain ACSs were identified and assessed in the conversion works (SSD 5544) and the modification application for the demolition works (SSD 5544 MOD1). Further, in the Statement of Environmental Effects (SEE) for SSD 5544 MOD1, three potential options for managing asbestos were identified:

1. Managing asbestos in situ;
2. Containment on-site; and
3. Removal of contaminated material from the Site.

To determine a way forward, a multi-criteria analysis was undertaken and identified containment on-site as the preferred long term option for management of ACS on Site as it would:

- remove potential hygiene risks to the terminal workers;
- eliminate ongoing operational costs of working within the pipeways;

- minimise short term costs of off-site disposal; and
- ensure ongoing commercial viability of the terminal.

ES 1.3 Site Location and Existing Environment

The Caltex Kurnell Terminal (the Site) is located on the Kurnell Peninsula within Sutherland Shire Local Government Area (LGA), approximately 15 km south of Sydney's Central Business District (CBD). The Kurnell Peninsula is serviced by Captain Cook Drive, a single lane road that connects the area with the wider road network.

The Site is bounded by the Kamay Botany Bay National Park to the south and east, Captain Cook Drive to the northwest and St Joseph Banks Drive to the south west. The northern Site boundary is bordered by Solander Street, a small southern section of Cook Street, undeveloped land, light industry and residences off the eastern side of Cook Street, and undeveloped land on the southern side of Reserve Road. Additional residences are located on the north side of Reserve Road. The Kurnell residential area is generally located to the immediate north and north west of the Site.

The Site is legally described under 38 Lot and deposited plan (DP) numbers, which are listed in **Section 3.1** of this SEE.

The ACS Modification works would be completed within the boundary of the Site.

ES 1.4 Project and Demolition Works Description

Approved Project

The conversion works involved the conversion of tanks and installation of pumps and associated pipelines to allow for the cessation of refining at the Site and to allow for the expansion of terminal operations. Caltex received development consent for the conversion works in January 2014 (SSD 5544). Cessation of refinery operations occurred in Q4 of 2014. By mid-2015 all of the works approved under this initial development consent for the Project were completed except for a number of tank conversions which will continue until the end of 2016. Following completion of the conversion works (i.e. end of 2016) the Site will have a nominal maximum storage capacity of 925 megalitres (ML) of refined product and by products.

The demolition works were consented in August 2015 and broadly involve the following activities:

- demolition, dismantling or removal of:
  - refinery process units and associated infrastructure;
  - redundant tanks and associated infrastructure;
  - redundant pipeways and above and underground pipelines; and
  - redundant buildings and services.
- associated civil works;
- waste management activities including concrete crushing; and
- returning the works areas to ground level.

The demolition works are likely to be completed by the end of 2017.

The ACS Modification Works

The ACS Modification works would broadly involve the following activities:

- Construction:
  - Additional soil sampling within the pipeways to further improve the accuracy of waste classification of the soil prior to placement in the containment cell or ACS biopile;
  - Construction of the containment cell base and leachate collection system in the proposed cell location;
  - Installation of ground water monitoring wells down gradient of the proposed cell location;
  - Excavation and transportation of ACSs that have been classified as general or restricted solid waste directly to the containment cell location for emplacement;

- Excavation and transportation of ACSs from the pipeways that have been classified as hazardous solid waste to be managed in one of the following ways:
  - Biopile the soil to process it until it can be classified as 'restricted solid waste' at a minimum and added to the containment cell; or
  - Removal off-site for treatment and disposal at an appropriately licenced facility in the event that biopiling does not effectively reduce the level of contaminants to a restricted level in the required timeframe.
- Filling and compaction of the ACSs into the containment cell;
- Environmental management of both the containment cell and the temporary ACS biopile areas;
- Verifying the removal of ACS from the pipeways; and
- Closure of the containment cell.

- Operation:
  - Managing and monitoring the closed containment cell.

The ACS Modification works would be undertaken 6 days a week over an 18 month period starting in January 2017 as presented in **Table ES-1**. The majority of the ACS Modification works would take place between 7.00am and 10.00pm. The works would be managed as part of the demolition activities and as such would be managed under the DEMP. As such, where applicable, the measures in the DEMP would be applied to the ACS Modification works.

Table ES-1 Proposed ACS Modification Works Schedule

Task	Indicative Date*
Containment Cell Construction	Start 2017 – Mid 2017
Excavation of ACS (hazardous waste) from Pipeways	Start 2017 – Q2 2017
Excavation of ACS (general and restricted solid waste) from Pipeways	Mid 2017 – End 2017
Preparation of ACS Hazardous Waste via Biopiling	Q1 2017 – Q4 2017
Filling of Containment Cell with ACS	Mid 2017 – End 2017
Closure of Containment Cell	Start 2018 – Mid 2018
On-going Management of Closed Containment Cell	-

- *Depending on timing of approval.

ES 1.5 Legislation and Planning Policy

A modification through S.96 (2) of the EP&A Act requires that aspects of the ACS Modification works that may have environmental, social or economic impacts that differ from those previously assessed within the Environmental Impact Statement (EIS) for SSD 5544, are required to undergo assessment in line with Section 79C of the EP&A Act.

Under Section 79C, Part 4 of the EP&A Act, the ACS Modification works must be evaluated against a range of considerations including environmental planning instruments, NSW Environmental Planning and Assessment Regulation 2000 (EP&A Regulation), the likely environmental, social and economic impacts of that development, the suitability of the Site, and the public interest. In order to comply with the requirements for assessing this type of modification, a SEE must be prepared and submitted alongside the Modification Application.

A complete account of relevant Commonwealth, State and local government legislation and policy is provided in Chapter 5 Legislation and Planning Policy.

ES 1.6 Consultation

Stakeholder consultation has been completed to help prepare this SEE and will continue during exhibition and following approval of the modification.

The objective of consultation to date has been to provide information to, and understand the concerns of, the various stakeholders.

Chapter 6 Consultation presents a list of the key comments raised during the consultation process and identifies where issues have been addressed in this SEE.

ES 1.7 Environmental Scoping Assessment

In order to assess the environmental impact of the ACS Modification, a number of key environmental issues have been identified through consultation with regulators and the community. A qualitative risk assessment was undertaken based on the recognition that a more detailed assessment would be required for the biophysical, environmental, economic and social aspects with the highest potential likelihood and greatest potential consequences. This risk assessment considered the issues mentioned in:

- relevant legislation;
- submissions from relevant stakeholders; and
- the EIS for the conversion works (SSD 5544) and the SEE for the demolition works (SSD 5544 MOD1).

The qualitative risk assessment was conducted based upon the guidelines outlined in AS/NZS 4360:2004 and AS/NZS ISO 31000:2009. This assessment guided the detailed assessments undertaken for the SEE.

ES 1.8 Soil, Groundwater and Contamination

This assessment involved the review of desktop information as well as undertaking additional studies to understand the soil, groundwater and contamination baseline for the ACS Modification works.

The following ground-disturbing and excavation activities would occur:

- Excavation of ACS contamination soil from the pipeways to a depth of 0.2m to 0.5m.
- Minor excavation/grading works in preparation for the containment cell and biopiling.

Potential soil and groundwater impacts from the ACS Modification works during construction include:

- Excavation works within the pipeways generating dust and liberating asbestos fibres that could potentially affect on-site and off-site receptors;
- Biopiling (including homogenisation) and containment cell area works generating dust and liberating asbestos fibres that could potentially affect on-site and off-site receptors;
- Disturbance of soils through during the ACS Modification works potentially mobilising contaminants and resulting in contaminant migration to underlying soils and groundwater;
- Spills and leaks from construction equipment potentially contaminating soil and groundwater; and
- Vehicles dispersing contaminated materials across the Site and off-site.

Potential soil and groundwater impacts from operation include:

- the potential erosion of the cap over the containment cell; and
- leaks in the containment cell liner leading to groundwater impacts.

For construction, the potential soil, groundwater and contamination impacts would be largely the same as those identified and managed within the DEMP for the Project. The DEMP includes a Soil and Water Management Plan (SWMP) and Asbestos Management Plan (AMP) both of which include management measures for managing contamination and erosion and protecting soils and groundwater.

The ACS biopile works and containment cell works constitute additional activities beyond the scope of works covered within the DEMP during construction and operation. To address these additional activities two additional subplans to the DEMP would be produced: a Containment Cell Management Plan; and an ACS Biopile Management Plan. These new subplans would reference other parts of the DEMP as necessary but would also include specific measures for the containment cell and ACS biopile.

ES 1.9 Waste Management

The waste management assessment involved identifying, quantifying and classifying potential sources of liquid and non-liquid waste generated from the ACS Modification works.

Recommendations on the preferred management strategies for effective storage, reuse/recovery, treatment and/or disposal were identified in accordance with relevant legislation, policies and guidelines including the Waste Avoidance and Resource Recovery Act 2007 (WARR Act) and DECCW, NSW (2009) Waste Classification Guidelines.

During the ACS Modification works construction phase, there would be limited waste generation mostly associated with construction workers (general municipal waste, sewerage effluent), and construction waste associate with preparing the ACS biopile and containment cell areas. Some leachate from the containment cell as it is being constructed could be expected. This, alongside the water from the biopile works area, would be directed to the Site's existing wastewater treatment plant.

During operation, which only involves maintenance of the asbestos cell, only minimal leachate, stormwater and vegetation waste would be generated.

Measures to ensure appropriate waste management during the ACS Modification works would be largely the same as documented within the existing DEMP. The DEMP includes a Demolition Waste and Resource Management Plan (DWRMP) which includes management measures for wastes. The ACS biopile and containment cell constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities two additional subplans to the DEMP would be produced: a Containment Cell Management Plan; and an ACS Biopile Management Plan. These new subplans would reference other parts of the DEMP as necessary but would also include specific measures for the containment cell and ACS biopile during construction and operation, as relevant.

ES 1.10 Surface Water, Wastewater and Flooding

A Water Management assessment was completed to understand the potential surface water, wastewater and flooding issues associated with the ACS Modification works.

Potential impacts to stormwater associated with the ACS Modification works include those arising from excavation and ground disturbance works (i.e. potential impacts to stormwater run-off quality), as well as potential changes to the operation and functioning of stormwater catchments in the short and longer term (i.e. catchment hydraulics).

Stormwater quality impacts during construction could arise from:

- erosion and entrainment of dust, soil and other material in stormwater from areas where excavation or grading works are required;
- leaks of fuel and hydraulic fuel from various plant items required for the ACS Modification works potentially impacting stormwater quality; and
- impact on stormwater quality arising from interaction with contaminated soils potentially exposed by the ACS Modification works.

Following the closure of the containment cell the catchment flows for one area of the Site would increase to include the extent of the containment cell previously diverted to the Site's OWSS. Water management measures have been integrated into the design of the cell to manage erosion, however, existing infrastructure is considered acceptable to handle the increase in stormwater volume.

Overall, the change in the volume and quality of stormwater discharged from the Site, arising from the ACS Modification works is not expected to be significant.

The ACS Modification works are unlikely to alter the flood risk profile of the Site or to change the ability to accommodate high rainfall events and/or broader flooding events from that which currently exists.

Measures to ensure appropriate water management during the ACS Modification works would be largely the same as documented within the existing DEMP. The DEMP includes a Soil and Water Management Plan. The ACS biopile and containment cell constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities two additional subplans to the DEMP would be produced: a Containment Cell Management Plan; and an ACS Biopile Management Plan. These new subplans would

reference other parts of the DEMP as necessary but would also include specific measures for the containment cell and ACS biopile during construction and operation, as relevant.

ES 1.11 Noise

A noise assessment was undertaken to understand and address potential noise impacts related to the ACS Modification Works. Construction noise (including associated traffic noise) was assessed. The noise contributions from other works on the Site were also considered in this assessment.

The predicted noise levels for the construction of the ACS Modifications works comply with the criteria at all identified receiver locations and would therefore not have an adverse impact on these receivers.

The cumulative impact noise modelling when considering other works on the Site showed exceedances at two sensitive receivers. However this is wholly associated and controlled by the demolition works and the ACS Modification works are not expected to impact on these receptors.

The existing traffic noise levels along Captain Cook Drive already exceed the noise criteria of 60 dBA during the day and 55 dBA during the night. Based on this, the noise contribution from traffic generated by the ACS Modification works would be negligible at residences on Captain Cook Drive (that is, less than a 2 dB increase).

ES 1.12 Air Quality and Odour

An assessment was undertaken to determine the potential air quality and odour impacts associated with the ACS Modification works. This assessment involved a review of the existing air quality and the scope of ACS Modification works; the identification of emissions likely to be generated from such works; and the determination of management and mitigation measures to be implemented for minimising and offsetting these impacts.

Potential air emissions likely to be generated include:

- Particulate matter and soil contaminant emissions (including asbestos) from the excavation, handling, transport and biopiling of contaminated soils.
- Emissions from ACS biopile aeration systems.
- Particulate matter emissions from the construction of the containment cell.
- Particulate matter from transport of ACS on internal roadways.
- Combustion emissions from mobile plant (e.g. trucks, excavators, dozers).

The assessment concluded that the potential for the ACS modification works to generate adverse air quality impacts is considered low and manageable with the implementation of appropriate mitigation measures, as consistent with those applied as part of the demolition works, but with specific allowances for the ACS biopile and containment cell works. In order to manage the potential impacts outlined above, the existing DEMP would be updated to include two additional subplans specific to the containment cell and ACS biopile areas. The Site's OEMP would also be updated to include management and monitoring of the containment cell during operation.

ES 1.13 Transport and Access

An assessment was undertaken to determine the potential traffic and access impacts associated with the ACS Modification works.

Approximately 24 heavy vehicle movements would be required to bring and remove the equipment and plant required to complete the ACS Modification works. Of greater note is the unlikely but potentially required removal of the worst case 5,390 tonnes ACSs classified as Hazardous Waste (refer to **Chapter 4 Project Description**). Assuming that a truck and dog can carry 30 tonnes of soil, this would require about 180 trucks to remove this material from the Site. These heavy vehicle movements would be sporadic rather than regular and would be confined to specific days. Over the 18 month program there would typically be no heavy vehicle movements.

Against existing traffic volumes in the vicinity of the Site and having regard for the historic traffic volumes generated by the Site, the additional private and heavy vehicle traffic generated by the ACS Modification works is not expected to compromise the capacity of the surrounding road network and as such no traffic impacts are expected.

Although traffic impacts as a result of the ACS Modification works are highly unlikely, measures would be included in the DEMP for the Project that are specific to the ACS Modification works, as identified in the assessment in this SEE.

ES 1.14 Heritage

The Site has previously been investigated for heritage values as part of the approved Project (SSD 5544) (the conversion works) and approved Project modification (SSD 5544 MOD1). These studies were utilised for this assessment.

The ACS Modification works would not require the permanent removal or loss of any infrastructure at the Site. The pipeways would not be affected by the removal of the ACS and therefore their heritage significance for the Site would not be impacted. Further, the demolition works have already resulted in the removal of the tanks that were previously located within the containment cell area and the ACS biopile area. These activities would not result in the loss of any notable heritage values at the Site. As these areas contain no items of heritage value, no historic heritage impacts are expected.

Considering all works involved in the ACS Modification works would be contained within previously disturbed areas within the Site boundary, no impacts to Aboriginal heritage values are expected.

ES 1.15 Ecology

The Site has been investigated for ecological values as part of the SSD 5544 and SSD 5544 MOD1 applications (Biosis 2012 and 2014). These studies were utilised for this assessment.

The ACS Modification works would have no significant impacts on the ecological values within the Site. This is due to the following factors:

- the ACS Modification works would be undertaken in a highly modified and disturbed landscape, devoid of native vegetation or fauna habitat;
- the ACS Modification works would not involve the removal or modification of any remnant native vegetation;
- there is low likelihood of threatened biota and/or Threatened Ecological Communities being present within the ACS Modification works area due to the lack of vegetation and/or foraging habitat.

The potential ecological impacts from ACS Modification works are as follows:

- potential discharge of stormwater run-off, sediment laden water, contaminated water and oily water off-site and into the groundwater system affecting nearby natural areas and GDEs;
- potential for further spread of existing noxious weed infestations; and
- potential impacts on fauna during dispersal including accidental trapping of amphibians in trenches.

These impacts are expected to be of negligible to minor significance and would be mitigated further through the implementation of the management and mitigation measures contained within the DEMP for the Project. The DEMP and its sub-plans contain a suite of measures to manage potential impacts related to erosion, stormwater, groundwater, noxious weeds and ecology.

ES 1.16 Hazards and Risk

The biopiling aspect of the ACS Modification works would store a range of potentially hazardous materials used in the bioremediation of contaminated soils. These materials include:

- di-ammonia phosphate;
- urea;
- mono-ammonium phosphate;
- triple super phosphate;
- potassium sulphate; and
- activated carbon.

None of these materials are classified as dangerous goods in accordance with the definition in the Australian Dangerous Goods Code.

In the unlikely event that the biopiling works are not successful in reducing the classification of ACSs from Special Hazardous Waste to Special Restricted Solid Waste, then this material would be sent to an offsite licenced facility.

The assessment undertaken for this SEE concluded that, with mitigation measures in place, this would not be considered a risk.

As the ACS Modification works would be managed in line with the demolition works at the Site, the controls agreed for the demolition activities related to Hazards and Risk, would also be implemented for the ACS Modification works.

ES 1.17 Cumulative Impact Assessment

A cumulative impact assessment was undertaken to assess impacts of the ACS Modification work works, along with neighbouring projects, on the surrounding environment. A cumulative impact assessment is a receptor based assessment. A cumulative impact can only occur when two or more impacts (i.e. residual environmental effects) affect the same receptor. A residual impact is the impact remaining following the application of management and mitigation measures.

For all of the environmental aspects assessed in this SEE, there are expected to be no significant residual impacts as a result of the ACS Modification works on any sensitive receptors. As such, no cumulative impacts are expected.

ES 1.18 Management and Mitigation Measures

Throughout the SEE, management and mitigation measures have been identified to address potential risks and impacts associated with the ACS Modification works. These measures include those that are relevant and/or have been revised from the approved management and mitigation measures for the conversion works (SSD 5544), demolition works (SSD5544 MOD1) and the ACS Modification works. These measures are contained in Chapter 8 to Chapter 15 of this SEE and presented as a compilation in **Chapter 16 Revised Management and Mitigation Measures**. The chapter also outlines how these measures would be implemented and monitored by Caltex through the DEMP.

As a result of the ACS Modification works, two additional subplans to the DEMP would be produced: a Containment Cell Management Plan; and an ACS Biopile Management Plan. These new subplans would reference other parts of the DEMP as necessary but would also include specific measures for the containment cell and ACS biopile.

ES 1.19 Evaluation and Justification

The ACS Modification works are an important part of making the Site as safe and viable as possible. They are linked to the ongoing process of converting the Site from an operation that contains both oil refining and liquid fuel depot land uses to a safe and viable finished fuel import terminal. The ACS Modification works would remove an existing hygiene risk and operational constraint from the Site and therefore help ensure that the objectives of the Project are met.

This SEE provides a comprehensive assessment of the ACS Modification works and includes investigations regarding all relevant environmental issues. Potential impacts have been assessed and strategies to avoid, minimise and mitigate those impacts form a key part of the SEE. The SEE includes a number of commitments to manage environmental impacts during the ACS Modification works.

The ACS Modification works has, to the extent feasible, been designed to address the key issues of concern. Caltex has also considered impacts on the surrounding environment and community of Kurnell. Caltex firmly believes it can undertake the ACS Modification works in a manner which would safeguard local environment and public amenity in the area.

This SEE has concluded that the ACS Modification works should proceed because they would:

- Result in no long term adverse impacts to the environment or local community;
- Ensure the primary objectives of the Project continue to be achieved; and
- Satisfy the principles of Ecologically Sustainable Development as described in the EP&A Regulation.

This SEE has highlighted a range of issues which would be addressed through the careful undertaking of the ACS Modification works.

On the basis of the findings detailed within this Statement of Environmental Effects, the ACS Modification works are considered to be justified.

1.0 Introduction

1.1 Overview

Caltex Australia Pty Ltd (hereafter referred to as Caltex) currently operates the Kurnell Terminal (the 'Site') on the southern side of Botany Bay, in Kurnell, NSW (refer to **Figure 1-1**). Between 1956 and 2014 the Site was used as both an oil refinery and a fuel terminal. In July 2012, Caltex announced that it would progress with converting the refinery to a finished product terminal (the 'Project'). In 2014 refining ceased and now the main purpose of the Site is as a fuel import terminal, although other ancillary and related operations also occur.

The process to convert the refinery to a terminal has involved a number of related activities including numerous upgrades and changes to operational infrastructure, as well as the removal and demolition of redundant infrastructure. This process is ongoing. The objective of the Project was and remains "*to establish a viable, safe, reliable and sustainable finished product import terminal at Kurnell*". This includes providing a safe working environment at the terminal and also ensuring that the operation is not burdened by unnecessary costs.

The Project has been divided into two phases:

1. converting infrastructure to allow the Site to operate as a terminal and shutdown the refinery (the conversion works); and
2. demolition and removal of redundant infrastructure (the demolition works).

Caltex has received development consent to complete the conversion (SSD 5544) and demolition works (SSD 5544 MOD1).

During the two phases of the Project Caltex highlighted that certain parts of the Site contain Asbestos Contaminated Soils (ACSs). Potential options for managing ACSs were identified, one of which included containment on-site.

The ACSs are considered a potential health and safety risk for those working on parts of the Site where it is present, but importantly, the level of asbestos in the soils does not present an environmental risk. Its presence is largely due to the historic use and subsequent degradation of asbestos containing materials (ACM) at the Site when it was operating as a refinery. The Kurnell Pipeways Asbestos Classification Report (AECOM, 2016a) identified that ACS is predominantly but not exclusively located within the certain sections of the pipeways that cross the Site (the 'pipeways').

Based on the presence of asbestos, Caltex require an Exemption Order under Section 419 of the *Work, Health and Safety Regulation 2011* in order to complete activities within the pipeways including conversion and demolition activities, routine maintenance, sampling, valve operations, weed removal etc. within the pipeways. Further, Caltex staff and contractors require special processes and equipment in order to work in these areas. This ongoing maintenance and operation work is required to maintain the safety of the Site, its employees and the local community.

ACSs contained within the pipeways are currently being managed in situ, however in order to remove the ongoing health and safety risks and the operational constraints, Caltex proposed to excavate and place ACSs within an on-site containment cell (the ACS Modification works). The location of the ACS Modification works area is shown on **Figure 1-2**.

Caltex is seeking approval for the ACS Modification works as a modification to development consent SSD 5544 under S.96 (2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as the works are a continuation of the conversion process, but have identified potential impacts that were not considered under the initial consent. The end result of these works would be substantially the same development as the approved Project under SSD 5544.

This Statement of Environmental Effects (SEE) has been prepared to support the application for the ACS Modification works and specifically for the construction of a containment cell at the Site. In line with the requirements of S.96 (2) of the EP&A Act, this SEE provides the information required by clause 115 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). This SEE considers a range of relevant environmental, safety, legal, social and economic impacts related to the ACS Modification works. Potential impacts are identified and where necessary mitigated or offset to ensure that they are minimised for the local environment and Kurnell and Sutherland Shire communities.

KEY

- The Site
- Caltex Land Ownership
- Towra Point Aquatic Reserve
- National Park
- Towra Point Nature Reserve

AECOM

N 0 100 200 400 m

SCALE 1:15,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE **FIGURE 1-1** - SITE LOCATION

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

		DATE	MAP #	REV	Project
DRAWN	MJB	29/09/2016			
CHECK	WM	30/09/2016	G001	03	60488804

KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Pipeways to be excavated
- Special General & Special Restricted Soil in Pipeways
- Special Hazardous Soil in Pipeways
- Biopile Works Area
- Containment Cell Works Area

AECOM

N

0 50 100 200 m

SCALE 1:9,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE **FIGURE 1-2** - PROPOSED ACS MODIFICATION

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

		DATE	MAP #	REV	Project
DRAWN	MJB	30/09/2016			
CHECK	WM	30/09/2016	G002	03	60488804

AECOM GIS Printed Date: 30/09/2016 P:\60\4X\60488804\4. Tech work area\4.6 GIS\02_Maps\G002_03_Proposed_ACS_Modification_160929.mxd

1.2 Proponent and Team

The proponent for the works is Caltex Australia Petroleum Pty Ltd, 2 Solander Street Kurnell, NSW 2231. The proponent contact is Craig Collard, Demolition Manager.

The SEE has been prepared by AECOM Services Pty Ltd ABN 46 000 691 690, Level 21, 420 George Street Sydney, 2000, Tel: (02) 8934 0000. The environmental planning and assessment coordinator is William Miles, CEnvP IA, Associate Director - Environment.

1.3 Project Need and Alternatives

1.3.1 Background

From 1956 to 2014 the Site was operating as oil refinery and terminal facility. The development consent to convert the Site to a fuel import terminal was granted in January 2014 (Application Number SSD 5544). From 2014 when the conversion works commenced and refining at the Site ceased, the Site is now only managing finished petroleum products and is referred to as the Kurnell Terminal.

As part of SSD 5544, a number of previous Development Applications (DAs) for the Site were surrendered. As such SSD 5544 is the dominant consent for the Site. In 2015 a modification to this consent (SSD 5544 MOD1) was granted to consent the proposed 'demolition works' at the Site.

Both the conversion and the demolition works have been to establish a viable, safe, reliable and sustainable finished product import terminal at Kurnell.

History of Asbestos on the Site

The Site contains areas of ACSs. The presence of ACSs at the Site was discussed in both the development application for the conversion works (SSD 5544) and the modification application for the demolition works (SSD 5544 MOD1). This contamination is largely due to the historic use of ACM at the Site when it was operating as a refinery.

The *Kurnell Pipeways Asbestos Classification Report* (AECOM, 2016a) identified that the ACS is predominantly located within the certain sections of the main pipeways that cross the Site (refer to **Figure 1-2**). Caltex currently require an 'Exemption' to Section 419 of the *Work, Health and Safety Regulation 2011* in order to complete works within these pipeways, including conversion and demolition activities, routine maintenance, sampling, valve operations, weed removal etc. Further, Caltex staff and contractors require special processes and equipment in order to work in these areas. These measures are detailed in the *Caltex Guidance Document Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres* and associated attachments. The ongoing maintenance and operation work is required to maintain the safety of the Kurnell Terminal, its employees, the local community and the environment.

As part of SSD 5544 MOD1, an Asbestos Management Plan for the Demolition Environmental Management Plan (DEMP) was required to be prepared. This referenced the *Caltex Guidance Document Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres.* Broadly the controls in place to manage potential exposure to airborne asbestos fibres whilst performing work in the pipeways, as outlined in the DEMP, include:

- The use of the Kurnell permit to work system;
- Signage along the perimeter of the pipeways clearly indicating the possibility of asbestos contamination and the requirement to obtain a permit prior to entry;
- A general work instruction detailing requirements (e.g. PPE) for entry to the pipeways;
- The use of Safe Work Method (SWM) or a Job Safety Analysis (JSA) to identify hazards and implement appropriate controls;
- The requirement to decontaminate both person(s) and equipment when exiting the pipeways;
- The controlled management of waste from the pipeways; and
- The attendance of personnel required to work in the pipeways to attend an Asbestos awareness training course.

In addition to the above controls, Caltex undertakes personal monitoring when maintenance work in the pipeways is being undertaken, particularly where the ACS may be disturbed using hand tools, to ensure that the work is not generating airborne asbestos concentrations in excess of 0.01 fibres / mL and to ensure that the controls are effective.

Whilst Caltex implements a number of measures and controls to manage the risks related to working close to ACSs, their presence maintains an ongoing health and safety risk at the Kurnell Terminal. It also creates operational constraints for working in the pipeways and in other areas should ACSs be identified as the demolition works progress.

As such, Caltex would like to remove the ACSs from these areas as far as possible to reduce health and safety risks and to remove operational constraints. The *Kurnell ACS Management – Options Report* (AECOM, 2016b) identified that the best option for the long term management of the ACS is placement of ACS within an on-site containment cell.

1.3.2 Need and Objective of the Project

As noted within the EIS for SSD 5544, "*Caltex initiated a review of its refining operations in May 2011".* In summary, this review concluded that *"the Caltex Kurnell and Lytton refineries in their current configuration are relatively small and are disadvantaged compared to the modern, larger scale and more efficient refineries in the Asian region. This disadvantage is exacerbated by the impact of the ongoing strength of the Australian dollar, lower Caltex refining margins and increasing costs on the 'as is' refining business. As a result of the refining review, Caltex is proposing to close the Kurnell Refinery and convert the Site to a petroleum fuels import (finished product) terminal*".

However, whilst it was concluded that the refinery business is no longer viable at Kurnell, the EIS also stated that the Site is at the hub of Caltex's supply chain for NSW and ACT and therefore needed to be retained as a finished product terminal to receive and distribute refined petroleum product.

This needs case for the Project (SSD 5544) supported its objective which was:

"*To ensure that Caltex's operations within Australia remain viable whilst ensuring that the company can provide a safe, reliable and sustainable supply of petroleum fuels to NSW and the ACT.*"

1.3.3 Need and Objective of the ACS Modification Works

The ACS Modification works share the objective noted in **Section 1.3.2** in that the purpose of the works is to ensure that Caltex's operations within Australia remain viable whilst ensuring that the company can provide a safe, reliable and sustainable supply of petroleum fuels to NSW and the ACT.

The presence of ACSs at the Site was discussed in both the development application for the conversion works (SSD 5544) and the modification application for the demolition works (SSD 5544 MOD1). The risks associated with working within the pipeways and other areas that may contain ACSs were identified and assessed.

In the Statement of Environmental Effects (SEE) for SSD 5544 MOD1, Section 9.7.1 noted three potential options for managing asbestos:

1. Managing asbestos in situ;
2. Containment on-site; and
3. Removal of contaminated material from the Site.

ACSs in the pipeways are currently being managed in situ under an Exemption Order to Section 419 of the *Work, Health and Safety Regulation 2011*. However in order to remove the ongoing health and safety risks and to remove the operational constraints, Caltex initiated the ACS Management Project to investigate whether one of the other two options would be a more appropriate long term solution. As such a multi-criteria analysis (AECOM, 2016c) was conducted which evaluated each option based on the approach, primary works (referred to as construction, as per **Section 4.4**), and secondary works (referred to as operation, as per **Section 4.5**). The following considerations were reviewed:

- Acceptability to community
- Potential on-site health and safety impacts
- Potential off-site health and safety impacts

- Potential environmental impacts
- Technical feasibility
- Acceptability to regulatory authorities including EPA, Safe Work Australia and permitting / licence requirements
- Ability of approach to meet Caltex's objective to remove the hygiene risk of ACS in the pipeways
- Cost to Caltex

The multi-criteria analysis identified containment on-site as the preferred long term option for management of ACS on Site. The findings of the multi-criteria analysis for each option are discussed below.

Managing asbestos in situ

ACS may be managed in situ in two ways, continuation of operation under the Exemption Order (005/2013), or covering the pipeways with a suitable barrier to minimise exposure risk. Neither of these options is considered appropriate as an ongoing management option for the Site.

Continuing to operate under the Exemption Order would not resolve the existing hygiene risk and operational constraints posed by the ACSs and Safe Work do not consider it as a permanent option for management of the asbestos hazard. As such this option does not meet the project objective and is therefore discounted.

Covering of the pipeways with a suitable barrier would mean that the ACSs remain in situ but would still be located across the Site. The pipeways act as spoon drains for the Site. Therefore concrete spoon drains would need to be constructed over the existing pipeways. In terms of complexity the necessary civil works would be minor. This approach gives the perception of a low health and safety risk to workers and the community, however in order to maintain the function of the pipeways as drainage lines, the pipeways would require grading potentially exposing workers to airborne asbestos. A large number of truck movements would also be required to bring the concrete and other materials to Site. Covering the pipeways would require ongoing monitoring of a large area of the Site, and would create a potential barrier for other works. Covering the pipeways may also reduce the capacity of the pipeways to store water during wet periods and therefore impact the overall stormwater management of the Site. As a result secondary engineering works may be required. The potential additional costs and operational constraints that could result from this option mean that it does not effectively meet the project objective and is therefore discounted.

Removal of contaminated material from the Site

Disposal off-site would require engagement of a suitably licensed waste contractor for excavation, transport and disposal off-site to a licensed landfill.

Due to the large volume of ACS (refer to **Section 4.3.1**) approximately 820 trucks (1,640 truck movements) are required for off-site disposal, based on 30 tonne loads. Transport of ACS off-site poses a potential off-site health and safety risk due to the risk of a vehicle accident. Given the number of truckloads required to transport waste off-site, noise, traffic and greenhouse gas impacts may be expected as a result of increased traffic on local roads.

In addition the cost associated with transportation of ACS from the pipeways off-site to licensed facility is considerable. As such Caltex does not consider this an acceptable solution for an operating facility that is looking to minimise risk and ensure viability of the operation of the terminal. Therefore this option is not a viable management option for the ACS.

Containment on-site

ACS would be excavated from the pipeways, and placed in a designated containment cell. Given the characteristics of the soils to be excavated, the containment cell would be designed to meet the requirements of a restricted solid waste landfill, as per the NSW *EPA Environmental Guidelines: Solid Waste Landfills, second edition 2016* (the Landfill Guidelines).

Removal of ACS from the pipeways and placement within an on-site containment cell would ultimately remove the following:

- the potential health risks associated with the presence of ACS;
- the operational constraints regarding the work in the pipeways; and
- the additional costs associated with the ongoing operation of works within the pipeways.

Containing the ACS in a cell on Site would remove the risks associated with transporting a large volume of this material across metropolitan Sydney. Equally, it would remove the need to introduce approximately 1,640 truck movements (820 truck and dogs carrying 24,500 t of soil) on to the road network, with the associate traffic effects.

As noted above the Site is at the heart of Caltex's operation in NSW and the ACT and is its only import location for these markets. The Site continues to be managed and is staffed by up to 150 people on a daily basis. If constructed, the cell would be managed as part of the wider operation at the Site and would not be abandoned.

Therefore, the placement of ACS in an on-site containment cell is considered the best option for ensuring a viable, safe, reliable and sustainable finished product import terminal at Kurnell.

1.3.4 Conclusion

Placement of ACS in an on-site containment cell at the Site is the best way for Caltex to ensure that it meets the objective of the Project, namely:

"*To ensure that Caltex's operations within Australia remain viable whilst ensuring that the company can provide a safe, reliable and sustainable supply of petroleum fuels to NSW and the ACT*."

Placement of ACS in an on-site containment cell would eliminate ongoing operational costs of working within the pipeways under the Exemption Order, and would minimise short term costs of off-site disposal, ensuring the ongoing commercial viability of the terminal, whilst also removing potential risks to the operations at the Site, the terminal workers and the local community.

1.4 Section 96 (2) Modification

The ACS Modification works are directly linked to the approved Project SSD 5544 and SSD 5544 MOD1 as they are the next step in the conversion process at the Site to establish a viable, safe, reliable and sustainable finished product import terminal at Kurnell. As the ACS Modification works are part of the same process as the conversion and demolition works, they share the same needs case, project objective and the same purpose. Without the ACS Modification works the safety and viably of the operation at the Site would be compromised, as demonstrated above.

As such, Caltex are seeking to modify the development consent for approved Project SSD 5544, and SSD 554 MOD1 to ensure that the Project objective for this consent can be successfully achieved and the Project continued. Caltex have recognised that the inclusion of the ACS Modification works under the development consent SSD 5544 would result in certain impacts that were not considered under the initial consent, as such a modification application under S.96 (2) of the EP&A Act is being sought. Whilst the ACS Modification works would introduce new considerations for the Project, these matters would be temporary in nature. Following completion of the ACS Modification works the end result would be substantially the same development as approved under SSD 5544.

1.5 Section 96 (2) Modification Process

1.5.1 The Scope of this SEE

This Statement of Environmental Effects (SEE) has been prepared to support the modification application for the ACS Modification. In line with the requirements of S. 96 (2) of the EP&A Act, this SEE provides the information required by clause 115 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

Further requirements for consideration within the SEE were identified through the consultation process summarised in **Chapter 6 Consultation**.

The key issues identified during the consultation process were investigated by Caltex through targeted assessments by specialists in their fields in line with relevant guidelines and assessment requirements. These assessments are summarised in **Chapters 8 to 15** of this SEE. Where necessary the conclusions in these chapters are supported by appendices.

The outcomes of these assessments have been used to formulate the proposed revised management and mitigation measures (refer to **Chapter 16 Revised Management and Mitigation Measures**) and to justify why the ACS Modification works are needed and should be approved (refer to **Chapter 18 Justification**).

1.5.2 Preparation and Exhibition

The objectives of this SEE are to:

- comply with the requirements of the EP&A Act and EP&A Regulation;
- address the requirements of key stakeholders as identified during the consultation process;
- provide the Minister and the Minister's delegates at the PAC with sufficient information to assess the potential environmental impacts, confirm the mitigation measures required and understand the benefits of the ACS Modification works; and
- inform stakeholders and the community about the ACS Modification works. A full account of this process up to lodgement of the modification application is included in **Chapter 6 Consultation**.

Section 115 of the EP&A Regulation contains provisions which indicate the specific information that must be included within the SEE. The relevant clauses in Section 115 and where these have been addressed in the SEE are shown below in **Table 1-1**.

Table 1-1 SEE Statutory Requirements

Clause	Requirement	SEE Location
1(a)	The name and address of the applicant.	**Section 1.2**
1(b)	A description of the development to be carried out under the consent (as previously modified).	**Chapter 3**
1(c)	The address, and formal particulars of title, of the land on which the development is to be carried out.	**Section 1.2** **Section 2.1.2**
1(d)	A description of the proposed modification to the development consent.	**Chapter 4**
1(e)	A statement that indicates either: - that the modification is merely intended to correct a minor error, misdescription or miscalculation, or - that the modification is intended to have some other effect, as specified in the statement,	**Section 1.1** **Section 1.4** **Chapter 5** **Chapter 18**
1(f)	A description of the expected impacts of the modification.	**Chapters 8-15**
1(g)	An undertaking to the effect that the development (as to be modified) will remain substantially the same as the development that was originally approved.	**Section 1.1** **Section 1.4** **Chapter 5** **Chapter 18**
1(h)	If the applicant is not the owner of the land, a statement signed by the owner of the land to the effect that the owner consents to the making of the application (except where the application for the consent the subject of the modification was made, or could have been made, without the consent of the owner).	Applicant (Caltex) is owner of land.
1(i)	A statement as to whether the application is being made to the Court (under section 96) or to the consent authority (under section 96AA), and, if the consent authority so requires, must be in the form approved by that authority.	**Section 1.4** **Section 5.3.1**
2	The notification requirements of clause 49 apply in respect of an application if the consent of the owner of the land would not be required were the application an application for development consent rather than an application for the modification of such consent	Not applicable

Clause	Requirement	SEE Location
3	Additional requirements if an application for the modification of a development consent under section 96 (2) or 96AA (1) of the Act, if it relates to residential flat development.	Not applicable
4	Additional requirements if an application referred to in subclause (3) is also accompanied by a BASIX certificate.	Not applicable
5	The consent authority may refer the proposed modification to the relevant design review panel but not if the application is for modification of a development consent for State significant development.	The Project is classified as State Significant Development
6	Additional requirements if an application for the modification of a development consent under section 96 (1A) or (2) of the Act, if it relates to development for which the development application was required to be accompanied by a BASIX certificate or BASIX certificate.	Not applicable
7	Additional requirements relating to the appropriate BASIX certificate.	Not applicable
8	An application for modification of a development consent under section 96 (1), (1A) or (2) or 96AA (1) of the Act relating to land owned by a Local Aboriginal Land Council may be made only with the consent of the New South Wales Aboriginal Land Council.	Land is not owned by Local Aboriginal Land Council
9	The application must be accompanied by the relevant fee prescribed under Part 15.	Noted
10	A development consent may not be modified by the Land and Environment Court under section 96 of the Act if an application for modification of the consent has been made to the consent authority under section 96AA of the Act and has not been withdrawn.	Not applicable

The SEE will be placed on public exhibition in accordance with Section 118 of the EP&A Regulation.

1.5.3 Assessment and Determination

Following exhibition of this SEE, Department of Planning and Environment (DPE) will provide Caltex with submissions received during the exhibition period. Caltex may then be required to provide a written response to the submissions that have been received.

DPE will make the following documents publically available:

- the S.96 application for modification to development consent SSD 5544 , including any accompanying documents or information and any amendments made to the development application;
- any submissions received during the submission period and any response provided (if required by DPE);
- any documents or information provided to the DPE by the applicant in response to submissions; and
- any assessment report prepared by the DPE.

DPE will then prepare an Assessment Report for the ACS Modification works that will take into account comments from relevant Government authorities as well as other stakeholders and the community. The Assessment Report will be provided to the Minister, or their delegate, who will determine whether to recommend S.96 approval. The Minister may delegate this determination to the NSW Planning Assessment Commission (PAC).

If granted, the approval may include a number of recommended conditions of consent to which the proponent would need to adhere during the undertaking of the ACS Modification works.

1.6 Terms and Definitions

Table 1-2 provides a summary of the terms used throughout this SEE.

Table 1-2 Summary of Key Terms and Definitions

Terminology used in this SEE	Definition
the Project	The conversion of the Caltex Refinery in Kurnell for future use as a viable and sustainable terminal to receive and distribute refined petroleum product.
the ACS Modification works	The proposed works to manage asbestos contaminated soil at the Site through placement in an onsite containment cell as well as the associated operation of a temporary biopile to treat soils with elevated levels of petroleum hydrocarbons (above restricted levels).
the conversion works	The previously approved works to convert the Kurnell Refinery to a finished product terminal. These works were approved as SSD 5544 (the approved Project is summarised in **Chapter 3 Approved Project**).
the demolition works	These previously approved works for the demolition, dismantling or removal of refinery process units, redundant tanks, redundant pipelines, redundant services and redundant buildings as well as associated minor civil works and waste management activities. These works were approved as SSD 5544 MOD1 (the approved Project is summarised in **Chapter 3 Approved Project**).
the Site	The Caltex Terminal on the Kurnell Peninsula, land owned and occupied by Caltex Australia Petroleum Pty Ltd. This is the area bordered by a solid black line on **Figure 1-1.**
Caltex's land ownership	This is the land owned by Caltex on the Kurnell Peninsula. It includes the Site and two other areas adjacent to the Site. This is the area bordered by a dotted black line on **Figure 1-1**.
conversion works area	The part of the Site where the conversion works took place (refer to **Figure 3-1**).
demolition works area	The area within which the demolition works are taking take place (refer to **Figure 3-1**).
ACS Modification works area	The area within which the ACS Modification works are proposed to take place (i.e. the proposed modification area) (refer to **Figure 1-2**).
Pipeways	The area where aboveground pipelines cross the Site. ACS has been identified in parts of the Pipeways (refer to **Figure 1-2**).
Containment cell works area	The area where the containment cell would be constructed and managed (refer to **Figure 1-2**).
Biopile works area	The area where the proposed ACS biopile would be located for temporary treatment of soils with elevated levels of petroleum hydrocarbons (refer to **Figure 1-2**).
the study area	The area in which environmental studies have been undertaken to assist in determining the impacts of the ACS Modification works. The parameters of a study area will vary depending on the environmental study being completed.
the proponent	Caltex Australia Petroleum Pty Ltd (Caltex)

1.7 Document Structure

Table 1-3 provides a summary of the document structure of this SEE.

Table 1-3 Document Structure

Executive Summary	This summarises the key issues and findings detailed in the other parts of the SEE.
Introduction	**Chapter 1** provides an outline of the approved Project (SSD 5544 and SSD 5544 MOD1), proposed Modification, the need for the proposed Modification, briefly outlines the environmental impact assessment process and introduces the various terms used throughout the SEE.
Project Location and Existing Environment	**Chapter 2** provides a description of the location of the Lot and the Site and describes the existing environment.
Approved Project	**Chapter 3** provides a description of the approved Project.
Proposed Modification	**Chapter 4** provides a detailed description of the proposed Modification including a program of activities and how they interact with the approved Project.
Legislation, Planning Policy and Approvals	**Chapter 5** includes the relevant controlling Commonwealth and State legislation and State and local policies. It identifies the licences and approvals required to enable the proposed Modification to proceed.
Consultation	**Chapter 6** summarises the issues raised during consultation with the relevant stakeholders. The issues raised during the consultation process are addressed in the subsequent specialist chapters of the SEE.
Environmental Scoping Assessment	**Chapter 7** provides an assessment of the potential environmental impacts of the proposed Modification and identifies the key issues for further assessment.
Environmental Assessment	**Chapters 8 - 15** provide an assessment of the potential impacts of the proposed Modification, including potential cumulative impacts, and the identification of appropriate mitigation measures to safeguard the environment.
Revised Management and Mitigation Measures	**Chapter 16** details the relevant environmental management and mitigation measures to safeguard against or minimise potential impacts from the proposed Modification.
Revised Conditions of Consent	**Chapter 17** outlines the existing conditions of consent for the conversion and demolition works that may need to be altered.
Evaluation and Justification	**Chapter 18** addresses the principles of Ecologically Sustainable Development (ESD) and the objects of the EP&A Act as well as providing a justification for the proposed Modification.
Appendices	**Appendices A – C** contain technical appendices for the Noise Impact Assessment, the Asbestos Containment Cell Concept Design Report and the Pipeways Asbestos Waste Classification Report.

2.0 Project Location and Existing Environment

2.1 The Site

2.1.1 Refinery and Terminal Operations

The Kurnell Terminal (the 'Site') is located on the Kurnell Peninsula within the Sutherland Shire Local Government Area (LGA), approximately 15 km south of Sydney's Central Business District. The Site is approximately 187 ha in size and consists of a number of lots and deposited plans. Between 1956 and 2014 the Site was used as both an oil refinery and a fuel terminal.

Kurnell Refinery was the largest oil refinery in NSW and the second largest of the seven oil refineries in Australia, based on crude oil processing capacity. It operated from 1956 to 2014. As approved in SSD 5544, refinery operations ceased in Q4 of 2014. A description of the approved conversion works (SSD 5544) and demolition works (SSD 5544 MOD1) is provided in **Chapter 3.0 Approved Project**.

Caltex now only import finished products (gasoline, jet fuel and diesel) through the two fixed berths at the existing wharf and the additional sub berth located in Botany Bay. These products are be stored in existing and converted tanks.

2.1.2 Site History

Caltex requested permission to establish a major oil refinery in NSW in 1951. Permission was granted by Cumberland County Council in June 1952 and the facility was commissioned in 1956. Since commissioning, the Site has been subject to various development applications (DAs).

The Site (refer to **Figure 1-1**) is legally described under the following lot and deposited plan (DP) numbers:

- Lot 56/ DP 908
- Lot 62/ DP 908
- Part Lot 12/ DP 7632
- Lot 190/ DP 7632
- Lot 44/ DP 8135
- Lot 46/ DP 8135
- Lot 78/ DP 8135
- Part Lot 122/ DP 8135
- Part Lot 124/ DP 8135
- Lot 48/ DP 9564
- Lot 78/ DP 9564
- Part Lot 1/ DP 215818
- Lot 1/ DP 215819
- Lot D/ DP 361103
- Lot G/ DP 361103
- Lot K/ DP 362655
- Lot 570/ DP 752064
- Lot 1/ DP 1044690
- Lot 283 / DP 752064
- Lot 57/ DP 908
- Part Lot 11/ DP 7632
- Lot 189/ DP 7632
- Lot 43/ DP 8135
- Lot 45/ DP 8135
- Part Lot 77/ DP 8135
- Lot 79/ DP 8135
- Part Lot 123/ DP 8135
- Part Lot 125/ DP 8135
- Lot 77/ DP 9564
- Lot 81/ DP 9564
- Part Lot 2/ DP 215818
- Lot B/ DP 338897
- Part Lot F/ DP 361103
- Lot J/ DP 362655
- Lot H/ DP 362655
- Lot 24/DP 776328
- Lot 25 / DP 776328
- Lot 1 / DP 132055

2.1.3 Existing Site Environment

The Site is zoned as Zone IN3 Heavy Industrial under the *Sutherland Shire Local Environment Plan 2015.*

The refinery was in operation from 1956 to 2014 and the Site has been highly disturbed during that time. As such there are few areas of ecological significance within the Site boundary.

The Site is listed as a heritage item on the *State Environmental Planning Policy (Kurnell Peninsula) (1989)* (SEPP (Kurnell Peninsula)) as the 'Australia Oil Refinery'. A summary of the history of the Site is included as part of the heritage assessment contained in **Chapter 14 Other Issues**.

2.2 The Surrounding Area

2.2.1 Surrounding land uses

Land uses surrounding the Site are as follows:

- to the east and south of the Site is the southern portion of the Kamay Botany Bay National Park;
- to the north-west of the Site, is the village of Kurnell and Marton Park;
- to the west of the Site is Quibray Bay; and
- land to the south west has the following land use zonings:
  - General Industrial;
  - Light Industrial;
  - Special Industrial; and
  - Special development.

2.2.2 Residential Areas

The village of Kurnell was proclaimed in 1933 and began to flourish following the construction of the Kurnell Refinery as many of the workmen employed to construct the facility took up residence. Many of the men who were employed to construct the refinery elected to stay in the area following the project's completion.

The Site is immediately to the south of the Kurnell Village and the Kurnell Village lies immediately to the south of Botany Bay. In the 2011 census Kurnell was recorded to have a population of 2,213[1].

2.2.3 The Existing Road Network

The Kurnell Peninsula is serviced by Captain Cook Drive. Captain Cook Drive has one lane for the majority of its length, travelling in each direction and is the only route of access and egress from the peninsula. This is discussed further in **Chapter 13 Transport and Access.**

2.2.4 Existing Environment Surrounding the Site

The general Site context in relation to Botany Bay and the wider area of Kurnell is shown in **Figure 1-1**.

The Site is located at the eastern end of Kurnell Peninsula. The Site is bounded by the Kamay Botany Bay National Park to the south and east, Captain Cook Drive to the north west and St Joseph Banks Drive to the south west. The northern Site boundary is bordered by Solander Street, a small southern section of Cook Street, undeveloped land, light industry and residences off the eastern side of Cook Street, and undeveloped land on the southern side of Reserve Road. Additional residences are located on the north side of Reserve Road. The Kurnell residential area is generally located to the immediate north and north west of the Site. Cronulla residential areas are located approximately 5 km to the south west.

Marton Park, comprising a developed recreational park area and an undeveloped wetland area, is located on the northern side of Solander Road. Kurnell Substation is located on the western side of Captain Cook Drive opposite the Site. Kurnell Desalination Plant is located opposite the terminal on the western side of Sir Joseph Banks Drive. The former Continental Carbon Australia facility is located approximately 800 m due south of the southern Site boundary, and is surrounded by the National Park.

In addition to the Kamay Botany Bay National Park and Marton Park, there are a number of other reserves within proximity of the Site. Captain Cook's Landing Place Park is located approximately 500 m to the north of the Site, while Bonna Point Reserve is located approximately 1.4 km to the north west of the Site. Towra Point Nature Reserve (on Towra Point Peninsula) is a Ramsar Site and is predominately on the other side of Quibray and Weeney Bays which are located west of the Site. Some of the Towra Point Nature Reserve extends as a vegetated fringe around the edge of Quibray Bay to an area close to the Site, north of Captain Cook Drive. Quibray Bay also includes Towra Point Aquatic Reserve which, whilst not part of Towra Point Nature Reserve and the Ramsar Site, forms a wider ecosystem with it. To the north of Kurnell is Botany Bay, a large bay with a diverse number of uses and habitats and where the Georges and Cooks Rivers meet before joining the Pacific Ocean.

[1] http://www.censusdata.abs.gov.au – accessed 21 July 2016

3.0 Approved Project

3.1 Introduction

This Chapter provides an overview of the key components of the approved Project (SSD 5544) (the conversion works) and approved Project modification for the demolition works (SSD 5544 MOD1).

A full project description is available in the Kurnell Refinery Conversion EIS (URS, 2013) and the Kurnell Refinery Demolition SEE (URS, 2014).

3.2 The Project

3.2.1 Conversion Works

The conversion works involved the conversion of tanks and installation of pumps and associated pipelines to allow for the cessation of refining at the Site and to allow for the expansion of terminal operations. These works occurred within the approved Project Area (referred to as the conversion works area) as presented in **Figure 3-1**.

Caltex received development consent for the conversion works in January 2014 (SSD 5544). Cessation of refinery operations occurred in Q4 of 2014. By mid-2015 all of the works approved under this initial development consent for the Project were completed except for a number of tank conversions which will continue until the end of 2016. The now operating Kurnell Terminal uses part of the Site in a manner similar to the refinery, i.e. for the storage and distribution of petroleum products. These works were and continue to be managed in line with the Environment Protection Licence (EPL) for the Site.

Following completion of the conversion works (i.e. end of 2016) the Site will have a nominal maximum storage capacity of 925 megalitres (ML) of refined product and by products.

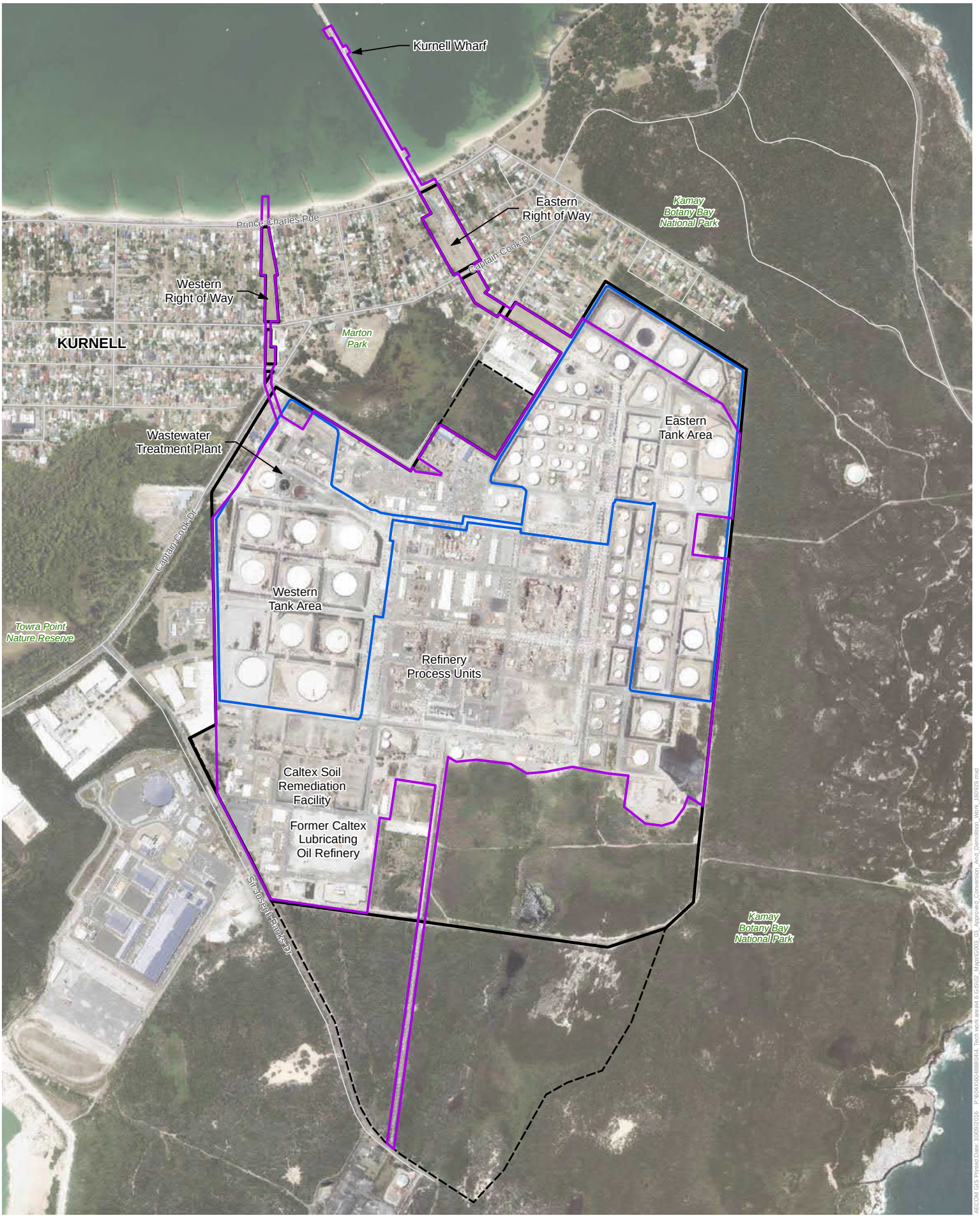
The Kurnell terminal has consent to manage the following products:

- Gasoline – Unleaded Petrol (ULP), Premium Unleaded Petrol (PULP) and Super Premium Unleaded Petrol (SPULP);
- Diesel; and
- Jet Fuel.

The terminal also has consent to manage the following by-products:

- Slop[2]; and
- Wastewater.

[2] Slop or slop oil is a petrochemical industry term for recovered petroleum hydrocarbons in a refinery or terminal, which requires further processing to make it suitable for sale and use. It is a product which Caltex would either reprocess at a separate facility or sell to a customer.



KEY

- The Site
- Caltex Land Ownership
- Conversion Works Area
- Demolition Works Area

AECOM

N

0 50 100 200 m

SCALE 1:9,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

FIGURE 3-1 - APPROVED CONVERSION AND DEMOLITION WORKS

PROJECT

KURNELL ACS MODIFICATION

CLIENT

CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	MJB	DATE 30/09/2016	MAP #	REV	Project
CHECK	WM	DATE 30/09/2016	G003	03	60488804

AECOM GIS Printed Date: 30/09/2016 P:\60\Xi\60488804\4. Tech work area\a4.6 GIS\02_Maps\G003_03_Approved_Conversion_And_Demolition_Work_160929.mxd

3.2.2 Demolition works

The demolition works involve the following activities:

- demolition, dismantling or removal of:
  - refinery process units and associated infrastructure;
  - redundant tanks and associated infrastructure;
  - redundant pipeways and above and underground pipelines; and
  - redundant buildings and services.
- associated civil works with the works outlined above;
- waste management activities including concrete crushing; and
- returning the works areas to ground level.

These works occurred within the approved demolition works area as presented in **Figure 3-1**.

Caltex received development consent for the demolition works in August 2015.

This consent included measures to manage the excavation, testing, storage and disposal of various soils at the Site, included hydrocarbon contaminated soils and ACSs, during the demolition works. These measures and the conditions of consent for the demolition works were agreed with various regulators and documented within the Demolition Environmental Management Plan (DEMP) for the Project.

The demolition works are likely to be completed by the end of 2017.

3.2.3 Program

The conversion works program and the demolition works program is provided in **Table 3-1**.

Table 3-1 Proposed Conversion and Demolition Schedule

Task	Indicative Date
Conversion Works	
Detailed Engineering & Design Start	Mid 2012
Engineering & Design Completed	Second half 2013
Tank Conversions Start	Q1 2014
Installation of Piping, Pumps and Associated Infrastructure	Q1 2014
Construction on Piping Completed	Q2 2014
Kurnell Refinery Shutdown	Q4 2014
Kurnell Refinery Decommissioning Process Units	First half 2015
Kurnell Refinery Decommissioning Tanks and lines	2015 – Mid 2016
Continued Tank Conversions	End 2014 – end 2016
CONVERSION TO TERMINAL COMPLETED	December 2016
Demolition Works	
Demolition of Refinery Process Units	Mid 2015 – Mid 2017
Demolition of Tanks	Mid 2016 – End 2017
Pipeline Removal	Start 2016 – End 2017
Demolition of Buildings	Mid 2016 – End 2017
Concrete Crushing	End 2017

3.3 Continued works

Continued maintenance and upgrade works are likely to occur over the coming years which would mean that the terminal would remain viable into the future. These upgrade works would be subject to relevant approvals and permits which would be applied for prior to the works being undertaken as required.

In the event that the terminal is no longer required, all decommissioning and restoration activities would be in accordance with applicable federal, state, and local permits, approvals and regulatory requirements and would be completed in accordance with existing licences and the relevant legislation and safeguards at the time. These works are subject to certain environmental approvals and safeguards, which would help ensure that any related work would be completed in a safe and appropriate manner.

4.0 Proposed Modification

4.1 Introduction

This Chapter provides an overview of the ACS Modification works, including a description of the works and a program for the works being undertaken. It describes the works that Caltex is seeking approval for under the S.96 (2) Modification Application. The ACS Modification works are in addition to the works described in **Chapter 3 Approved Project**.

4.2 Overview

The ACS Modification works would broadly involve the following activities within the ACS Modification works area presented in **Figure 1-2**:

- Construction:
  - Additional soil sampling within the pipeways to further improve the accuracy of waste classification of the soil prior to placement in the containment cell or ACS biopile;
  - Construction of the containment cell base and leachate collection system in the proposed cell location;
  - Installation of ground water monitoring wells down gradient of the proposed cell location;
  - Excavation and transportation of ACSs that have been classified as general or restricted solid waste directly to the containment cell location for emplacement;
  - Excavation and transportation of ACSs from the pipeways that have been classified as hazardous waste to be managed in one of the following ways:
    - Biopile the soil to process it until it can be classified as 'restricted solid waste' at a minimum and added to the containment cell; or
    - Removal off-site for treatment and disposal at an appropriately licenced facility in the event that biopiling does not effectively reduce the level of contaminants to a restricted level in the required timeframe.
  - Filling and compaction of the ACSs into the containment cell;
  - Environmental management of both the containment cell and the temporary ACS biopile areas;
  - Verifying the removal of ACS from the pipeways; and
  - Closure of the containment cell.
- Operation:
  - Managing and monitoring the closed containment cell.

The preferred approach to managing the ACSs that are classified as hazardous waste would be to biopile them on Site in order to reduce the level of hydrocarbons by biodegradation to a level where the soils can be classified as restricted solid waste. Whilst this method is expected to be successful based on previous examples, this assessment has included the option of removing this soils from the Site to a licenced waste facility as a contingency measure.

It is proposed that the containment cell would predominantly be used to dispose of ACSs from the pipeways in order to remove the hygiene risk and remove the WHS Regulation Exemption. However, Caltex are also proposing to dispose of ACSs from other parts of the Site if there is available capacity following disposal of the pipeway ACSs. These ACSs would need to be classified as either Special General Solid Waste or Special Restricted Solid Waste. All soils that would be placed within the containment cell or in the ACS biopile would only be sourced from the Site. No material from off site would be accepted in either the containment cell or in the ACS biopile.

Equally, it's important to note that SSD 5544 MOD1 provided consent for the excavation, handling, management and transport of ACS at the Site. As such, the modification for the ACS Modification works does not require consent for the excavation, handling and transport of ACS from other parts of the Site (i.e. outside of the pipeways) to the containment cell. Indeed as the demolition works assessed the management of contaminated

soils and ACS, the DEMP that is being used to manage these works contains a large number of measures that would be relevant to the ACS Modification works.

The works to construct, fill and close the cell are estimated to take approximately 18 months. The ACS biopiling works are expected to take approximately 11 months.

The capital investment value for the ACS Modification works is $13.5 million.

Concept design drawings for the containment cell are provided in **Appendix B**.

4.3 Investigations and Design

4.3.1 Soil

4.3.1.1 Soil Classification

Prior to the commencement of the construction works, further soil sampling would be undertaken to:

- to further improve the accuracy of waste classification of the soil for ongoing management, either to be placed into the cell directly, or to be processed in the ACS biopile; and
- to confirm the volume of soil classified as hazardous for processing at the ACS biopile and the characteristics of the soil to determine the appropriate biopiling process.

Section 4.4.3 outlines the different management options for hazardous waste.

4.3.1.2 Soil Volumes

Based on the review of the data provided in the *Pipeways Waste Classification Report* (AECOM, 2016a), the soils within the pipeways were classified in accordance with the Waste Classification Guidelines. The extent of each of these areas is shown on **Figure 1-2**. The calculated volumes are listed in **Table 4-1** below.

Table 4-1 Kurnell Pipeways – Waste Classification and Estimated Waste Volume***

Soil Category*		Area (ha)	Volume[1] (m^3)	Mass (tonnes)**
1	Soil - asbestos not detected	3.48	6,955	-
2	Special Waste (Asbestos)/ General Solid Waste	3.57	7,960	10,600
3	Special Waste (Asbestos)/ Restricted Solid Waste	1.15	2,308	3,100
4	Special Waste (Asbestos)/ Hazardous Waste	1.44	2,880	3,850

**Waste Classification based on the Waste Classification Guidelines (EPA, 2014).*

***The conversion density used for soil from m^3 to tonnes is 1.34 t/m^3 based on the average minimum dry density tests carried out for soils located at the proposed asbestos containment cell area and assuming a moisture content of 5%.*

****Testing was focused on the pipeways as this was subject to the WHS Exemption. However other parts of the Site are also known to contain asbestos.*

4.3.2 Proposed Cell Location

In order to determine the most suitable location for the proposed containment cell an options analysis was undertaken (AECOM, 2016b). The proposed located, as shown in **Figure 1-2** and **Figure 4-2**, was identified as the preferred location based on the following characteristics:

- The area is bunded area:
- has an area of 11,398 m^2;
- is 268 m away from Kamay Botany Bay National Park;
- is 931 m away from residential dwellings;
- is 540 m away from commercial offices;
- is 650 m away from the SSRF (reducing cross contamination risks); and
- is within 13 m from the pipeways containing ACS.

Furthermore, the area provides easy access from all sides and is within the same area as the land farm, aligning with the current waste management use of this part of the Site.

The proposed cell location is contained within the existing tank bunds for tanks 224 and 225 and the majority of the bunded area for tanks 333, 334 and 335. The tanks have been demolished and associated infrastructure removed as part of the demolition works.

The Kurnell Terminal Geotechnical / ESA (AECOM, 2016c) identified that the geotechnical and environmental ground conditions would be suitable for construction of a containment cell within this location. Constraints associated with the shallow groundwater and bedrock preclude constructing a below ground containment cell. As such an aboveground containment cell is proposed.

4.3.3 Cell Design and Capacity

Based on review of the data provided in the *Pipeways Waste Classification Report* (AECOM, 2016a), the containment cell has been designed to create a maximum airspace capacity for up to 24,500 tonnes of ACS.

The 24,500 tonnes has been determined based on the following:

- 10,600 tonnes of Special General Solid Waste;
- 3,100 tonnes of Special Restricted Solid Waste;
- 3,850 tonnes of Special Hazardous Waste (assuming this volume can be successfully treated to allow re-classification as Special Restricted Solid Waste); and
- A 40% contingency which allows for sensitivity in soil density, potential use of daily cover soils during waste placement and space for other ACS from other parts of the Site if required.

Based on an average maximum wet density of 1.6 t/m^3; a 24,500 tonne capacity containment cell would require a waste containment volume of approximately 15,300 m^3. This airspace volume has been allowed between the top of the leachate barrier system and the underside of the capping layer.

The highest classification of waste to be contained within the containment cell is Special Restricted Solid Waste, and therefore the containment cell has been designed in accordance with the requirements for a restricted landfill cell. The concept design of the proposed containment cell has been prepared generally in accordance with the NSW *EPA Environmental Guidelines: Solid Waste Landfills, second edition 2016* (the Landfill Guidelines) (refer to **Appendix B**).

4.4 Construction

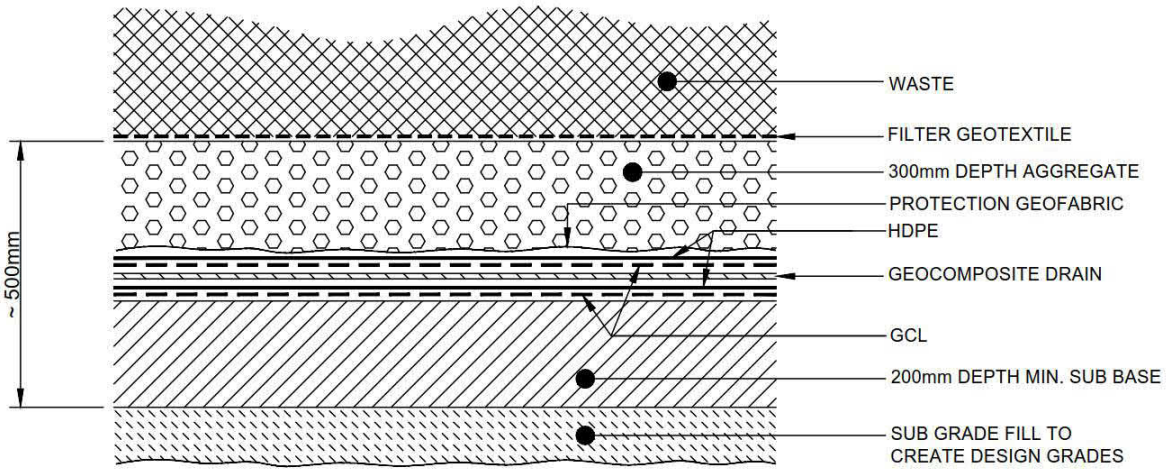
4.4.1 Cell Construction

The containment cell would be constructed in accordance with the Landfill Guidelines and in the following manner:

- Minor excavation in the existing ground surface for sump bases. Sump bases would be designed to be depressed to create a storage volume to minimise continuous pumping of leachate and/or inundation of large areas of the liner with leachate. The sump base is depressed approximately 500 mm into the existing surface in the area of the two sumps.
- Placement of sub-base fill to mirror the top of the liner. Liner surface grades would be designed in accordance with the Landfill Guidelines.
- Installation of the lining system, including leachate collection layer, to extend for the full extent of the footprint area to the top of the surrounding bunds. The proposed lining system is presented in **Figure 4-1.**
- The leachate barrier system would be a dual barrier system for containment of Restricted Solid Waste.
- Installation of a leachate storage tank within bund for tank 226.

The approximate extent of the containment cell is 80 metres in the east-west direction and 114 metres north-south. The proposed containment cell footprint for construction is shown in **Figure 4-1**.

Figure 4-1 Proposed Containment Cell Liner



Notes: HDPE - High Density Polyethylene
GCL - Geosynthetic Clay Liner

4.4.1 Excavation and Transport of ACSs

ACS from within the pipeways would be excavated by a licenced contractor. ACS classified as General Solid Waste and Restricted Solid Waste, as per **Figure 1-2**, would be excavated into a truck and dog and transported to the containment cell. ACS would be progressively excavated to align with the filling rate of the containment cell to minimise stockpiling.

A water truck would be used to wet down areas during excavation to minimise dust emissions. In the event that stockpiling is required, stockpiled soils would be wetted down to minimise dust emissions, placed on impermeable sheeting and covered, if being left overnight or unattended.

Following excavation, validation of the excavated areas would be undertaken to certify that asbestos is no longer present (refer to **Section 8.5** for further detail). Where required, the pipeways would be graded and backfilled with an appropriate material to protect against erosion.

4.4.2 ACS Preparation

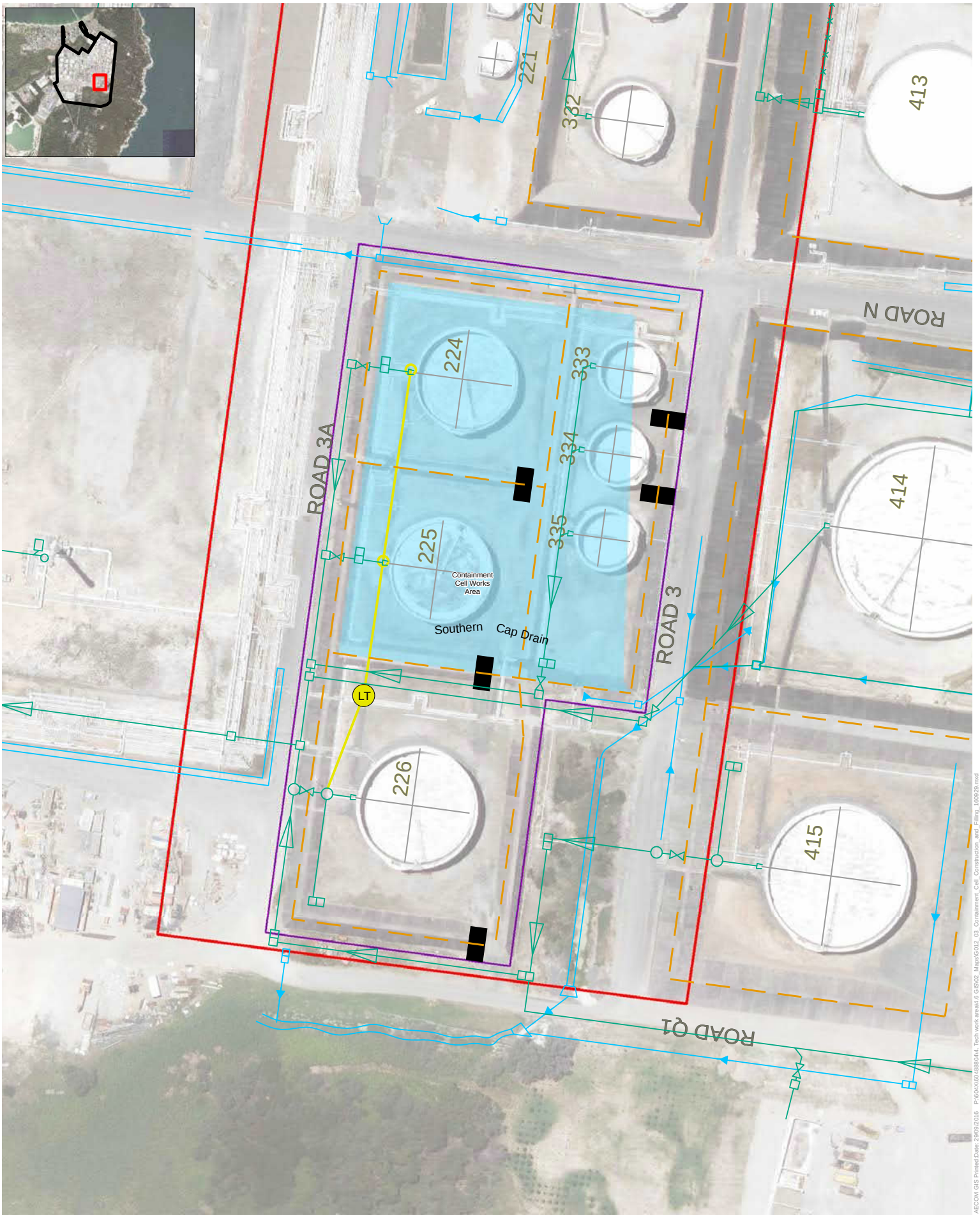
5,390 tonnes (around 3,600 m^3) of Special Hazardous Waste has been determined to be present within the pipeways based on the following:

- 3,850 tonnes of Special Hazardous Waste being calculated as being present (AECOM 2016a); and
- A 40% contingency on this amount which allows for variations in soil density.

This means that the amount of Special Hazardous Solid Waste being assumed to require on-site processing, or disposal off-site is a conservative estimate.

Based on Caltex's previous experience at the Site, biopiling has been determined as an appropriate way to treat the hydrocarbon contaminated ACS to allow it to be contained within the containment cell. The proposed approach to biopiling outlined in this section is based on the key learnings from the Kurnell Pilot Sustainable Soil Remediation Facility (PSSRF) (EPS, 2015), as well as the key learnings from consultation with the NSW EPA for the permanent facility (the 'Caltex Soil Remediation Facility' (CSRF)).

The objective of biopiling would be to reduce the concentrations of hydrocarbons (C_{10}-C_{36}) to a level below the upper threshold for Restricted Solid Waste before placement into the containment cell, whilst protecting the Site personnel and the community. Only ACS classified as Special Hazardous Waste from the pipeways would be biopiled.



KEY

- ACS Modification Works Area
- Containment Cell Works Area
- Containment Cell Footprint

Existing Infrastructure

- Bund
- Oily water sewer system
- Stormwater
- Gravelled Access Ramp
- Decommisioned Tank

Proposed Infrastructure

- Leachate Rising Main
- LT Leachate Tank

AECOM

N 0 10 20 40 m

SCALE 1:1,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

FIGURE 4-2 - CONTAINMENT CELL CONSTRUCTION AND FILLING LAYOUT

PROJECT

KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	MJB	DATE 29/09/2016	MAP #	REV	Project
CHECK	WM	DATE 30/09/2016	G012	03	60488804

AECOM GIS Printed Date: 29/09/2016 P:\60\4X\60488804\4. Tech work area\4.6 GIS\02_Maps\G012_03_Containment_Cell_Construction_and_Filling_160929.mxd

Overview

Biopiling the Special Hazardous Solid Waste would broadly involve the following works:

- establishment of the Biopile works area;
- excavation of soils from the pipeways for immediate transport to the bipopile pads, or to the soil homogenisation area;
- construction of the biopiles;
- bio-remediation of the impacted soil;
- testing of the treated soil; and
- transport to the containment cell.

These aspects are discussed in more detail below.

Biopile Works Area Construction and Biopiling Process

The biopiling area would be constructed within the former bunds of tanks 213, 214, 215, 327, 328, 353 and 354 (refer to **Figure 4-4**). The existing bunds would be utilised to prevent surface water flowing into or out of the biopiling works area.

To prepare the biopiling works area, the biopile pads and soil homogenisation area would be lined with a geosynthetic clay liner or 1.5 mm thick HDPE liner. These would be aligned and connected to the existing oily water sewer system (OWSS) which still services the bunded area. Although production of leachate from the material is considered unlikely, the ACS biopile would be designed to dispose of leachate through the Oily Water Sewer System (OWSS).

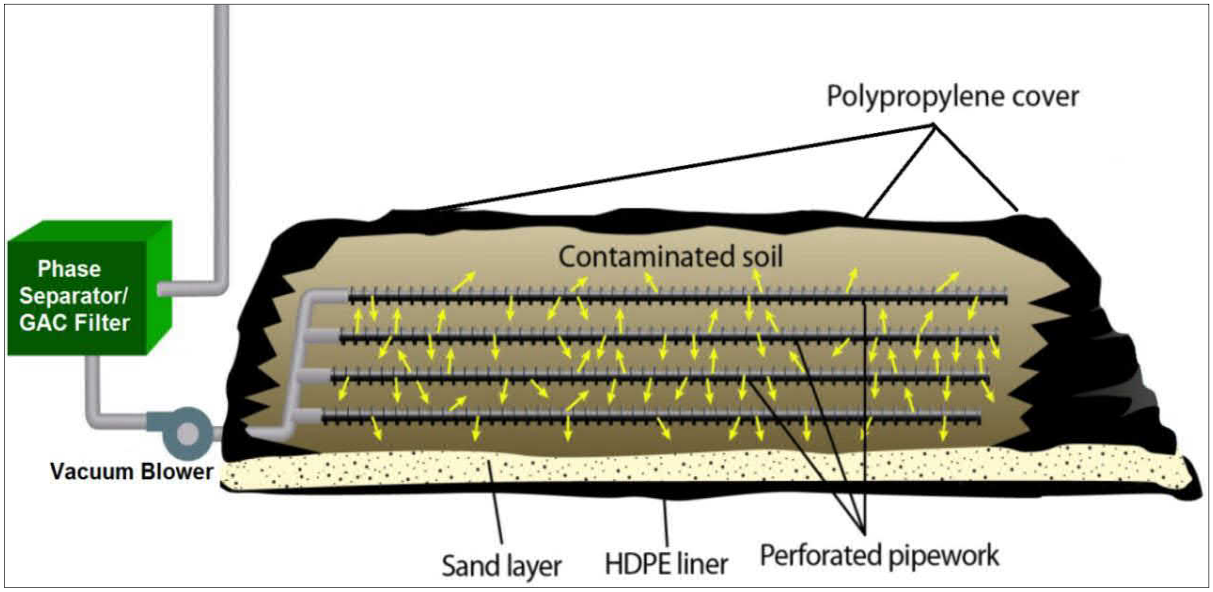
Crushed concrete would be utilised to stabilise vehicle access locations.

An ‘active’ biopiling process is proposed due to the need to minimise the risk of release of asbestos fibres from the soil. Active biopiling is a covered aerated system retained under negative pressure. The aeration system uses blowers and a pipe network to introduce air to the system. Air and vapour leaving the system are directed to a carbon filtration drum. This drum captures and negates the release of odours and remaining volatile organic compounds (VOCs) to the airshed. This is preferable to an “intensive” bioremediation method which would involve frequent mechanical turning of the material.

provides a schematic of a typical active biopiling aeration system, which would be a similar system to what would be used for the ACS Modification. As shown in **Figure 4-3**, each active biopiling system would normally comprise the following:

- a network of perforated PVC piping connected via gathering system;
- a phase separation tank, where extracted water is collected (either due to the presence of water in the biopile, or the condensation of water vapour in the aeration system);
- two Granular Activated Carbon (GAC) canisters in series;
- a vacuum blower; and
- a short exhaust vent which can be monitored using a Photo-ionisation Detectors to determine the presence or absence of VOCs.

Figure 4-3 Schematic of Typical Biopile Aeration System (adapted from NSW EPA 2012)



The maximum height of the biopile would be 2.5 m. The volume of the biopile would be finalised following further classification and pending the volume of impacted soils needing to homogenised (described further below). For current purposes it is assumed that the total volume of ACS for biopiling would be approximately 4,000 m^3 which is comparable to the conservative estimate. This volume would be divided into four biopiles each of 1,000 m^3. For a 2.5 m high biopile holding a volume of 1,000 m^3 this would require a basal footprint for each biopile of approximately 20 m x 30 m, allowing for a stable slope at the perimeter of the material.

Granular activated carbon drums would be placed in series to capture VOCs, although they are anticipated to be minimal. Photo-ionisation Detectors would be utilised to confirm the absence of VOCs following construction. The biopiles would be covered at all times following placement of soils.

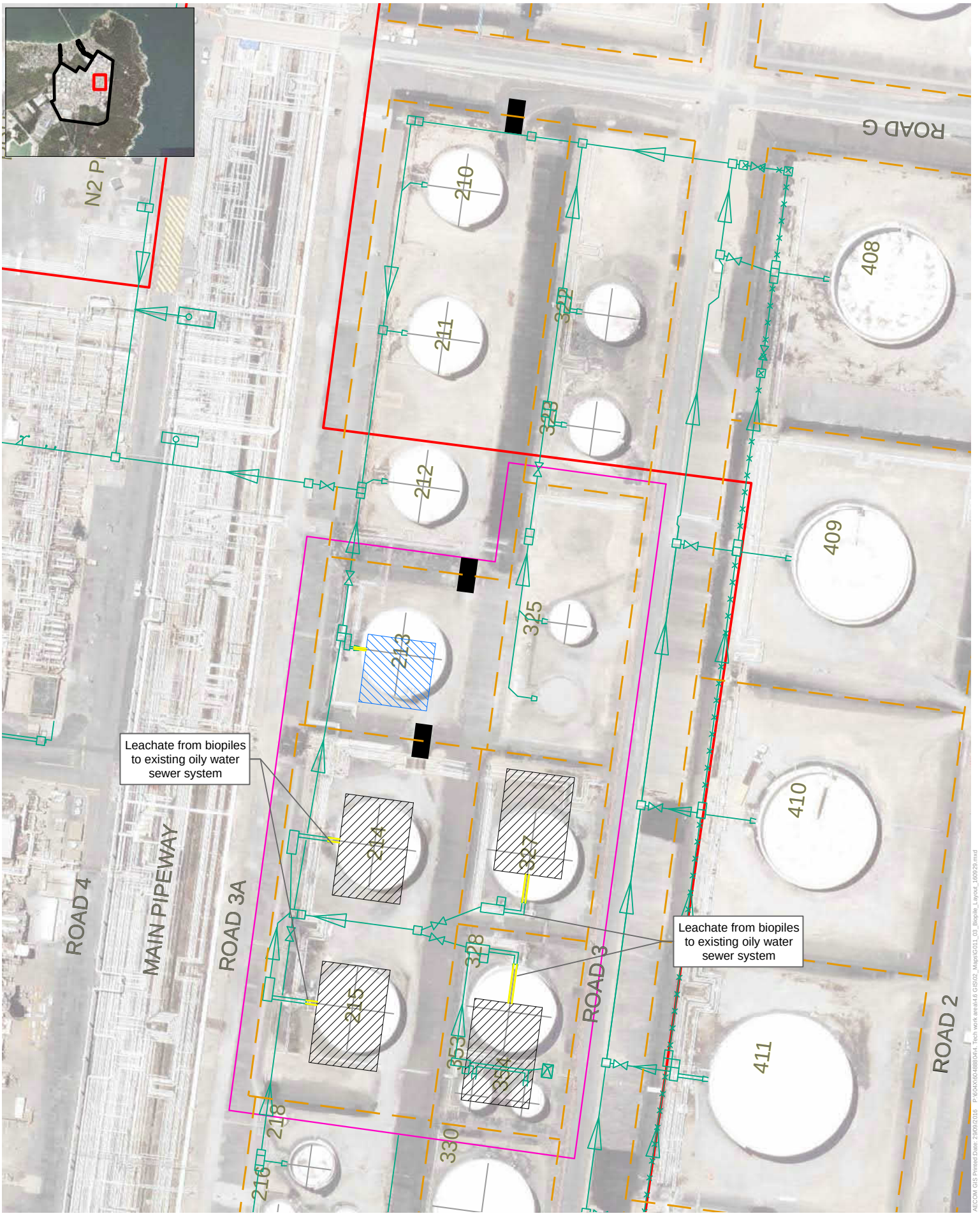
Soil Characteristics

The soil to be processed is classified as 'Special Hazardous Waste' as per the NSW Waste Classification Guidelines (EPA, 2014) based on the presence of elevated concentrations of petroleum hydrocarbons and asbestos fibres. Analysis has shown that the hydrocarbons generally occur in the carbon band range $C_{15} – C_{36}$ which is generally non-volatile or semi-volatile. With reference to petroleum hydrocarbons in the range $C_{10} – C_{36}$ the Waste Classification threshold values are as follows:

- for General Solid Waste, max concentration of 10,000 mg/kg;
- for Restricted Solid Waste, max concentration of 40,000 mg/kg; and
- concentrations greater than 40,000 mg/kg: classifies as Hazardous Waste.

The measured concentrations in the $C_{10} – C_{36}$ range are between less than 50 mg/kg to 106,000 mg/kg with a mean of 19,087 mg/kg and a median of only 915 mg/kg, indicating that the higher concentrations are sporadic and that the material is not homogeneous (AECOM, 2016a).

Further, asbestos fibres also occur in the soils sporadically. Their presence does not correlate with the presence or absence of hydrocarbon contaminants in the soil.



KEY

- ACS Modification Works Area
- Biopile Works Area

Existing Infrastructure
- Bund
- Oily water sewer system
- Gravelled Access Ramp
- Decommisioned Tank

Proposed Infrastructure
- Oily water sewer system connection point
- Soil Homogenisation Area
- Biopile Pad

AECOM

N 0 10 20 40 m

SCALE 1:1,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE **FIGURE 4-4** - BIOPILE WORKS AREA

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	MJB	DATE 29/09/2016	MAP #	REV	Project
CHECK	WM	DATE 30/09/2016	G011	03	60488804

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Homogenisation Process

Active biopiling for hydrocarbons in the C_{10}-C_{36} range can only be effective if the typical hydrocarbon concentration is no greater than 50,000 mg/kg, and homogenous. Homogenisation is necessary to lower peak concentrations so as to promote microbe activity. The process of excavating the soils and placement within a truck prior to placement in the ACS biopile is expected to result in some homogenisation of the material. However, until the actual excavation works take place the level of soil mixing through this process is unknown. Therefore a separate homogenisation process as described below is proposed when required.

If necessary the soil would be homogenised by blending the material with elevated hydrocarbons (> 50,000 mg/kg) with excavated material from the pipeways classified as general solid waste to bring the hydrocarbon levels below 50,000 mg/kg prior to placement within the ACS biopile. The excavated material would be placed in a controlled stockpile next to the proposed biopiles where homogenisation is applied (refer to **Figure 4-4**). The material would be homogenised in batches using a screening bucket such as the Allu Screener Crusher bucket (or similar) attached to the dipper arm of an excavator. The crusher screener bucket and the controlled stockpile shall be kept wet whenever active to minimise the generation of dust.

Monitoring of the ACS Biopile

During the construction and operation of the ACS biopile(s), the following would be monitored:

- Prior to the commencement of excavations for biopiling, dust and aerosol monitoring stations would be placed at a minimum of six locations around the working area with the objective of monitoring prevalent upwind and downwind locations.
- During operation of the ACS biopile these stations would be used to monitor for particulate matter being mobilised from the biopile works area. The monitoring would be focused on identifying dust and asbestos emissions from this area to ensure that the ACS biopile is operating effectively and not resulting in asbestos and dust emissions.
- Carbon: nitrogen: phosphate: potassium ratios would be tested during the operation of the ACS biopile to determine the need, or otherwise, for additives such as straw, farm manure, Urea and fertilizer products such as diammonium phosphate.
- Soil sampling at ‘time zero’ would be undertaken (i.e. following construction and prior to covering of the biopiles) to confirm hydrocarbon concentrations at a rate of one sample per 100 m^3 of biopile. Subsequent samples from soil auger sampling beneath the cover would be every two weeks for the first month and every month for the following six months at a rate of one sample per 200 m^3 of biopile to determine and to maintain where necessary the appropriate levels of moisture content, oxygen and temperature. ACS Biopile soils would be tested to determine the rate of degradation of hydrocarbons and to allow forward projection of the necessary residence time in the ACS biopile prior to placement in the containment cell.

The specifics of this testing, including frequency, based on Caltex’s knowledge from the demolition works, PSSRF and CSRF would be outlined in an ACS Biopile Management Plan specific to the ACS Modification.

Once the soils meet the restricted waste thresholds (40,000 mg/kg) or less, the biopiles would be deconstructed and the soils would be excavated and placed in the containment cell.

The soils to be biopiled have a mixture of the lighter and heavier hydrocarbon fractions dominated by aliphatics which would be relatively more amenable to degradation. A conservative period of treatment of up to 10 months is estimated for the treatment of the homogenised soils prior to placement in the containment cell. One month would be required for deconstruction of the ACS biopile.

4.4.3 ACS Disposal

It is expected that the biopiling approach would be effective in bringing the hazardous ACS within the ‘Restricted Solid Waste’ classification. In the event that this approach is unsuccessful, this material would be transported to a licenced waste facility for treatment and disposal.

This material would have been moved to the biopile works area by this point. From here it would be carefully loaded into truck and dogs, securely covered, and transported by a licenced waste contractor to a licenced waste facility for treatment and disposal.

4.4.4 Cell Filling and Temporary Management

ACS classified as General or Restricted Soil Waste would be transported from the pipeways or biopile works area via truck. These soils would then be placed in the containment cell at the same rate as the ACSs are excavated from the pipeways. General and restricted soils will be placed first, followed by the soils from the ACS biopile once suitable. Once soils are placed into the cell a dozer and compactor would be used to fill in the cell in the appropriate sequence and grade.

It is proposed to use temporary plastic sheeting which would be placed immediately over the ACS after it is placed in the containment cell. The use of suitably rigid plastic sheeting would minimise the generation of dust from the placement of ACS. Prior to placement of the next load of ACS and at the start of each day's filling works, the plastic sheeting would be stripped back to allowing filling operations to continue. At the end of each day's filling operation the plastic sheeting would be secured in place to prevent it being lifted or displaced due to wind.

As discussed **Chapter 10 Surface Water, Wastewater and Flooding** the containment cell is located within a bunded area. During filling of the containment cell stormwater from within the bunded area would be treated as leachate and directed to the Site's WWTP via the OWSS. Stormwater outside of the containment cell area would continue to be managed in accordance with the existing processes at the Site.

4.4.5 Cell Closure

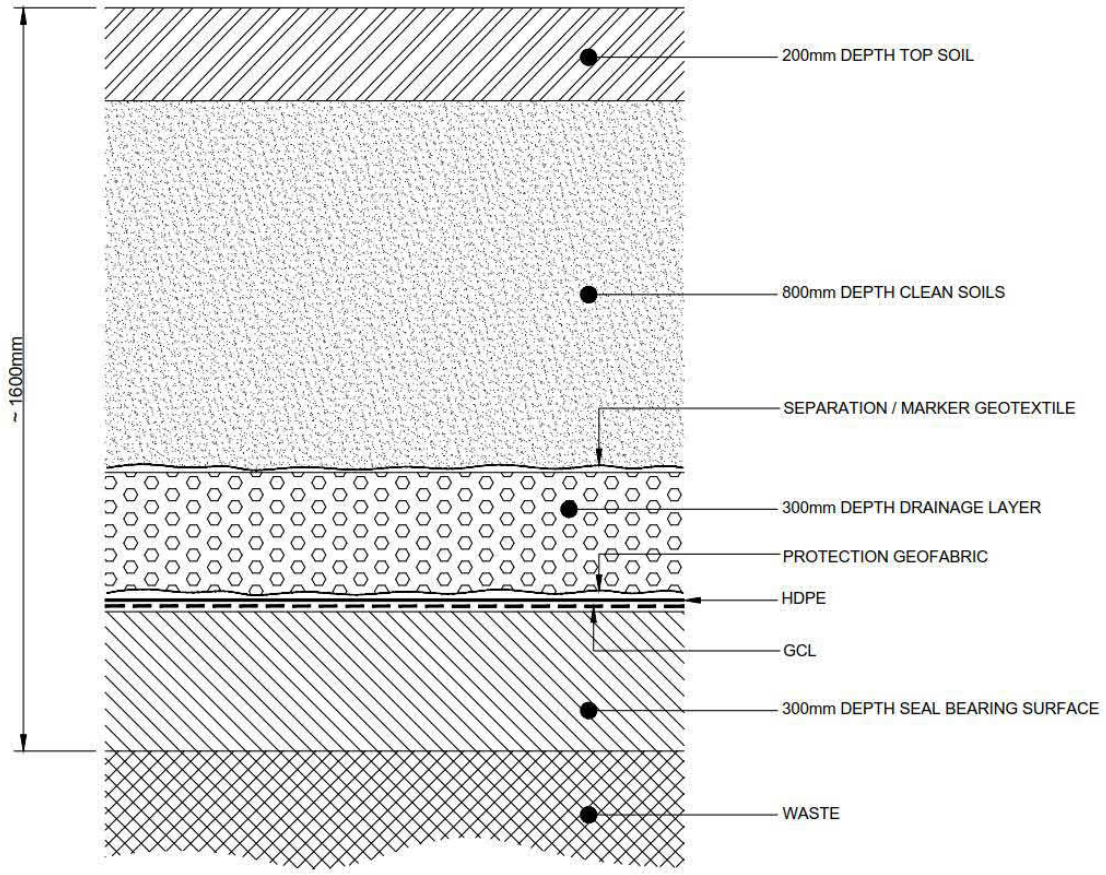
The containment cell capping layer would be designed to meet the minimum requirements of the Landfill Guidelines. At the completion of the filling the final cap would be installed and meet the following requirements:

- The top of the cap would meet the outer crest of the surrounding bunds except for the eastern side where the cap is limited to the boundary shown in **Figure 4-2**.
- The existing eastern bund would be removed to allow surface water flows from the final cap to drain to the Site's stormwater drainage system.
- The final height of the cap would be determined during waste placement and would be dependent on the final volume of waste generated from the ACS excavation works.
- To facilitate runoff and minimise ponding of water, the cap would have a gradient of greater than 5% to defined drainage points. However, to reduce the risk of erosion, the cap has been restricted to a gradient of ≤20%.
- The cell would be revegetated as soon as practicable following civil works with native grasses.

The Landfill Guidelines and *Protection of the Environment Operations (Waste) Regulation 2014* (Waste Regulations) require 3 m of VENM cover over asbestos contaminated waste however they do not require a geosynthetic liner in the cap. The proposed cap design, as described above, includes 1.6 m of soil and aggregate layers and two layers of geosynthetic including a GCL and an HDPE, as shown in **Figure 4-3**. The detailed design would include the design of the connection between the capping and liner layers, in particular the welding of the upper and lower HDPE liners, thereby fully containing the waste within HDPE and other layers. The 3 m of VENM over asbestos containing waste is prescribed in the Waste Regulations to ensure no friable particles are released from waste. The 1.6 m of soil and aggregate and the two layers of geosynthetic are considered an appropriate alternative to 3 m of VENM to contain asbestos fragments. In addition a marker layer would be included as a separation geotextile to reduce the risk of the cap being removed.

The proposed cell cap is presented in **Figure 4-5**.

Figure 4-5 Proposed Containment Cell Capping Layer



4.4.6 Program

The ACS Modification works would be undertaken over an 18 month period starting in January 2017.

Table 4-2 Proposed ACS Modification Works Schedule

Task	Indicative Date*
Containment Cell Construction	Start 2017 – Mid 2017
Excavation of ACS (hazardous waste) from Pipeways	Start 2017 – Q2 2017
Excavation of ACS (general and restricted solid waste) from Pipeways	Mid 2017 – End 2017
Preparation of ACS Hazardous Waste via Biopiling	Q1 2017 – Q4 2017
Filling of Containment Cell with ACS	Mid 2017 – End 2017
Closure of Containment Cell	Start 2018 – Mid 2018
On-going Management of Closed Containment Cell	-

*Depending on timing of approval.

4.4.7 Working Hours

The working hours would be in line with the Conditions of Consent for SSD 5544 and SSD 5544 MOD1, in particular Conditions C18, C19 and C20. In summary:

- Construction to be completed between 7.00 am and 10.00 pm seven days a week (Condition C18);
- High noise generating construction and demolition works would be confined to less sensitive times of the day, and shall not be undertaken on Sundays or public holidays or outside the hours of 7.00 am to 6.00 pm Monday to Saturday (Condition C19); and
- Construction outside those hours would only be undertaken in certain circumstances as defined in Condition C20.

Potential noise impacts related to the ACS Modification works are discussed further in **Chapter 11 Noise** and **Appendix A Noise Impact Assessment**.

4.4.8 Equipment and Plant

The following equipment and plant would be required for the ACS Modification works:

- Water truck
- Truck and dog
- Compactor
- Manitou Forklift
- Excavator
- Small Excavator (5 tonne)
- Dozer
- 360 degree 30 tonne crawler mounted back actor-excavator
- Hydraulic breaker
- Power mixer / Allu bucket
- Water bowser with spray feed
- Forklift
- Welding tools
- Wheel mounted front end loader
- Light weight wheel mounted tractor with narrow (600mm) back hoe)
- Tank and spray feed to apply nutrients.

4.4.9 Workforce

The ACS Modification works would require approximately 50 contractors at the Site over the program with a maximum of 30 staff on Site at any one time. A number of these staff are already based at the Site.

Table 4-3 ACS Modification Workforce

Stage	Workforce Numbers
Cell Construction	10
Excavation and Transport of ACSs	6
ACS Preparation	16
Cell Filling & Management	8
Cell Closure	10

*Truck movements to and from the site have not been included in the workforce numbers.

For comparison, **Table 4-4** presents the workforce numbers for the other activities that have previously, currently and are projected to take place at the Site

Table 4-4 Kurnell Terminal Workforce

Workforce Numbers (Previous, Current and Projected)								
	2012[2]	2013	2014[3]	2015	2016	2017	2018	2019
Caltex Employees	410	400	450[4]	40	45	45	45	45
Contractors	475	475	475	40	55	55	55	55
Conversion works construction numbers	-	140	140	100	90	-	-	-
Demolition works construction numbers	-	-	-	230	130	130	-	-
Caltex Soil Remediation Facility	-	-	-	-	10	5	5	5
ACS Modification works	**-**	**-**	**-**	**-**	**-**	**30**	**30**	**-**
Total	**885**	**1,015**	**1,065**	**410[5]**	**330**	**265**	**135**	**105**
Maintenance Shutdown Periods[1]	500	0[6]	0[6]	0[6]	90	90	90	90
Total including Maintenance Activities	**1,385**	**1,015**	**1,065**	**410**	**420**	**355**	**225**	**195**

Notes
1 Maintenance shutdown periods are periodic and for short time frames (8-12 weeks).
2 Employee numbers at the Site in 2012.
3 2014 will be the peak construction period. Additional personnel brought to the Site for the conversion works would be a maximum of 140 personnel.
4 Additional Caltex Employees in 2014 would be staff hired for terminal operations.
5 The large reduction in numbers between 2014 and 2015 follows the cessation of refining at the Site. The increase in workforce numbers between 2015 and 2016 represents a gradual stabilisation of the terminal operational workforce.
6 No maintenance shutdown periods will occur during 2013 and 2015

4.4.10 ACS Modification Works Traffic

The traffic generated by the ACS Modification Works would depend on whether the hazardous ACS are successfully biopiled or disposed offsite.

Based on previous experience it is likely that the biopiling process would be successful and as such the traffic movements associated with the modification works would incorporate a mix of construction plant vehicles and personnel movements. Under this scenario, traffic movements required for the ACS Modification works are likely to be minimal. Certain equipment would be required to construct and manage the containment cell and the biopiling area. Equally, up to 30 personnel would come to Site each day in private vehicles.

If the hazardous ACS need to be disposed offsite, then approximately 5,390 tonnes of Special Hazardous Waste would need to be transported to a licensed waste facility. This would conservatively require 180 truck and dogs or 360 truck and dog movements.

Access would remain the same as for the conversion and demolition works with access to the Site predominantely undertaken from Solander Street.

4.4.11 Environmental Management

The ACS Modification works would be undertaken in accordance with the existing Demolition Environmental Management Plan (DEMP) and associated sub-plans where applicable. A large number of the measures and controls documented within the DEMP and its subplans are relevant to the management of the ACS Modification works. This is particularly the case for the excavation of the ACSs from the pipeways.

The ACS biopile works and containment cell works constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities two additional subplans to the DEMP would be produced, one for the containment cell and one for the ACS biopile. These two subplans would reference other parts of the DEMP as necessary but would also include specific measures for these works. These subplans would be called:

- Containment Cell Management Plan
- ACS Biopile Management Plan

4.5 Operation

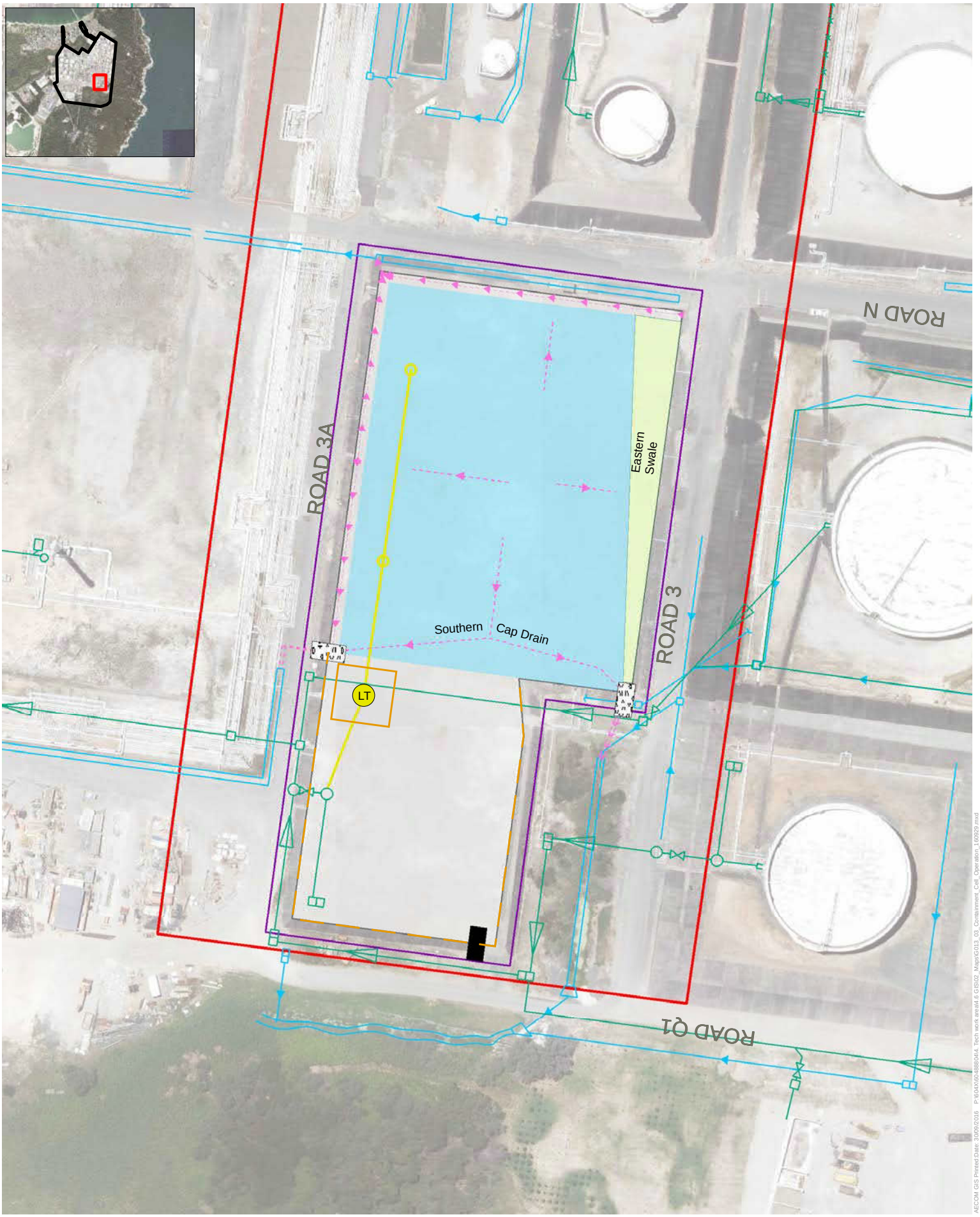
The on-going management of the containment cell would be incorporated into the Site's Operational Environmental Management Plan (OEMP). A relevant section of the OEMP would be developed and would include measures in line with the Landfill Guidelines. The OEMP would include the post-closure management and monitoring measures for leachate, stormwater, landfill gas, odour, dust, litter and final cap integrity. Refer to **Figure 4-6** for the Containment Cell Footprint layout during operation.

Leachate from the closed containment cell would be treated at the Site's Wastewater Treatment Plant (WWTP), in accordance with EPL 837. Stormwater would be directed to the existing stormwater catchments at the Site.

Following closure of the containment cell, post closure monitoring would include:

- Regular inspections for deterioration of the capping's condition, including erosion, cracking, dead or stressed vegetation, ponding, differential settlement, slope stability, and damage to any pipes, drains and other works installed on the final capping;
- Repair and/or replacement of portions of the final capping found to be damaged;
- Monitoring of leachate and rainfall volumes; and
- Groundwater monitoring.

The containment cell would not have an effect on the operation of the rest of the terminal.



KEY

- ACS Modification Works Area
- Containment Cell Works Area
- Containment Cell Footprint

Existing Infrastructure

- Bund
- Stormwater
- Gravelled Access Ramp

Proposed Infrastructure

- Leachate Rising Main
- LT Leachate Tank
- Bund
- Graded Existing Bunded Area

Stormwater Controls

- Cap Drain
- Formed Channel
- Under Road Pipe
- SW Drain
- Unformed Channel
- Rock Armour (Erosion Control)

AECOM

N 0 10 20 40 m

SCALE 1:1,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

FIGURE 4-6 - CONTAINMENT CELL OPERATIONAL LAYOUT

PROJECT

KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	MJB	DATE 30/09/2016	MAP #	REV	Project
CHECK	WM	DATE 30/09/2016	G013 03		60488804

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5.0 Legislation, Planning Policy and Approvals

5.1 Introduction

This Chapter reviews the key Commonwealth and State legislation as well as the State, regional and local planning policies that apply to the ACS Modification works in order to determine the approvals that would be required to allow the works to proceed.

The key approval required is consent under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The ACS Modification works constitutes 'development' as defined by the EP&A Act and therefore requires consent under Part 4 of the same Act. As the ACS Modification works results in substantially the same development as approved under SSD 5544 in January 2014, approval is being sought through a modification to the existing approval through Section 96 (2) of the EP&A Act.

A modification through Section 96 (2) of the EP&A Act requires that aspects of the ACS Modification works that may have environmental, social or economic impacts that differ from those previously assessed within the EIS for SSD 5544, are required to undergo assessment in line with Section 79C of the EP&A Act.

Under Section 79C, Part 4 of the EP&A Act, the ACS Modification works must be evaluated against a range of considerations including environmental planning instruments, NSW *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), the likely environmental, social and economic impacts of that development, the suitability of the Site, and the public interest.

In order to comply with the requirements for assessing this type of modification, a Statement of Environmental Effects (SEE) must be prepared and submitted alongside the Modification Application (MA).

In addition to modification approval under the EP&A Act, there are a number of other approvals that may be required. This section reviews Commonwealth and State legislation as well as the State, regional and local planning policies that apply to the ACS Modification works, to determine the approvals that would be required to allow the works to proceed.

5.2 Commonwealth Legislation

5.2.1 Environmental Protection and Biodiversity Conservation Act 1999

Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) states that an action which has, will have or is likely to have a significant impact on a matter of national environmental significance may not be undertaken without prior approval of the Commonwealth Minister for Environment and Heritage, as provided for under the provisions of Part 9 of the EPBC Act. The Act identifies the following as matters of national environmental significance for which Ministerial approval is required:

- World Heritage properties;
- National Heritage places;
- Wetlands of international importance (including Ramsar Wetlands);
- listed threatened species and ecological communities;
- listed migratory species protected under international agreements (e.g. CAMBA and JAMBA);
- protection of the environment from nuclear actions; and
- Commonwealth marine areas.

The EPBC Act also protects the environment within which any action is proposed to be undertaken, or where an action will affect Commonwealth land.

The ACS Modification works would not involve a nuclear action, are not expected to have a significant effect upon the health and viability of any migratory species listed under provisions of the Act, would not affect any World Heritage property, and would not affect any Commonwealth land or its environment.

Kurnell Terminal is located approximately 150 m from the Towra Point Nature Reserve, a listed Ramsar Wetland of international significance. The Kurnell Peninsula Headland is included in the National Heritage List (NHL listing No. 105812) established under the EPBC Act. The NHL was established to protect places that have outstanding value to the nation. Approval from the Minister is required under the EPBC Act for controlled actions which are deemed will have a significant impact on items and places listed under the NHL and on Ramsar Wetlands.

Chapter 14 Other Issues include assessments of the potential impact of the ACS Modification works on threatened species and communities. This assessment concluded that the ACS Modification works would not result in a significant impact on any Matter of National Environmental Significance (MNES). As such the ACS Modification works do not require referral to the Commonwealth Department of Environment (DoE) for approval under the EPBC Act.

5.2.2 Australian Heritage Council Act 2003

The Australian Heritage Council Act 2003 establishes the Australian Heritage Council as an independent advisory body regarding National/Commonwealth heritage places and mandates the Council to maintain the Register of the National Estate (RNE) to promote the assessment and conservation of heritage items.

No items listed under the RNE are located on or adjacent to the Site (refer to **Chapter 14 Other Issues**).

5.3 NSW State Legislation

5.3.1 Environmental Planning and Assessment Act 1979

The ACS modification works requires consent as 'development' under the provisions of the EP&A Act as it involves "*the use of land*" for the construction, filling and maintenance of the containment cell. The ACS Modification works is directly linked to approved Project SSD 5544 as they are the next step in the conversion process at the Site to establish a viable, safe, reliable and sustainable finished product import terminal at Kurnell and the management of asbestos and ACS onsite was specifically assessed as part of SSD 5544 MOD1.

As such, Caltex are seeking to modify the development consent for approved Project (SSD 5544) to ensure that the Project objective for this consent can be successfully achieved and the Project continued. Caltex have recognised that the inclusion of the ACS Modification works under the development consent SSD 5544 would result in certain impacts that were not considered under the initial consent, as such a modification application under S.96 (2) of the EP&A Act is being sought. Following completion of the ACS Modification works the end result would be substantially the same development as approved under SSD 5544.

Whilst the ACS Modification works would introduce new considerations for the Project, these matters would be temporary in nature and can be appropriately managed. Additional potential impacts would be managed in line with the proposed management and mitigation measures presented in **Chapter 16 Revised Management and Mitigation Measures**.

As this application is modifying a State Significant Development, the consent authority remains the Minister for Planning.

5.3.2 State Environmental Planning Policies

State Environmental Planning Policies (SEPPs) operate under the jurisdiction of the EP&A Act and set out planning policies for various geographies and project types within NSW. The relevant SEPPs for the ACS Modification works, and their requirements, are outlined below.

5.3.2.1 State Environmental Planning Policy 33 - Hazardous and Offensive Development

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) outlines the approach used in NSW for planning and assessing the risks and hazards associated with industrial development proposals. Through the policy, the permissibility of an industrial proposal is linked to its safety and pollution control performance. SEPP 33 applies to proposals that fall under the policy's definition of '*potentially hazardous industry*' or '*potentially offensive industry*'.

Under the land use definitions provided in the 'Dictionary' of the *Sutherland Shire Local Environment Plan 2015*, the ACS modification works would be considered a 'waste disposal facility' and not 'industry' (i.e. a place where 'industrial activity' takes place). This is because the ACS Modification works are temporary in nature (notwithstanding the maintenance of the containment cell), and are not being developed as a business for Caltex

(in contrast to the Caltex Soil Remediation Facility), but to reduce hygiene risks at the Site. Equally the ACS Modification works does not propose to use any dangerous goods.

Nevertheless as the transport of certain ACSs maybe required, a high level screening assessment has been included in **Chapter 14 Other Issues**.

5.3.2.2 State Environmental Planning Policy (Infrastructure) 2007

Clause 121(1) of *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) provides that "*development for the purpose of waste or resource management facilities … may be carried out by any person with consent on land in a prescribed zone.*"

Clause 120 of SEPP I defines "waste or resource management facilities" to include a "waste disposal facility".

Clause 120 of SEPP I defines "a prescribed zone" to mean:

"… any of the following land use zones or a land use zone that is equivalent to any of those zones: …

(d) IN3 Heavy Industrial, … "

As the ACS Modification works is defined as a type of 'waste or resource management facility', under clause 121(1) of the ISEPP it will be permissible with consent as it is within a prescribed zone (i.e. (d) IN3 Heavy Industrial) (refer to **Section 5.4**).

5.3.2.3 State Environmental Planning Policy No. 55 - Remediation of Land

State Environmental Planning Policy No. 55 - Remediation of Land (SEPP 55) provides a state wide planning approach to the remediation of contaminated land. Section 7 of the SEPP specifies that:

"A consent authority must not consent to the carrying out of any development on land unless:

(a) it has considered whether the land is contaminated, and

(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and

(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose."

Contamination issues are discussed within **Chapter 8 Soil, Groundwater and Contamination**. This Chapter identifies that the land is suitable for use for a containment cell and therefore the provisions to SEPP 55 do not prevent consent being granted for the works.

5.3.3 Other NSW State Legislation

While the EP&A Act provides the framework for the planning and development approvals system in NSW, there are a number of other Acts, Regulations and Environmental Planning Instruments (EPIs) of relevance to the ACS Modification works. The relevant Acts, Regulations and EPIs are discussed below.

5.3.3.1 Australian Oil Refining Agreements Act 1954

The Australian Oil Refining Agreements Act 1954 (AORA Act) was gazetted to facilitate the construction and operation of the Kurnell Refinery. The Act also allows for Caltex to maintain its asset at the Site.

5.3.3.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (PoEO Act) provides for the issue of an Environment Protection Licence (EPL) for scheduled activities pursuant to Section 48 of the PoEO Act, in relation to pollution and waste disposal caused by development or operation of developments. Activities requiring an EPL are listed in Schedule 1 of the Act.

Clause 15 of Schedule 1 lists 'contaminated soil treatment' as a schedule activity. Contaminated soil treatment, means "*the on site or off site treatment of contaminated soil (including, in either case, incineration or storage of contaminated soil but excluding excavation for treatment at another site)*." The containment cell will not treat or store contaminated soils, but will dispose of it. As such this element of the ACS Modification works would not apply. The temporary ACS biopile part of the works would treat the ACS classified as Hazardous Waste, however part of the works would only involve disturbing 1.44 ha of contaminated soil and would only need to treat approximately 2,880 m^3. Therefore the ACS Modification works would not be a scheduled activity under Clause 15, Schedule 1 of the PoEO Act.

The PoEO Act defines 'waste' for regulatory purposes. As only excavated soil from the Kurnell Terminal site will be placed within the proposed containment cell no ‘waste’ will be generated by excavating the ACSs unless the hazardous ACS need to be transported off site to a licenced facility.

The PoEO Act also provides for the management of water, air and noise pollution and the control of wastes. The proposed management and mitigation measures outlined in **Chapter 16 Revised Management and Mitigation Measures** would be implemented to minimise the potential for the ACS Modification works to result in pollution of the environment.

5.3.3.3 Work Health and Safety Act 2011

The *Work Health and Safety Act 2011* (WH&S Act) and its supporting Regulation 2011 (WH&S Regulation) defines major hazard facilities (MHFs), regulates their operation and includes measures to prevent accidents occurring at MHFs. They also include specific provisions regarding the management of asbestos and ACMs.

At present Caltex require an ‘Exemption’ to Section 419 of the *Work, Health and Safety Regulation 2011* in order to complete activities within the pipeways, including conversion and demolition activities, routine maintenance, sampling, valve operations, weed removal etc. The purpose of the ACSs modification works is to remove the ACSs from the pipeways and remove the requirement for an exemption.

The Site is classified as a MHF. Any works to or modifications of a MHF need to be discussed with Safework NSW as the administrators of the WH&S Act. Caltex have consulted with Safework NSW on the ACS Modification works (refer to Chapter 6) and will continue to do so moving forward. However as the ACS Modification works would not modify the MHF, consent and approval of WorkCover NSW is not required.

5.3.3.4 Water Management Act 2000

The *Water Management Act 2000* (WM Act) governs the issue of water access licences and approvals for those water sources (rivers, lakes, estuaries and groundwater) in New South Wales where water sharing plans have commenced. The Site is located within the area covered by the commenced Water Sharing plan entitled the ‘Greater Metropolitan Region Groundwater Sources’ 2011.

The WM Act creates:

- mechanisms for protecting and restoring water sources and their dependent ecosystems;
- improved access rights to water; and
- partnership arrangements between the community and the Government for water management.

The WM Act defines an aquifer interference activity as that which involves any of the following:

- the penetration of an aquifer;
- the interference with water in an aquifer;
- the obstruction of the flow of water in an aquifer;
- the taking of water from an aquifer in the course of carrying out mining or any other prescribed activity; and
- the disposal of water taken from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations.

The ACS Modification works would not extend more than 0.5 mbgl and therefore they are unlikely to intercet groundwater.

This is further discussed in **Chapter 8 Soil, Groundwater and Contamination** and **Chapter 10 Surface Water, Wastewater and Flooding**.

5.3.3.5 Threatened Species Conservation Act 1995

The Threatened Species Conservation Act 1995 (TSC Act) provides legal status for biota of conservation significance in NSW. The Act aims to ‘conserve biological diversity and promote ecologically sustainable development’.

The ACS Modification works would result in no impacts to the values protected by the TSC Act (refer to **Chapter 14 Other Issues**).

5.3.3.6 Noxious Weeds Act 1993

The *Noxious Weeds Act 1993* provides for the identification and control of noxious weeds and specifies the duties of public and private landholders to control noxious weeds. The Act stipulates that an occupier of land must take steps to control noxious weeds on their land.

The ACS Modification works are unlikely to effect on noxious weeds and their management at the Site (refer to **Chapter 14 Other Issues**). Management of noxious weeds on the Site would continue to be subject to Caltex's existing Weed Management Plan.

5.3.3.7 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) provides for the conservation of environmental heritage defined as places, buildings, works, relics, moveable objects, and precincts, of State or local heritage significance that are at least 50 years old. The Act provides for the listing of heritage structures on the State Heritage Register and Orders can be made under the Act to protect relics from removal or alteration. This Act applies to non-Aboriginal relics only. Aboriginal relics are protected under the *National Parks and Wildlife Act 1974* (see below).

An assessment of the potential impacts of the ACS Modification works on heritage items in the area is provided in **Chapter 14 Other Issues**. That assessment concluded that the heritage significance of the Site would not be significantly impacted by the works.

5.3.3.8 National Parks and Wildlife Act 1974

Under the *National Parks and Wildlife Act 1974* (NP&W Act) the NSW National Parks and Wildlife Service (NPWS) (part of the Office of Environment and Heritage (OEH)) is responsible for the care, control and management of all national parks, historic sites, nature reserves, Aboriginal areas, state conservation areas and regional parks. The relevant aspect of this Act that relates to the ACS Modification works is "*Protection of Flora and Fauna*".

The NP&W Act administers the protection of flora and fauna. It makes it an offense to harm any animal, threatened species, population or community that is protected under this Act within a licence or development consent. It also enables the creation of State-protected sites of ecological value.

The relevant provisions of this Act and relevant State-protected sites of ecological value have been considered within **Chapter 14 Other Issues**. This assessment concluded that the ACS Modification works would not have an impact on any threatened species, population or community protected under this Act.

5.4 Local Planning Policies and Instruments

The Site falls within the jurisdiction of the *Sutherland Shire Local Environment Plan 2015* (SSLEP). Under this LEP the Site is zoned 'IN3: Heavy Industrial'. Under this zone, no development is permitted without consent and a wide variety of land uses are prohibited.

Under the land use definitions provided in the 'Dictionary' of the SSLEP, the ACS Modification works would be considered a '*waste disposal facility*' as this means:

"*a building or place used for the disposal of waste by landfill, incineration or other means, including such works or activities as recycling, resource recovery and other resource management activities, energy generation from gases, leachate management, odour control and the winning of extractive material to generate a void for disposal of waste or to cover waste after its disposal.*"

The definition for a '*waste disposal facility*' goes on to note that "*waste disposal facilities are a type of waste or resource management facility.*"

The ACS Modification works would be considered a 'waste disposal facility' as it would involve the use of a place (i.e. part of the Site) for the disposal of a waste material (i.e. the ACSs).

'Waste disposal facilities' and 'waste or resource management facilities' are not specifically mentioned in the SSLEP as land uses that are either permitted without consent, permitted with consent or prohibited under IN3 – Heavy Industrial. However, the land uses listed under 'permitted with consent' include "Any other development not specified in item 2 (permitted without consent) or 4 (prohibited)". As such the ACS project would be permissible as an innominate land use. Equally these works are permitted in this location under the ISEPP (refer to **Section 5.3.2.2**)

The SSLEP aims to promote an appropriate balance of development and management of the environment that will be ecologically sustainable, socially equitable and economically viable. As discussed in **Chapter 18 Evaluation and Justification** the ACS Modification works are consistent with the principles or Ecologically Sustainable Development (ESD).

5.5 Strategic Planning Framework

The SEE has also assessed the demolition works against all relevant strategic planning documents, including those outlined below.

5.5.1 Land Use Safety Study (Kurnell Peninsula) 2007

The Land Use Safety Study assesses the current risks from Caltex Terminal operations to existing and future residential land uses and provides recommendations for risk reduction and development control.

The Land Use Safety Study identifies three main sources of risk from the Site:

- fires from large crude oil and refined petroleum product storage tanks and associated transfer pipelines;
- fires, explosions or toxic gas releases from processing areas; and
- fires and explosions from large liquefied petroleum gas (LPG) storage.

Chapter 14 Other Issues discusses the hazards and risks associated with the ACS Modification. The assessment concludes that the overall risk associated with the ACS Modification works is low and does not introduce an additional risk due the similar nature of the works to the demolition works at the Site.

6.0 Consultation

This chapter documents the consultation effort for the ACS Modification works.

6.1 Methodology

Consultation between the Caltex Terminal Management and various stakeholders is an ongoing process. Caltex maintains an open dialogue between the personnel responsible for the Site and those residents with whom it shares the Kurnell Peninsula. Regular community meetings, announcements and feedback sessions with the residents are part of the ongoing consultation process. Consultation on the ACS Modification works has included liaison with government agencies, including DPE, NSW EPA and SafeWork NSW.

6.2 Objectives of Consultation

The main objectives of the consultation are to:

- identify the relevant stakeholders and advise them of the ACS Modification;
- identify the key issues and sensitivities related to the ACS Modification;
- ensure ongoing communication is implemented with regards to the ACS Modification works and approvals process; and
- ensure that relevant government agencies are engaged in the planning and approvals process.

6.3 Stakeholder Identification

Given the nature and location of the ACS Modification, the stakeholders relevant to these works are similar to those identified as part of Caltex's ongoing community and stakeholder liaison strategy.

For this modification the key stakeholders were identified as DPE, NSW EPA and SafeWork NSW.

6.4 Government Agency Identification

The consultation undertaken with government stakeholders is outlined in **Table 6-1**. A summary of these responses in provided in **Table 6-2** in **Section 6.5.**

Table 6-1 Government Stakeholder Consultation

Department	Consultation Method	Response Provided
NSW Department of Planning and Environment (DPE)	Meeting 29 January and Letter 11 April 2016	Meeting outcomes are summarised in **Table 6-2** and email response to letter confirming modification approach
NSW Environment Protection Authority (NSW EPA)	Meeting 20 April 2016	Meeting outcomes are summarised in **Table 6-2**.
Safe Work NSW	Meeting 13 April 2016	Meeting outcomes are summarised in **Table 6-2**.

6.5 Summary of Issues and Responses

Table 6-2 summarises comments raised at the meetings noted above.

Table 6-2 Issues Raised Through the Consultation Process

Issue	Response
Government Agency issues raised	
NSW Department of Planning and Environment (DPE)	
Letter to be provided to DPE presenting justification for completing the ACS Management works as a modification to SSD 5544.	Completed
A convenient restricting future development may be placed on the area where the cell is located.	Noted
Need to consult with EPA and other relevant stakeholders.	Noted
NSW Environment Protection Authority	
EPA asked that the proposal consider the impact of the proposal other operations/management approaches at the Site include groundwater monitoring.	Chapter 8
EPA asked that all options are considered including managing the ACSs in situ and removing them from the Site. Caltex needs to justify why this is the preferred option.	Chapter 1
EPA noted the importance of considering the long term management of the proposal, whether financial assurance is appropriate and the importance of being transparent (e.g. including details of the containment cell on the property title.	Noted
The design for the containment cell should be in line with the Landfill Guidelines	Chapter 4
EPA asked if the cell is going to be used as a one off method or will Caltex consider placing additional waste from the Site into the cell that meetings requirements?	Chapter 4
EPA asked if the cell would be impacted by flooding?	Chapter 10
EPA would want to clearly understand the process for any onsite treatment of hazardous waste	Chapter 4
EPA mentioned that Caltex needs to have management plans for the following activities: - Excavation and transport of asbestos impacted soil to the containment cell - Construction of the containment cell - Filling and capping of the containment cell - Ongoing operations and maintenance of the cell	Chapter 16
Safe Work NSW	
The future use of the pipeways should be considered and if necessary the relevant National Environment Protection Measure.	Chapter 1
Once the ACSs are removed from the pipeways, measurements would need to be considered in order to demonstrate that the risk of exposure to friable asbestos is no longer present: - Visual inspection of the exposed excavation area of the pipeways would be required to confirm that there is no identifiable asbestos; and - Placement of a marker layer (e.g. geofabric) over the exposed excavated soils, at 200 mm or 500 mm depending on the excavation depth.	Chapter 4 and Chapter 8
Caltex should consider bring an independent licenced asbestos inspector on board to verify that the friable asbestos has been removed from the pipeways. All visual asbestos would need to be removed from the pipeways.	Chapter 8
During the works, visual inspections and air monitoring will be required in order to monitor for asbestos.	Chapter 4 and Chapter 12
There will need to be a Safe Work Method Statement and Air Quality Monitoring Program for the works.	Chapter 16

Issue	Response
Government Agency issues raised	
Any ACSs that can't be disposed of in the contaminant cell will need to be sent to a licenced waste facility.	Chapter 4
Placing VENM over the excavated parts of the pipeways should be considered.	Chapter 4
Following the works, Caltex will need to update the Asbestos Management Plan for the Site and Asbestos Register.	Chapter 16

6.6 Public Consultation

Caltex maintain on-going dialogue with the local community regarding its operations on the Kurnell Peninsula. Quarterly meetings are held for the community in Kurnell. This consultation is advertised and well-attended by a core group from the local community. In addition to the quarterly Kurnell Community Meeting, Caltex also engages with the local Kurnell community through:

- Kurnell Progress Residents Association (monthly) Meeting; and
- printed reports in Kurnell Village News (bi-monthly).

Caltex will use these consultation opportunities to discuss the proposed modification with the local community.

6.7 Exhibition

The SEE will be placed on public exhibition by the DPE. Submissions made during the exhibition of the SEE would be addressed with the Response to Submissions report to be prepared as part of the assessment process for the modification application. This process provides further opportunity for public and government agency involvement and participation in the environmental planning and assessment process.

6.8 During ACS Modification Works

During completion of the works, it is anticipated that the ongoing public consultation would sufficiently address the public consultation needs for the ACS Modification works. Caltex also invites the public to raise any comments and concerns via the publicly available telephone and email contacts featured on their website. Comments and concerns received would be managed under the established governance process whereby they would be logged, tracked and responded to promptly.

The process of regular community meetings, the use of the 24 Hour Community Concerns Hotline and providing further information to the community via letter drops would be used throughout the construction of the ACS Modification works.

7.0 Environmental Scoping Assessment

7.1 Environmental Scoping for Modification Application

This SEE documents a number of environmental assessments. These environmental assessments identify additional environmental impacts resulting from the ACS Modification works and identify appropriate measures to manage or mitigate these impacts.

The identification of potential impacts, and confirmation of appropriate assessment methodologies, is determined through a scoping process. The scoping process for this SEE was based on:

- a review of available information and documents relating to the existing environment;
- site visits and appraisals;
- consultation with stakeholders (refer to **Chapter 6 Consultation**);
- a review of relevant legislation and planning policy (refer to **Chapter 5 Legislation, Planning Policy and Approvals**); identifying the sensitivities of the local environment (refer to **Chapter 2 Project Location and Existing Environment**);
- understanding the characteristics of the modification and how they relate to the approved Project and the assessments which have been completed previously, in particular the demolition works (refer to **Chapter 4 Proposed Modification**); and
- an identification of other projects or actions that may cumulatively add to any perceived impact from the ACS Modification works.

7.2 Summary of Potential Issues Identified

Following the scoping process, potential issues were determined for the following environmental aspects, as relevant to the modification:

- Soil, Groundwater and Contamination;
- Waste Management;
- Surface Water, Wastewater and Flooding;
- Noise;
- Air Quality and Odour;
- Transport and Access;
- Heritage;
- Ecology (terrestrial); and
- Hazards & Risks.

7.3 Prioritisation of Potential Issues

A risk assessment was undertaken to determine the key issues and prioritise the scope of work for each environmental aspect. This risk assessment considered the issues mentioned in:

- consultation with relevant stakeholders;
- the EIS for the conversion works (URS, 2013); and
- the EIS for the demolition works (URS, 2014).

The risk assessment was undertaken in accordance with the guidelines outlined in AS/NZS 4360:2004 and AS/NZS ISO 31000:2009.

Table 7-1 outlines the key environmental aspects in relation to the ACS Modification works.

Table 7-1 Prioritisation of Environmental Issues

High Priority Issues	Medium Priority Issues	Low Priority Issues
- Soils, Groundwater and Contamination (**Chapter 8**) - Waste Management (**Chapter 9**) - Air Quality and Odour (**Chapter 12**)	- Surface Water, Wastewater and Flooding (**Chapter 10**)	- Noise (**Chapter 11**) - Transport and Access (**Chapter 13**) - Heritage (**Chapter 14.1**) - Ecology (**Chapter 14.2**); - Hazards and Risks (**Chapter 14.3**)

7.4 Format of the Assessment Chapters

A common format has been adopted for reporting each of the assessment chapters of the SEE. This is outlined below.

Introduction

This section provides an overview of the environmental aspect under consideration. It also provides cross-reference to other technical assessments or relevant appendices that have been used to inform the assessment chapter.

Method of Assessment

This section summarises the methodology for:

- determining the existing environment relevant to the particular environmental aspect;
- conducting an assessment of the potential impacts of the modification in relation to the particular environmental aspect;
- determining whether these impacts are significant; and
- providing a suite of mitigation measures that will minimise and manage these impacts.

For each environmental assessment there is an explanation of the approach to identifying impacts and assessing whether a potential impact is likely to be considered significant. Assessments can either be quantitative (relying on criteria, standards and thresholds) or qualitative (using certain scientific material, but ultimately making decisions based on professional judgement).

Existing Environment

The section describes the key components, characteristics and the status of the existing environment relevant to the environmental aspect. It also considers changes to the existing environment over the period of time that the ACS Modification works are to take place.

As the ACS Modification works are a modification to an approved Project, the existing environment takes into consideration the influence the conversion works and demolition works (i.e. the approved Project) would have on the existing environment. This needs careful consideration as there is an overlap between the approved demolition works in 2017.

Also, the key receptors for each assessment will be identified and described in this section.

Impact Assessment

This section identifies potential impacts of the ACS Modification works on the sensitive receptors for the particular environmental aspect and evaluates the significance of the impact in accordance with the criteria detailed in the Method of Assessment.

Impacts may be referred to either prior to (potential impact) or following mitigation (residual impact). In the 'Impact Assessment' section all impacts are potential impacts.

Impacts can be considered:

- direct or indirect;
- adverse or beneficial; and
- significant, non-significant (negligible) or neutral.

Where existing criteria, guidance, environmental standards or assessment methodologies exist, the significance of an impact will be based on that information. Where possible and/or necessary quantitative judgements about the significance of an impact will be made using this information. Where no explicit guidance or information exists, qualitative judgements on the significance of an impact will be made. Where qualitative judgements are required, some or all of the following impact characteristics will be considered to understand its potential magnitude:

- extent – the area potentially affected by the impact;
- magnitude – the size or amount of the impact;
- duration – how long the impact is likely to last;
- frequency – whether the impact is continuous, brief or intermittent;
- timing – if the impact occurs at a particularly sensitive time; and
- permanence – whether the impact is permanent or temporary.

The judgement as to whether an impact is significant will depend on the importance or sensitivity of the receptor (e.g. as defined by legislation, policy, standards or guidance) and the magnitude of the impact affecting it (as decided by quantitative or qualitative means). For the purposes of the 'Impact Assessment' section of each technical chapter all impacts are considered 'alone' and not cumulatively.

Mitigation

This section describes the management and mitigation measures that have been identified to avoid, reduce or compensate for the effects of significant impacts on the environment.

The mitigation hierarchy has been used to help identify management and mitigation measures for each of the technical assessments. Wherever possible, impacts have been firstly avoided where possible, then either reduced at source or at receptor where avoidance cannot be achieved, and finally either compensated or offset where avoidance or reduction is not possible or would not achieve practicable or acceptable levels of mitigation.

If management and mitigation measures are to be implemented through particular environmental management plans, then these will also be discussed.

Once all of the mitigation measures are identified and described, this section will also consider any residual impacts that would remain following the application of the management and mitigation measures.

Summary

At the end of each assessment chapter a summary is provided. This summary will note residual impacts and other relevant permits or licences that are required. It will also provide a table summarising the management and mitigation measures for just the ACS Modification works. These may include unaltered or amended measures from SSD 5544, SSD 5544 (MOD1) or new measures.

The management and mitigation tables from all of the technical assessments are collated into a single table (**Table 16-1**) within **Chapter 16 Revised Management and Mitigation Measures**. **Table 16-1** includes an updated, consolidated schedule of mitigation and management measures, and differentiates between the measures established for the approved Project and those proposed for the ACS Modification works.

8.0 Soil, Groundwater and Contamination

8.1 Introduction

The following chapter provides a description of the soil, groundwater and contamination management issues relating to the ACS Modification works.

This chapter presents a description of the soil, groundwater and contamination status of the areas which would be disturbed during the ACS Modification works (refer to **Figure 1-2**). This description is based on a desktop review of existing information as well as the geotechnical and environment site assessment (AECOM, 2016c) and the Pipeways Asbestos Waste Classification (AECOM, 2016a).

The potential impacts of the ACS Modification works are identified and assessed, and then mitigation measures are provided to avoid or minimise the potential impacts of the ACS Modification works related to soils, groundwater and contamination.

8.2 Assessment Methodology

This assessment has been conducted as a desktop investigation which involved the review of existing information about the Site such as: previous investigations, historic information, records of contamination and contamination management.

The following studies have been undertaken to understand the soil, groundwater and contamination within the ACS Modification works area:

- A geotechnical and environment site assessment (ESA) of the containment cell works area to understand the baseline soil, groundwater and contamination (AECOM, 2016c); and
- Pipeways Asbestos Waste Classification Report to identify the presence of asbestos and other contaminant concentrations in the sediments within the pipeways (AECOM, 2016a).

The background data used in this chapter is primarily based on a review of the following reports:

- Kurnell Refinery Conversion Environmental Impact Statement (URS, 2013);
- Kurnell Refinery Demolition Statement of Environmental Effects (URS, 2014);
- Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report (Coffey, 2007);
- Contamination Data Gap Assessment – Caltex Refinery, Kurnell (Caltex, 2013b); and
- Caltex Australia Petroleum 2014 Caltex Refinery Kurnell Preliminary Investigation Order 20131001 April (Caltex, 2014b).

8.3 Existing Environment

8.3.1 Regional Topography and Geology

The Kurnell Peninsula, is an elevated plateau of Hawkesbury Sandstone which is approximately 18 km in length (URS, 2004). The elevation on and around the Site is generally in the region of 5 m Australian Height Datum (AHD). Land to the east of the Site in Kamay Botany Bay National Park rises to approximately 30 m AHD (Port Hacking 9129-4N Topographic Map, Third Edition, Land and Property Information NSW, 2001). The depth to bedrock beneath the Site varies between 2 m to 20 m. Bedrock surface elevation rises toward the east and south of the Site, with sandstone outcrops mapped at the northeast and southeast boundaries (URS, 2006).

According to published geological information (Sydney 1:100,000 geological service sheet), the Site is underlain by Quaternary (Pleistocene) wind-blown medium- to fine-grained well-sorted marine quartz sand (URS, 2004, 2010).The sandstone is described as medium- to coarse-grained, composed predominantly of quartz with minor lithic fragments, feldspar, mica and clay pellets. The Site lies on the aeolian Kurnell landscape unit, composed of gently undulating to rolling coastal dunefield and relict dunes (NSW Soil Conservation Service Soil Landscape Series, Wollongong-Port Hacking, URS, 2011).

8.3.2 Acid Sulphate Soils

A review of the Atlas of Australian Acid Sulphate Soils Mapping (CSIRO, 2008) indicated that the ACS Modification works are on ground classified as 'Low Probability' of containing Potential Acid Sulfate Soils (PASS).

Acid sulfate soils have also been recorded and classified by Sutherland Shire Council in the ACS Modification works area. These maps show the ACS Modification works area extends across land classified as Class 4 with respect to PASS. Sutherland Shire Council has provided the following definition of Class 4 areas:

- *In a Class 4 area, acid sulphate soils are likely to be found beyond 2 metres below the natural ground surface. Any works that extend beyond 2 metres below the natural ground surface, or works which are likely to lower the water table beyond 2 metres below the natural ground surface, will trigger the requirement for assessment and may require management (Sutherland Shire Council, 2010).*

The ACS Modification works would not require excavation beyond 0.5 metres below ground level (mbgl) therefore acid sulphate soils are unlikely to be encountered.

8.3.3 Hydrogeology

8.3.3.1 Hydrology at the Site and the ACS Modification Works Area

A *Voluntary Investigation Final Report* by Coffey (2003) indicated that groundwater at the Site is contained within an unconfined aquifer in Quaternary sands, generally 2 to 2.5 mbgl. Although the groundwater is generally found at this depth, groundwater monitoring (Coffey 2011, Caltex 2013a) indicates there is variable depth to groundwater across the Site, ranging from approximately 1 mbgl in the north-western area of the Site, to 15 mbgl in the south eastern area of the Site. The groundwater flow is generally to the northwest (**Figure 8-1**) and influenced by the strike and dip of the underlying sandstone bedrock (Coffey 2007). Within the Site there is an east-west groundwater divide located south of the pipeways and north of the Caltex Soil Remediation Facility (CSRF) (Caltex, 2013b). To the north of the divide the groundwater flows in a north-westerly direction to Botany Bay at a gradient of 0.003 to 0.005. South of the divide the groundwater is thought to flow south west at gradient of 0.006 towards a stormwater drain, and then flow north west into Botany Bay via Quibray Bay (refer to **Figure 8-1**).

The ACS Modification works are located to the north of the divide therefore would only potentially impact groundwater flowing in a north-westerly direction.

The *Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report* by Coffey (2007) reports that groundwater in the north of the Site is thought to discharge to Marton Park Wetland. The receiving waters for groundwater migrating from the Site is Botany Bay to the north and Quibray Bay to the west. The ecosystem within Quibray Bay is considered sensitive and different parts of it comprise either Towra Point Nature Reserve or Towra Point Aquatic Reserve.

A quarterly groundwater monitoring program is implemented at the Site as a protection system to identify the potential for migration of hydrocarbon contaminated groundwater before it leaves the Site. The monitoring program includes monitoring wells in the central part of the Site and various boundary monitoring wells along the northern and western boundaries of the Site corresponding to the down gradient direction of groundwater flow (Coffey, 2003) (refer to **Figure 8-1**). There are also a number of private groundwater bores in Kurnell that are generally used for watering gardens. Monitoring of groundwater bores in the Kurnell residential area is conducted by Caltex every seven years. The most recent monitoring, GHD (2015), reported that "*overall, there is no evidence of impact to groundwater quality from the historical refining operations to the areas down hydraulic gradient*".

8.3.3.2 Hydrology at the Containment Cell Works Area

In order to determine baseline groundwater quality at the containment cell works area, two groundwater monitoring bores were installed AECOMMW1 and AECOMMW2 (shown in **Figure 8-1**). Monitoring at these bores was undertaken and identified that groundwater sampled from these wells did not show hydrocarbon impacts that exceeded ecological or groundwater health screening levels (ASC NEPM, 2013). Hydrocarbon detections were present but these were at magnitudes of order below the criteria (AECOM, 2016c). Both wells showed exceedances of the marine and fresh water guidelines for the metals chromium and zinc which is consistent with wells in the surrounding area based on the Annual Groundwater Monitoring Event report by Coffey (2015) where wells PMW01 and PMW10 had exceedances of zinc and PMW04 had exceedances of chromium.

Groundwater flow for the wells south of the containment cell works area was inferred to head in a westerly direction as these wells are located south of the onsite interpreted groundwater divide (Caltex, 2014). The location of AECOMMW1 and AECOMMW2 are north of the onsite interpreted groundwater divide (Caltex, 2014), and the likely flow from this area is towards the north-west.

8.3.4 Groundwater Dependant Ecosystems

The online Groundwater Dependent Ecosystems Atlas was consulted to determine the proximity of the ACS Modification works to potential Groundwater Dependent Ecosystems (GDEs). As shown in **Figure 8-2**, a vegetation GDE, noted as 'previously identified within a previous desktop study' is located partially on Caltex owned land. This GDE is the Marton Park Wetland, a freshwater wetland which includes woodland communities.

According to the Marton Park Wetland Management Plan (Molino Stewart Pty Ltd 2009) the wetland is a freshwater wetland with limited tidal influence. The wetland plays an important role in the drainage of the surrounding area, including the eastern portion of Kurnell, part of the Site and some Caltex owned land adjacent to the Site and the Kamay Botany Bay National Park.

Much of the Site is bunded and surface runoff from potentially contaminated areas, including the containment cell area, is treated onsite at the WWTP before discharging to the Tasman Sea.

Threats to the groundwater quality include the large number of houses in the area, the area not being sewered for a long time (historical threat), and potential infiltration from industrial sites (including the Site) (Molino Stewart Pty Ltd 2009).

To mitigate the potential impacts to groundwater, excavation works would be limited to 0.5 mbgl (refer to **Figure 8-4**) and appropriate controls implemented to restrict interaction with groundwater. The controls are discussed in **Section 8.5**.

8.3.5 Contamination

Based on the historical land use and reported activities carried out across the Site, various investigations have been conducted to determine key contaminants of potential concern (COPC) for the Site (Coffey, 2007, Coffey, 2011, Caltex 2013a, AECOM, 2013, AECOM, 2016a and AECOM, 2016c).

Table 8-1 presents a summary of COPC within the Contamination Management Zones (CMZs) identified from these reports that have the potential to be affected by the ACS Modification works (refer to **Figure 8-3**). A detailed summary of contamination with the pipeways is provided in **Appendix C**. As demonstrated in **Table 8-1**, Caltex have a number of processes and monitoring programs in place on the Site to manage existing COPC.

KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Interpreted groundwater level contours (mAOR)
- Interpreted groundwater flow direction
- Approximate location of bedrock ridge (Groundwater divide)
- Permanent Monitoring Well
- ASC Preliminary works Monitoring Bore

N

0 50 100 200 m

AECOM

SCALE 1:9,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

FIGURE 8-1 - COFFEY (2007) GROUNDWATER FLOW DIRECTION AND MONITORING WELLS

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

		DATE	MAP #	REV	Project
DRAWN	MJB	30/09/2016			
CHECK	WM	30/09/2016	G010	03	60488804

AECOM GIS Printed Date: 30/09/2016 P:\60\X\60488804\4. Tech work area\4.6 GIS\02_Maps\G010_03_Groundwater_Flow_160929.mxd

KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area

GDE, Reliant on subsurface groundwater (vegetation)

- Identified in previous study: fieldwork
- High potential for groundwater interaction
- Moderate potential for groundwater interaction
- Low potential for groundwater interaction

AECOM

N 0 200 400 600 m

SCALE 1:18,000 | SIZE A3

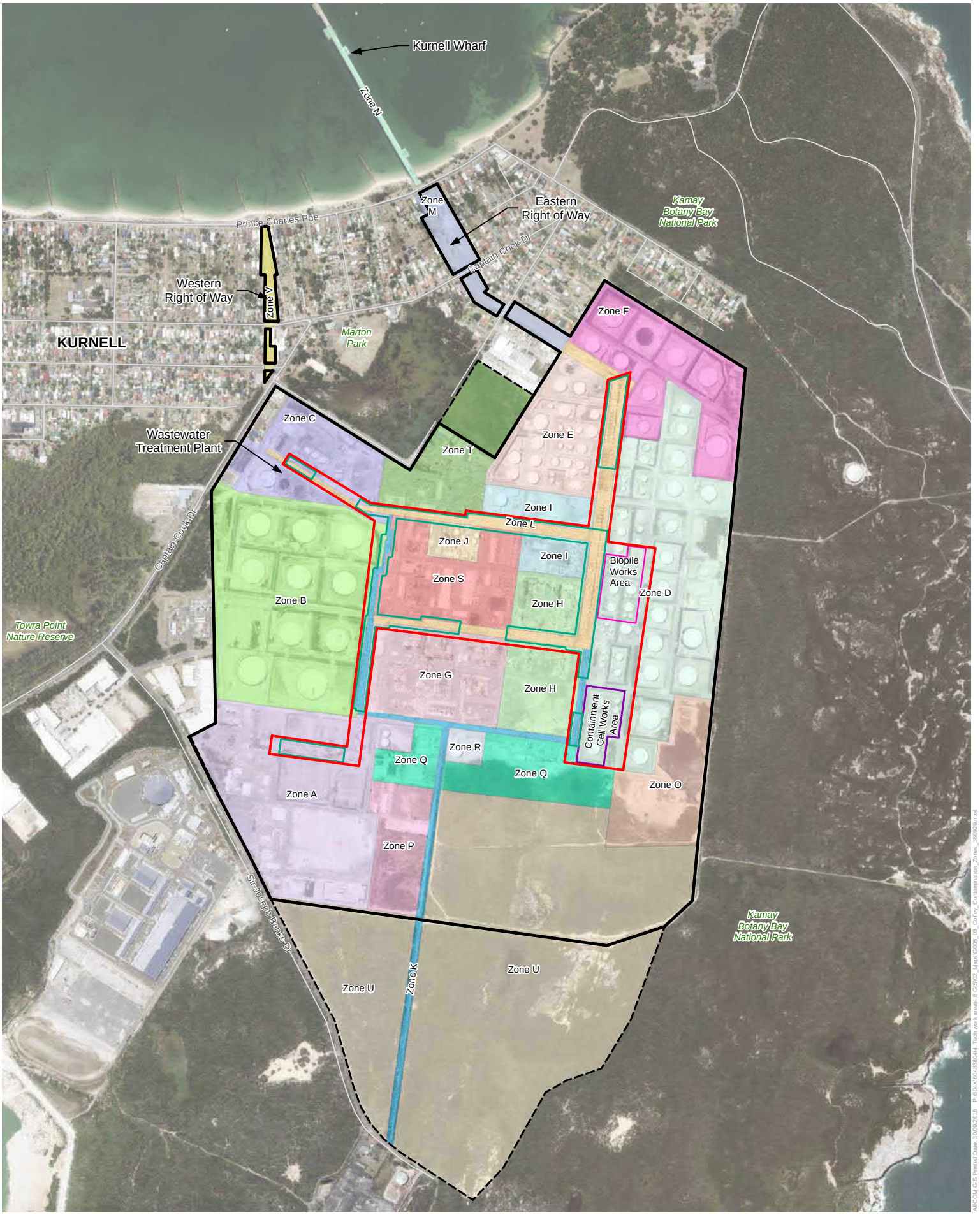
SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE **FIGURE 8-2** - GROUNDWATER DEPENDANT ECOSYSTEM

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	MJB	DATE 29/09/2016	MAP #	REV	Project
CHECK	WM	DATE 30/09/2016	G008 03		60488804



KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Pipeways to be excavated
- Biopile Works Area
- Containment Cell Works Area

Contamination Management Zone

Zone A	Zone G	Zone M	Zone S
Zone B	Zone H	Zone N	Zone T
Zone C	Zone I	Zone O	Zone U
Zone D	Zone J	Zone P	Zone V
Zone E	Zone K	Zone Q	
Zone F	Zone L	Zone R	

AECOM

N 0 50 100 200 m

SCALE 1:9,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

FIGURE 8-3 - COFFEY (2007) CONTAMINATIONMANAGEMENT ZONES

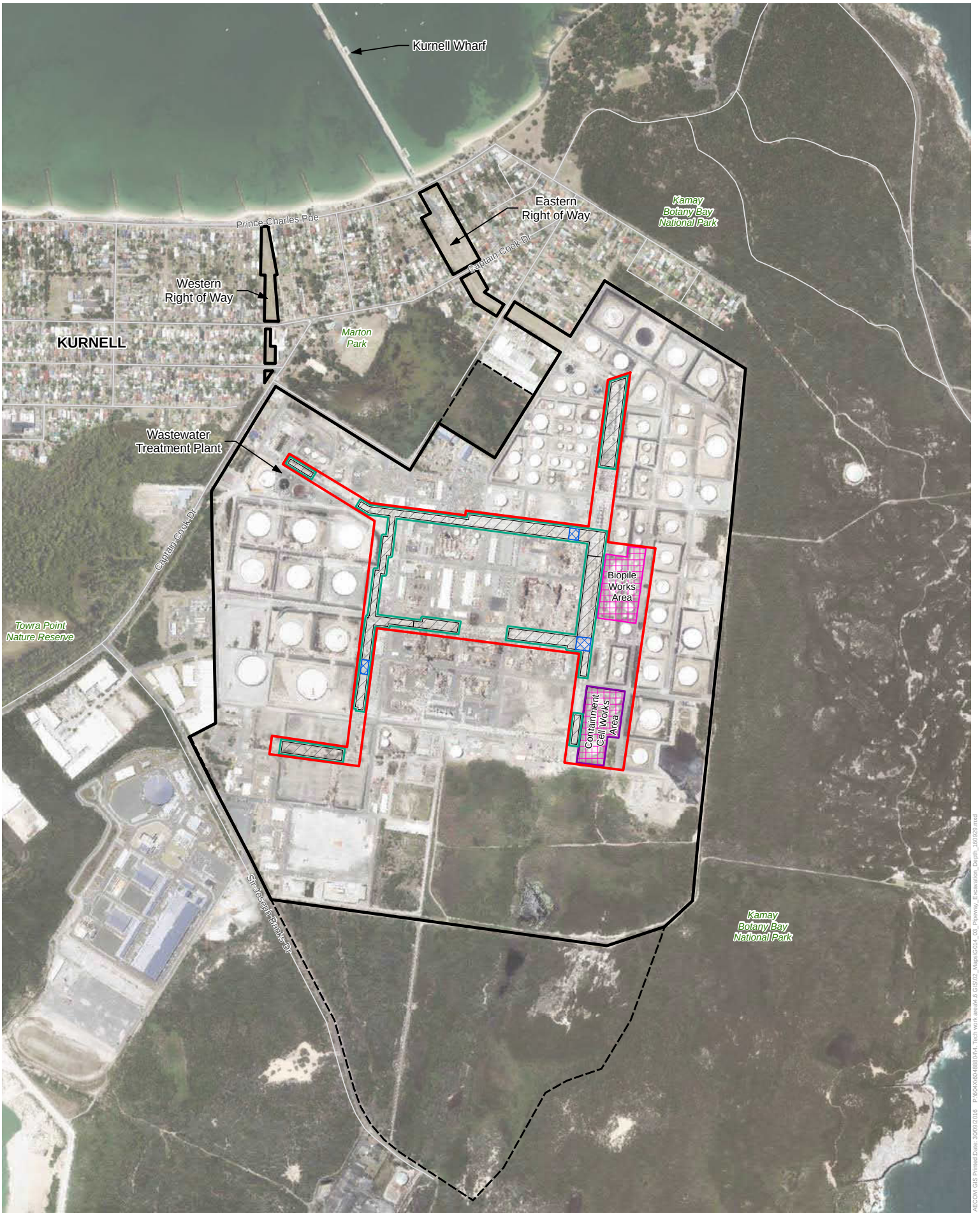
PROJECT

KURNELL ACS MODIFICATION

CLIENT

CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	MJB	DATE 30/09/2016	MAP #	REV	Project
CHECK	WM	DATE 30/09/2016	G005 03		60488804



KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Pipeways to be excavated
- Excavate to 0.5 m
- Excavate to 0.2 m
- Biopile Works Area
- Containment Cell Works Area
- Grading Works

AECOM

N

0 50 100 200 m

SCALE 1:9,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

FIGURE 8-4 - EXCAVATION DEPTHS & GROUND DISTURBANCE LOCATIONS

PROJECT

KURNELL ACS MODIFICATION

CLIENT

CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	MJB	DATE 30/09/2016	MAP #	REV	Project
CHECK	WM	DATE 30/09/2016	G014	03	60488804

AECOM GIS Printed Date: 30/09/2016 P:\60AX\60488804\4. Tech work area\4.6 GIS\02_Maps\G014_03_Pipeway_Excavation_Depth_160929.mxd

Table 8-1 Contamination Management Zones

CMZ*	Monitoring / Characterisation	Contaminants of Potential Concern	Groundwater Considerations	Soil Considerations
Zone D Containment cell and ACS biopile	Quarterly groundwater monitoring of monitoring wells hydraulically down gradient from Zone D. Refer to **Figure 8-1** for monitoring well locations. Monitoring and recovery wells were installed following a Light Non-Aqueous Phase Liquid (LNAPL) contamination event 1994.	TPH, BTEX, PAHs. Potentially mercaptans and Pb.	LNAPL was identified in the western portion of Zone D in the early 1990s. Although the LNAPL were recovered in 1994, it is possible that affected groundwater may be present. Groundwater sampled from AECOMMW1 and AECOMMW2 showed exceedances of the marine and fresh water guidelines for the metals chromium and zinc, however did not show hydrocarbon impacts that exceeded ecological or groundwater health screening levels guidelines (AECOM, 2016c). Contaminant levels were consistent with that reported in the Annual groundwater Monitoring Report (Coffey, 2015).	LNAPL were identified in the western portion of Zone D in the early 1990s. A distinct smear zone of heavy and light hydrocarbon was observed in soil east of the main pipeline. Assessment of parts of this CMZ have not indicated significant soil contamination related to refinery operations. No impacts to soil within the containment cell works area have been identified (AECOM, 2016c).

CMZ*	Monitoring / Characterisation	Contaminants of Potential Concern	Groundwater Considerations	Soil Considerations
Zone A **Zone K** **Zone L** Pipeways	Quarterly groundwater monitoring is conducted from three boundary and one in-bound monitoring well in Zone A. Refer to **Figure 8-1** for monitoring well locations. No groundwater monitoring is conducted in Zone K and Zone L. Soil sampling was undertaken in the pipeways in 2013 and 2016 (AECOM, 2016a) to investigate the presence of asbestos and other contaminants to determine an appropriate management strategy. Soil assessments have been undertaken for soil validation for the remediation of a pipeline leak and a soil assessment for waste classification purposes. The leak and associated impacted soils have been remediated and validated.	Zone A: TPH, toluene, PAHs, Butanone or methyl ethyl ketone (MEK), Furfural and Asbestos. Zone K and L: TPH, BTEX, PAHs, Phenols, Metals (Pb and Cr) and asbestos. Potential contaminants from off-site transported by the oily water sewer system (OWSS) and stormwater network. Zone A, K, and L; Chromium, Lead, Nickel, Mercury and Benzo(a)pyrene and total petroleum hydrocarbons (TPH).	Zone L: LNAPL contamination (sourced from Zone D) was identified in the early 1990s in the vicinity of the Pipeline easements. Contamination source assessments and remediation works have been undertaken in relation to identified contamination in the main pipeway (Zone L) and Continental Carbon Pipeline (Zone K). In both cases the contamination was considered to be remediated. Zone A: Elevated groundwater TPH has been periodically measured in the boundary and in-bound monitoring wells, with a general decrease in TPH and BTEX since 1998. During the contamination source assessments, TPH was measured in temporary surface water within the pipeways, ranging from 6,980 µg/L to 59,200 µg/L One location within the pipeways measured concentrations of naphthalene and phenanthrene in temporary surface water. TPH C_6-C_{36} and/or toluene exceeded the site investigation criteria at 9 locations out of the 13 sampled. Zone K: Regular quarterly groundwater monitoring in monitoring well PMW13 (Zone S) has previously detected elevated groundwater concentrations of TPH and naphthalene associated with a leak in Pipe Track 3 in Zone K. LNAPL was detected in monitoring well PMW13 (Zone S) between February 2000 and November 2002. A product recovery pump was installed in this well and Coffey reported no detection of LNAPL in 2006. Elevated TPH C_6-C_{36} have subsequently been reported in this well (42,290 ug/L in 2007 to 21,690 ug/L in 2013).	LNAPL contamination and affected subsurface soils (sourced from Zone D) were identified in the early 1990s in the vicinity of pipeline easements. Asbestos was identified in both the surface and the subsurface samples. Asbestos (including chrysotile and amosite) was at or above detection limits in a total of 25 of 35 ACS samples within the pipeways (AECOM, 2013 and AECOM, 2016a). The average quantity of asbestos detected varied between 0.005 wt% and 0.75 wt%, with the upper range being defined by two samples containing 0.75 wt% and 0.12 wt% asbestos. An overall average of 0.05 wt% was reported in soils in which asbestos was detected via quantitative analysis. Other contaminates were detected in soils within the pipeways, including metals, hydrocarbons and benzo(a)pyrene). Based on the total leachability of the metals the soils were generally classified as General Solid Waste, or Restricted Solid Waste as per the Waste Classification Guidelines (AECOM, 2016a). The measured concentrations in the C_{10} – C_{36} range are between less than 50 mg/kg to 106,000 mg/kg with a mean of 19,087 mg/kg and a median of only 915 mg/kg, indicating that the higher concentrations are sporadic and that the material is not homogeneous (AECOM, 2016a).

8.3.6 Remediation and Validation

Condition E1.1 of EPL 837, requires Caltex to undertake several investigations to address the data gaps identified in the "Contaminated Data Gap Investigation Plan, dated 15 April 2014. The final submission to the EPA under this program is due on the 26 December 2017. In addition Caltex will also prepare a Remediation Action Plan (PAP) for the Site for the commencement of remedial works in 2018.

In accordance with condition M2 of EPL 837, Caltex will continue to conduct quarterly groundwater monitoring. Groundwater monitoring results are reported to the EPA under condition R1, in the Site's Annual Return.

The ACS Modification works would not result in the removal of any monitoring wells and would not affect the ongoing remediation program at the Site.

During the ACS Modification works appropriate management and mitigation measures would be implemented to manage and appropriately handle contaminated soils. As identified in **Table 8-1**, no impacts to soil are present within the containment cell works area (AECOM, 2016a).

8.4 Impact Assessment

8.4.1 Construction Works Impacts

8.4.1.1 Overview

Figure 8-4 shows where excavation or ground disturbance works would occur for the ACS Modification works. As described in **Section 4.3**, ground disturbance works would result from the following activities:

- Excavation of soil from the pipeways - An estimated 13,148 m^3 of ACS is likely to be excavated to a depth of 0.2 to 0.5m from the pipeways. All of this soil is contained within defined pipeway areas. The soils below and around the pipeways would not be disturbed.
- Minor excavation/grading works would take place in the containment cell works area and the biopile works area to grade the area for drainage during the construction of the containment cell and ACS biopile. If soil is required to be imported to level these areas, it would be validated soil from the CSRF on the Site.

As discussed in **Section 4.3.6**, the excavation and ground disturbance elements of the ACS Modification works (i.e. pipeways excavation works and ACS biopile/containment cell construction) would be staged over a twelve month period.

The following soil handling activities would occur during ACS Modification works:

- excavation of loading of soil into trucks;
- unloading soil at the biopile works area;
- unloading and placement of soil in the containment cell works area;
- homogenisation of soil at the biopile works area in a controlled stockpile using a screening bucket attached to an excavator; and
- loading of soil at the ACS biopile for transport to the containment cell works area or off-site.

Potential soil and groundwater impacts from the ACS Modification works include:

- Excavation works within the pipeways generating dust and liberating asbestos fibres that could potentially affect on-site and off-site receptors;
- Biopiling (including homogenisation) and containment cell area works generating dust and liberating asbestos fibres that could potentially affect on-site and off-site receptors;
- Disturbance of soils through during the ACS Modification works potentially mobilising contaminants and resulting in contaminant migration to underlying soils and groundwater;
- Spills and leaks from construction equipment potentially contaminating soil and groundwater; and
- Vehicles dispersing contaminated materials across the Site and off-site.

According to available Acid Sulfate Soil Mapping (refer to **Section 8.4.1**), the probability of encountering acid sulfate soils in the ACS Modification works area is considered very low as excavations would only be to about 0.5 mgbl.

A number of these impacts have already been considered as part of conversion works (SSD 5544) and demolition works (SSD 5544 MOD1) approvals and are controlled by measures provided within the DEMP, but have been included here for completeness. Erosion and sediment control measures are also included in the DEMP.

Where further detail is required, these impacts are discussed in the following sections. Measures to minimise the potential for adverse effects are discussed in **Section 8.6**.

8.4.1.2 Asbestos

Asbestos would be encountered during the construction works. Asbestos is present in various forms, including small fragments and fibres, and mostly occurs in surface soil layers (refer to **Appendix C**).

The ACS Modification works would involve the excavation, transport, management and disposal of ACSs. The handling and movement of ACSs could result in asbestos fibres being released into the atmosphere which could then be inhaled by people located on or offsite.

Whilst this risk exists, it is highly unlikely to eventuate. Caltex has a number detailed procedures and controls in place to manage asbestos at the Site and only uses licenced contractors to complete works involving ACSs.

Following completion of impact assessments and risk assessments for the demolition works, and in consultation with the EPA, detailed measures were developed and agreed to manage asbestos (including the handling and transport of ACSs) at the Site during the demolition works. This included updating the Asbestos Management Plan (AMP) for the Site to include measures specific to the demolition works. This AMP forms a sub plan to the DEMP. Relevant measures within the AMP and DEMP would be implemented for the ACS Modification works.

Additional specific mitigation measures are discussed below in **Section 8.5** and also in **Chapter 12 Air Quality**.

8.4.1.3 Contamination of Soils and Groundwater

There are a number of activities during the construction phase of the ACS Modification works that could potentially mobilise contaminants and result in migration of contaminants to soils and groundwater including:

- Excavation in the pipeways;
- Excavation and/or grading of soils during the construction of the biopiling works area or containment cell works area;
- Transport of soils to the biopile works area or containment cell works area; and
- Management of soils and stormwater within containment cell and biopile works area.

These are discussed in order below.

The pipeways form spoon drains that carry water across the Site. The ACSs are located within the top 0.2 – 0.5 m of the sediments that have accumulated within the pipeways. Excavation works would occur within the pipeways. As such, any water ingress during this process would be captured in the pipeway's spoon drain and directed to the Oily Water Sewer System (OWSS).

The excavation, grading and transport of ACSs within the biopile works area and the containment cell works area are consistent with the activities described in the demolition works approval. As such the controls within the DEMP are appropriate to manage these minor ground disturbance works and transport activities.

The biopiling area would be constructed within existing bunds (refer to **Figure 4-4**). Surface water flows from this bunded area are currently directed to the OWSS and this would continue to be the case during the ACS biopiling works. The ACS biopile would be lined with a geosynthetic clay liner or 1.5 mm thick HDPE liner to prevent leachate interacting with groundwater. Leachate from the ACS biopile would be disposed of via the Site's existing OWSS. Following the completion of biopiling the HDPE liners would be removed. The bunds would remain and continue to direct stormwater to the OWSS. As such, no impacts to the groundwater are expected from the ACS biopiling process.

Stormwater from with the containment cell works area generated during the construction, filling and closure of the containment cell would be managed as leachate, and directed to the Site's OWSS via the leachate tank (as shown in **Figure 4-2**). Further, the liner of the containment cell that would be installed at the start of the construction process would be designed to prevent interaction of leachate and groundwater.

In addition to the controls described above it is important to note that toxicity characteristic leaching procedure (TCLP) analysis was undertaken on samples from the pipeways which exceeded specific contaminant

concentrations (SCC) for General Solid Waste, as per Table 1 of the Waste Classification Guidelines (EPA, 2014). This testing concluded that the leachability of the heavy metals and Benzo(a)pyrene within the ACS is low and therefore these metals would be unlikely to mobilise through the leachate (refer to **Appendix C**).

Based on the leachability of the ACSs and the engineering controls in place during construction and operation of the containment cell and ACS biopile, no impacts to groundwater quality as a result of the ACS Modification works are considered likely to occur.

Specific measures for managing the containment cell works area biopile works area would be included in the Containment Cell Management Plan and ACS Biopile Management Plan, respectively, and are discussed in **Section 8.5** below.

8.4.1.4 Dewatering Activities

Groundwater is not expected to be encountered during ground disturbing works as groundwater is generally observed to be 2 to 2.5 mbgl across the majority of the Site. In the event that groundwater or surface water (e.g. following a rainfall event) accumulates in an excavation or the containment cell area during construction and dewatering is required, then the accumulated water would be collected directed to the Site's OWSS.

Management measures for dewatering and disposing of wastewater are included in the DEMP.

8.4.2 Operation Works Impacts

The operation of the ACS Modification works includes the following activities:

- management of the closed containment cell.

Potential soil and groundwater impacts from operation include:

- the potential erosion of the cap over the containment cell; and
- leaks in the containment cell liner leading to groundwater impacts.

The erosion and sediment controls that would be implemented during operation are discussed in **Section 10.5.1**.

As discussed in **Section 8.5.1**, the leachability of metals is considered low and appropriate for emplacement in a restricted containment cell.

It is considered very unlikely that the cell liner would leak and result in leachate impacting groundwater beneath the cell. The design of the containment cell includes a cell liner system and leachate barrier system that connects to a storage tank and ultimately the Site's OWSS. Nevertheless, additional groundwater monitoring wells would be installed around the cell to identify a leak should it occur. This monitoring is outlined in further detail in **Section 8.6**.

8.5 Mitigation

8.5.1 Construction

The potential soil, groundwater and contamination impacts would be largely the same as those identified and managed within the DEMP for the Project. The DEMP includes a Soil and Water Management Plan (SWMP) and AMP both of which include management measures for managing contamination and erosion and protecting soils and groundwater. As noted in **Section 4.4.9**, the ACS biopile works and containment cell works constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities two additional subplans to the DEMP would be produced: a Containment Cell Management Plan; and an ACS Biopile Management Plan. These new subplans would reference other parts of the DEMP as necessary but would also include specific measures for the containment cell and ACS biopile.

Mitigation measures required beyond that identified in the DEMP, but required to manage the ACS Modification works, include:

- As described in **Section 4.3.1.1**, additional sampling would be undertaken to ensure that the area of soil disturbance is restricted as far as practicable to asbestos impacted areas only.
- All ACSs to be removed from the pipeways would be wetted down prior to excavation, loading and transport.

- ACS classified as hazardous under the Waste Classification Guidelines would be transported to the ACS biopile for processing prior to placement in the containment cell. Hazardous soils would not be placed into the containment cell.
- ACS classified as general or restricted under the Waste Classification Guidelines would be transported directly to the containment cell. Excavation works would be staged to allow placement of excavated ACS directly into the containment cell to minimise the need to stockpile ACS.
- Where hazardous ACS cannot be appropriately managed on-site, it would be taken off-site for treatment and disposal at an appropriately licensed facility. The volume of ACS from the pipeways that may be required to be disposed of off-site has been estimated to be <5,390 tonnes.
- All vehicle tyres would be cleaned before exiting the containment cell works area and the biopile works area via a temporary truck wash system.
- The containment cell area and biopile works area would remain bunded to prevent water flowing out of the respective areas except via the OWSS and WWTP.
- Stormwater from within excavated areas of the pipeways would be sent to the WWTP unless it is tested and is of suitable quality to be directed to stormwater, as per normal operation of the pipeways.
- Stormwater within the containment cell works area and biopile works area would be directed to the OWSS and treated at the WWTP.
- Two groundwater monitoring bores would be installed at the north and west of the containment cell. Quarterly monitoring would be undertaken during construction, filling and closure of the cell.
- A marker layer would be installed during the final capping of the containment cell to identify the presence of asbestos as a safeguard for potential future use.
- Following excavation of the ACS, an independent licenced asbestos inspector would be employed to verify that the friable asbestos has been removed from the pipeways and that the Exemption Order under Section 419 of the *Work, Health and Safety Regulation 2011* is no longer required.

8.5.2 Operation

The Site's Operational Environmental Management Plan (OEMP) would be updated to include management and monitoring of the containment cell.

Measures to be employed include:

- Quarterly groundwater monitoring for two years for the two installed monitoring wells. Following this time, annual groundwater monitoring would be undertaken to provide ongoing demonstration that the containment cell liner is operating effectively. Monitoring of these bores would occur in accordance with the existing groundwater monitoring program for the Site.
- Regular inspections of the containment cell to monitor the effectiveness of the erosion and sediment control measures (refer to **Figure 4-6**) incorporated into the design of the containment cell, in line with the Site's existing Inspection Checklist and following heavy rain events.

9.0 Waste Management

9.1 Introduction

The following chapter provides an assessment of the potential waste management issues relating to the ACS Modification works.

This chapter identifies, quantifies and classifies the various waste streams generated from the ACS Modification works and proposes relevant management strategies for effective storage, reuse/recovery, treatment and/or disposal in accordance with applicable standards and regulatory requirements.

9.2 Legislation and Planning Policy

9.2.1 NSW State Legislation and Guidelines

Protection of the Environment Operations Act 1997

The NSW waste regulatory framework is set by the *Protection of the Environment Operations Act 1997* (PoEO Act). One of the PoEO Act's objectives is:

- To reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote the following:
    - Pollution prevention and cleaner production;
    - The reduction to harmless levels of the discharge of substances likely to cause harm to the environment;
    - The elimination of harmful wastes;
    - The reduction in the use of materials and the re-use, recovery or recycling of materials;
    - The making of progressive environmental improvements, including the reduction of pollution at source; and
    - The monitoring and reporting of environmental quality on a regular basis.

The PoEO Act defines 'waste' for regulatory purposes and establishes management and licensing requirements along with offence provisions to deliver environmentally appropriate outcomes. The Kurnell Terminal operates under Environment Protection Licence (EPL) No. 837. As only excavated soil from the Kurnell Terminal would be placed within the proposed containment cell, the ACS Modification works are not a Scheduled Activity under the PoEO Act. The PoEO Act also establishes the ability to set various waste management requirements via the *Protection of the Environment Operations (Waste) Regulation 2014* (PoEO Waste Regulation).

Protection of the Environment Operations (Waste) Regulation 2014

The PoEO Waste Regulation came into effect on 1 November 2014. The principal elements of the waste regulatory framework in the PoEO Waste Regulation that may apply to the ACS modification works are:

- Prescribed Wastes for Land Pollution Offence: The *Protection of the Environment Operations (General) Regulation 2009* will contain a list of wastes that automatically constitute land pollution under Section 142A of the PoEO Act. These wastes include hazardous waste, restricted solid waste, and greater than 10 tonnes of asbestos waste. As a defence under Section 142A of the PoEO Act, in order to conduct the ACS Modification works, this SEE will be submitted to gain regulatory approval for the wastes listed.
- Transportation and Management of Asbestos Waste: Clarifies the obligations for the transportation of asbestos waste (including report on the transportation of asbestos waste within New South Wales), disposal of asbestos waste, and prohibition of the re-use and recycling of asbestos waste. This is applicable to the ACS Modification works where special hazardous soils may be transported off-site if the on-site bioremediation option does not meet its objectives.

- Improving Resource Recovery Exemptions - clarifies the obligations of generators, processors and consumers who supply or receive waste intended to be beneficially applied to land, reused as fuel or reused in connection with a process of thermal treatment. Caltex currently hold 'The Caltex treated soil order 2016' ('order') and 'The Caltex treated soil exemption 2016' ('exemption'), which commenced on the 4 April 2016 and is valid until 4 April 2018, for remediation of soil at the Caltex Soil Remediation Facility (CSRF) (refer to **Figure 1-2**). Treated soil from the CSRF may be used as engineered fill during construction of the proposed containment cell or to grade the biopile works area.

Waste Avoidance and Resource Recovery Act 2007

The *Waste Avoidance and Resource Recovery Act 2007* (WARR Act) includes the majority of NSW's over-arching objectives and guiding principles to encourage beneficial re-use and resource recovery.

The WARR Act promotes waste avoidance and resource recovery by providing a framework for the development of strategies and programs. It defines the waste hierarchy which is a set of priorities for the efficient use of resources which underpin the objectives of the WARR Act. The waste hierarchy ensures that resource management options are considered against the following priorities:

1. **Avoidance** including action taken to reduce the amount of waste generated, to maximise efficiency and avoid unnecessary consumption;
2. **Resource recovery** including reuse, recycling, reprocessing and energy recovery. Where avoiding and reducing waste is not possible, the next most preferred option is to re-use the materials without further processing, avoiding the costs of energy and other resources required for recycling; and
3. **Disposal** including management of all disposal options in the most environmentally sensitive manner. Disposal is the least preferred option, and is appropriate for materials such as asbestos that cannot be safely reused or recycled.

Waste Avoidance and Resource Recovery Strategy 2014-2021

The NSW Government's *Waste Avoidance and Resource Recovery (WARR) Strategy* (2014) provides the strategic direction for future waste management and resource recovery activities in NSW. The priorities for waste reform were determined by the NSW Government in the *NSW 2021: A plan to make NSW number one*.

The WARR Strategy aims to drive the efficient use of resources, reduce the environmental impact of waste and improve the well-being of the NSW environment, community and economy. The WARR Strategy sets out long-term targets and provides a framework for the development of various implementation plans. The WARR Strategy sets the following targets for 2021–22 which are applicable to the ACS Modification works:

- Increasing waste diverted from landfill; and
- Managing problem wastes better.

The WARR Strategy provides a clear framework for waste management to 2021-22 and provides an opportunity for NSW to continue to increase recycling across all waste streams. The ACS Modification works would aim to meet the objectives of the WARR Strategy and implement measures to manage waste in a way which minimises the impact waste has on the environment.

The ACS Modification works aim to manage waste generated from the construction and operation of the works in accordance with the waste hierarchy and objectives of the WARR Act and Strategy.

NSW Solid Waste Landfill Guidelines 2016

The *NSW Solid Waste Landfill Guidelines 2016* (Landfill Guidelines) provide guidance for the environmental management of landfills in NSW by specifying a series of 'minimum standards'. They involve a mix of design and construction techniques, effective site operations, monitoring and reporting protocols, and post-closure management.

The NSW EPA use these guidelines to assess applications for new or varied landfill licences under the POEO Act 1997 and to assess issues that arise during the operational and post-closure periods of landfills.

The minimum standards in these guidelines apply to general solid waste and restricted sold waste landfills. There are some additional (higher) standards for restricted solid waste landfills, recognising the contaminated nature of those wastes.

The minimum standards in these guidelines reflect the following broad goals for landfilling in NSW (EPA, 2016):

- Landfills should be sited, designed, constructed and operated to cause minimum impacts to the environment, human health and amenity.
- The waste mass should be stabilised, the site progressively rehabilitated, and the land returned to productive use as soon as practicable.
- Wherever feasible, resources should be extracted from the waste and beneficially reused.
- Adequate data and other information should be available about any impacts from the site, and remedial strategies should be put in place when necessary.
- All stakeholders should have confidence that appropriately qualified and experienced personnel are involved in the planning, design and construction of landfills to high standards.

Construction and operation of the proposed containment cell would be completed in general accordance with the Landfill Guidelines.

NSW Waste Classification Guidelines 2014

Waste classification helps those involved in the generation, treatment and disposal of waste, ensure the environmental and human health risks associated with their waste is appropriately managed in accordance with the PoEO Act and its associated regulations. Part 1 of the *NSW Waste Classification Guidelines* (EPA, 2014) provides advice and directions on classifying waste so that appropriate management of all waste types is achieved.

Waste material generated from the ACS Modification works would be classified in accordance with these guidelines. The following waste classifications are relevant to the ACS Modification works:

- Special waste;
- Liquid waste; and
- Pre-classified waste, including:
    - General solid waste (putrescible);
    - General solid waste (non-putrescible);
    - Restricted solid waste; and
    - Hazardous waste.

9.2.2 Local Government Requirements

The Site is located within the Sutherland Shire Council Local Government Area (SSC LGA). The *Sutherland Shire Local Environment Plan 2015* (SSLEP) and the *Development Control Plan Draft 2015* (DCP) outline development requirements which should be considered for projects within the SSC LGA when relevant.

The SSLEP aims to promote an appropriate balance of development and management of the environment that will be ecologically sustainable, socially equitable and economically viable.

The DCP 2015 outlines key control measures designed to ensure sustainable development within the SSC LGA. The objectives of the DCP for the IN3 Heavy Industrial zoning include:

1 *To encourage on-site waste management facilities that are integrated with the design of a development and enable source separation, reuse and recycling.*

2 *To enable collection service providers efficiently collect waste and recyclables with minimum disruption and impact on the community.*

Given the nature of the waste, reuse and recycling is not appropriate for soils contaminated with asbestos. However the ACS Modification works follow objective no. 1 outlined above, in that it is resulting in on-site waste management.

9.3 Assessment Methodology

The waste management assessment involved an analysis of the proposed ACS Modification works to identify potential or likely waste streams and volumes arising from the works. The assessment has been completed using information provided by Caltex and investigations undertaken by AECOM including:

- A geotechnical and environment site assessment (ESA) of the containment cell works area to understand the baseline soil, groundwater and contamination (AECOM, 2016c); and
- Pipeways Asbestos Waste Classification Report to identify the presence of asbestos and other contaminant concentrations (AECOM, 2016a) (refer to **Appendix C**).

The requirements of relevant legislation and policy has also been reviewed and addressed in this Chapter.

9.4 Existing Environment

9.4.1 Existing Waste Management Measures

Wastes generated from Caltex's existing operations in Kurnell are generally recycled where possible or sent to landfill for appropriate treatment and disposal in accordance with the existing certified environmental management system (EMS) for the Site and Caltex's Waste Management System (WMS) 2012. The WMS outlines the current waste management processes currently in place at the Site.

Key existing EMS and WMS and associated procedures relevant to the ACS Modification works include:

- PROC 5.06.11.001 Kurnell Waste Management;
- STD 5.06.11.001 Management of Waste Skip Bins in the Kurnell Refinery;
- STD 2.05.03.018 Hazard Control of Equipment & Material Leaving Site; and
- STD 2.05.03.019 Recyclable Materials Handling.

The Site also has conditions on its existing EPL (EPL 837) for the management of waste which are relevant to the ACS Modification:

- O5.1 The licensee must ensure that any liquid and/or non-liquid waste generated and/or stored at the premises is assessed and classified in accordance with the EPA Waste Classification Guidelines as in force from time to time.
- O5.2 The licensee must ensure that waste identified for recycling is stored separately from other waste.

The key on-site waste management facilities utilised for management of waste generated from existing operations which may be relevant to the ACS Modification works include:

- Empty Drum Storage Area: The Empty Drum Storage Area is used for the storage of empty drums prior to sending them for recycling.
- Waste Water Treatment Plant (WWTP): Water treatment involves three stages of treatment from physical to chemical and biological. The unit allows on-site treatment of all effluent, spent caustic waste and a large range of aqueous liquid wastes. Refer to **Chapter 10 Surface Water, Wastewater and Flooding** for further details.
- Landfarm: This is used to degrade the hydrocarbon content of oily sludge's, tank bottoms or highly contaminated sand/soil used during a spill. Access to the Landfarm is controlled through the use of a Waste Disposal Permit. No material is to be placed on the Landfarm or hard stand adjacent to it without the authorisation of an approved Waste Disposal Permit.
- Slop Troughs: The Site operates a melting trough for the recovery of clean oils for reprocessing.
- Metal Recycling Area: This is used to store only uncontaminated metal pieces, which are suitable for on-site reuse, or off-site recycling.
- The CSRF: This is located in the southern section of the Site and is operated in accordance with EPL 837. The CSRF remediates contaminated soils from the Site (and off-site) enabling beneficial reuse of the material as engineered fill, however does not accept waste contaminated with asbestos, and therefore would not be used for treatment of ACS from the pipeways. It is proposed to potentially use treated soils from the CSRF as engineered fill or in earthworks associated with construction of the Containment cell. The use of treated material from the CSRF for the containment cell works would be carried out in accordance with the condition as given in the Caltex treated soil exemption 2016' (the 'exemption') issued by the EPA under clauses 91 and 92 of the *Protection of the Environment Operations (Waste) Regulation 2014*.

9.5 Impact Assessment

9.5.1 Potential Environmental Impacts

Waste has the potential to impact ecological function and services, biodiversity, water quality, social value and human health. However, if re-use options are available and utilised, waste can be considered a resource.

The key activities and respective personnel associated with ACS Modification works expected to generate waste include:

- Containment cell construction, filling and closure, in particular:
  - minor excavation in existing ground surface for sump bases;
  - installation of the containment cell lining system;
  - leachate and stormwater management; and
  - on-site staff/contractors.
- ACS biopile construction and closure;
  - minor grading works;
  - installation of the biopile cell lining system;
  - wastewater management; and
  - on-site staff/contractors.
- Ongoing management of the cell, in particular:
  - stormwater and leachate generation from the containment cell; and
  - maintenance of the containment cell including landscaping.

If not managed responsibly, waste generated by the ACS Modification works has the potential to cause the following impacts:

- land and water (surface and groundwater) contamination as a result of spills or inappropriate storage, handling, transportation and disposal of solid and liquid wastes;
- land and water (surface and groundwater) contamination as a result of the use of incorrectly verified soils from the CSRF (refer to **Section 9.4**);
- odours and vermin resulting from improper storage and treatment of solid and putrescible wastes;
- visual amenity impacts caused by inappropriate storage of waste;
- inefficient and careless use of resources during construction and closure of the containment cell; and
- human health impacts from the exposure and incorrect handling of asbestos fibres and/or small fragments found in contaminated soils.

The estimated quantity, classification, and primary source of major waste streams generated during the ACS Modification works are summarised in **Table 9-1**.

Table 9-1 Estimated Quantity, Classification and Source of Primary Waste Streams

Waste Type	Estimated Approximate Quantity	Classification[3]	Primary Source
Construction (the works to excavate the ACS soils, to construct, fill and close the cell, to establish, operate and close the ACS biopile)			
General Municipal Waste	26 Kilograms/day[4]	General Solid Waste (Putrescible) Food Waste	General day-to-day waste from on-site staff / contractors.
	8 Kilograms/day[4]	General Solid Waste (Non-Putrescible) Paper Cardboard Glass Plastic	
Sewerage Effluent	3 Kilolitres/day[4]	Liquid Waste	On-site staff / contractors.
Asbestos Contaminated Soil[5]	5,390 tonnes[6]	Special Waste/ Hazardous Waste	The Pipeways (refer to **Figure 1-2**).
Biopile Materials (e.g. metals, plastic sheeting and pipes)	Minor	General Solid Waste (Non-Putrescible)	Biopile deconstruction.
Residual Materials (e.g. geosynthetic liner)	Minor	General Solid Waste (Non-Putrescible)	Containment cell construction.
Leachate	30 m³/day	Liquid Waste	Stormwater from within the containment cell area.
Stormwater	Minor	Liquid Waste	Stormwater from outside of the bunds and is considered clean or uncontaminated.
Management of Cell (Operation)			
Leachate	9 m³/day	Liquid Waste	Liquid that has percolated through the containment cell and is collected within the containment cells leachate collection system.
Stormwater	Minor	Liquid Waste	Any liquid that falls on the capped vegetated cell and is considered clean or uncontaminated.
Garden Waste	Minor	General Solid Waste (putrescible)	General maintenance of grass /vegetation on the containment cell.

Measures to manage the wastes generated as part of the ACS Modification works are outlined below.

[3] Waste classification would be confirmed prior to disposal in accordance with the *Waste Classification Guidelines (EPA, 2014)*
[4] Based on 30 construction staff per day (worst-case) (with the assumed working hours of 10 hours per day)
[5] The Special Waste/General Solid Waste and Special Waste/Restricted Solid Waste has not been included in this table as it is not considered 'waste' in the context of the ACS Modification. The Special Waste/Hazardous Waste has been included as this may be transported off-site if it is not successfully processed to be suitable for emplacement in the containment cell (refer to **Section 4.3**)
[6] Includes a 40% contingency on 3,850 tonnes which allows for variations in soil density

9.6 Mitigation

Measures to ensure appropriate waste management during the ACS Modification works would be largely the same as documented within the existing DEMP. The DEMP includes a Demolition Waste and Resource Management Plan (DWRMP) which includes management measures for wastes. As noted in **Section 4.4.9**, the ACS biopile and containment cell constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities two additional subplans to the DEMP would be produced: a Containment Cell Management Plan; and an ACS Biopile Management Plan. These new subplans would reference other parts of the DEMP as necessary but would also include specific measures for the containment cell and ACS biopile.

It is intended that waste generated from the construction or operational stages of the ACS Modification works would be managed appropriately and where possible, recycled and/or reused, considered for on-site treatment, or sent off-site to appropriately licensed facilities for treatment and disposal.

Some wastes generated from the ACS Modification works such as general solid waste, dirty stormwater, oily water, vegetation and sewerage would continue to be managed in accordance with the existing Waste Management Measures for the Site. Where relevant, the management of waste generated from the ACS Modification works would also comply with the conditions of the EPL.

The disposal of waste materials would be considered as a last resort and where all other avenues have been investigated. Where no other option is available, all waste would be handled and disposed of in a manner that causes the least environmental harm.

Where possible, Caltex intends to utilise existing local waste management facilities and would employ licenced waste management companies to manage the identified waste streams arising from the ACS Modification works that require disposal.

Table 9-2 outlines the proposed storage, handling and/or disposal methods for each of the primary waste streams expected to be generated from the ACS Modification works. These management methods would be included in the Containment Cell Management Plan and an ACS Biopile Management Plan, where they are in addition to the measures identified in DEMP and DWRMP.

Table 9-2 Waste Management Measures for Primary Waste Streams

Waste Type	Classification	Management Methods
Cell Construction, Filling and Closure (Construction)		
General Municipal Waste	General Solid Waste Putrescible (Food Waste)	Food waste would be collected on-site in designated waste collection bins. No recyclable or contaminated materials are to be placed in this bin. A waste contractor would pick up the bin(s) and take it off-site as required to a licensed off-site waste facility.
	General Solid Waste Non-Putrescible (Paper, Cardboard, Glass, Plastic)	Paper, cardboard, glass and plastic waste would be collected on-site in designated recycling collection bins. A waste contractor would pick up the bin(s) and take it off-site to a licensed recycling facility.
Sewerage Effluent	Liquid Waste	Sewage would be sent to existing sewerage infrastructure.
Asbestos contaminated soil	Special Waste/ Hazardous Waste	Hazardous waste would be transported to the biopiling area, and treated to reduce the concentration of hydrocarbons to enable re-classification as special restricted solid waste and placement within the on-site containment cell. In the event that the biopile process is not able to reduce the hydrocarbon concentrations to a restricted level, hazardous waste contaminated with asbestos will be prepared for off-site disposal to a licenced facility in line with the Caltex producer '*Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres'* (April, 2014). Transport and disposal of asbestos impacted soil will be undertaken by a licenced contractor and comply with NSW WorkCover requirements.

Waste Type	Classification	Management Methods
Biopile Construction Materials (e.g. metals, plastic sheeting and pipes)	General Solid Waste (Non-Putrescible)	Collected in dedicated stockpile on-site. Reused on-site, off-site recycling and/or disposal by a licensed waster contractor.
Residual Materials (e.g. geosynthetic liner)	General Solid Waste (Non-Putrescible)	The containment cell would be designed to minimise the volume of residual material. Where appropriate the contractor would identify options for reuse or recycling and/or disposal by a licensed waste contractor.
Leachate	Liquid Waste	The biopile works area and containment cell works area would be designed so that runoff from these areas is directed through the oily water sewer system (OWSS) and treated at the wastewater treatment plant (WWTP), in accordance with EPL 837. Refer to **Chapter 10 Surface Water, Wastewater and Flooding** for further information on wastewater management.
Stormwater	Liquid Waste	Clean stormwater, from outside the bunded areas would be diverted to the on-site stormwater system. Refer to **Chapter 10 Surface Water, Wastewater and Flooding** for further information.
Management of Cell (Operation)		
Leachate	Liquid Waste	Leachate would be directed to the oily water sewer system (OWSS) and treated at the WWTP, in accordance with EPL 837. Refer to **Chapter 10 Surface Water, Wastewater and Flooding** for further information.
Stormwater	Liquid Waste	Clean stormwater, from outside the bunded areas would be diverted to the on-site stormwater system. Refer to **Chapter 10 Surface Water, Wastewater and Flooding** for further information.
Garden Waste	General Solid Waste (putrescible)	Garden waste would be managed in accordance to Caltex's current Waste Management Systems.

Specific waste management and mitigation measures required beyond that identified in the DEMP, but required to manage the ACS Modification Works, include:

- Cleaner production:
  - using treated soils from the CSRF where appropriate for the containment cell construction works in accordance with the conditions of the Caltex treated soil exemption 2016;
  - procurement of pre-fabricated materials to eliminate off-cuts on-site, and the re-use of materials where possible;
  - provision of separate waste containers/skips to ensure waste material segregation and maximise the opportunities for re-use and recycling; and
  - ensuring safe storage and disposal of residual construction waste ensuring least amount of harm to surrounding environment.

- Recycling:
  - Recyclable wastes would be stored in suitable containers and designated waste management areas, to be transferred by a licensed waste contractor to an appropriate recycling facility where possible.
- Source separation:
  - Additional sampling would be undertaken in the pipeways to further delineate the areas classified as asbestos contaminated in order to minimise the volume of soil classified as Special Waste and disposed of in the containment cell. In addition, soils currently classified as hazardous waste would have additional sampling undertaken to ensure only the minimum amount practical of hazardous soil is being processed at the ACS biopile.
- Monitoring, auditing and reporting:
  - inspections by Caltex following periods of extended heavy rainfall to confirm that pumps within the containment cell sumps are directing leachate to the Site's WWTP;
  - new waste streams would be addressed as they arise and assessed to determine the most suitable management measures to use when handling, storing, transporting and disposing of the waste. Unidentifiable waste streams would be analysed and sent for testing in an accredited laboratory to assess the risks associated with handling and disposal of the waste;
  - in the event that ACS also classified as hazardous waste is removed off-site, this waste would be tracked using the NSW EPA online waste tracker and each delivery would be provided with a consignment authorisation and transport certificates which would be provided to Caltex; and
  - in the event that special waste is removed off-site, special waste would be transported in accordance to Part 7 Transportation and Management of Asbestos Waste of the *POEO (Waste) Regulation 2014*. This outlines the requirements for waste transporters to record and monitor the movement of more than 100 kilograms of asbestos waste or more than 10 m² of asbestos sheeting from the Site of generation to the final disposal point using the NSW EPA online system called WasteLocate.
- Asbestos management:
  - Asbestos would be managed in accordance with measures outlined in:
    - The Soil Water Management Plan (SWMP), required under condition C15 of SSD 5544 and C15A and C15B of SSD 5544 (MOD1), which refers to the Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres Guidance Document (Caltex, April 2015);
    - The DEMP for the Project and its subplans; and
    - The measures presented within this SEE as applicable.

10.0 Surface Water, Wastewater and Flooding

10.1 Introduction

This chapter identifies the potential impacts of the ACS Modification works on the stormwater and wastewater systems and flood risk, and recommends preferred management strategies in-line with applicable standards and regulatory requirements.

Impacts related to potential soil, groundwater and land contamination impacts are discussed in **Chapter 8 Soils, Groundwater and Contamination**.

10.2 Assessment Methodology

This assessment has been based on a number of data sources:

- Kurnell Refinery Conversion Environmental Impact Statement (URS, 2013);
- Kurnell Refinery Demolition Statement of Environmental Effects (URS, 2014);
- Environment Protection Licence No. 837 and associated Pollution Reduction Programs;
- Caltex's Stormwater Management Plan (2012) for the Site;
- existing surface water and wastewater studies of the Site (GHD, 1992, 1993);
- Kurnell Township Flood Study Final Report (WMAwater, 2009);
- Kurnell Floodplain Risk Management Plan, Final Study, April 2012 (WMAwater, 2012); and
- aerial and satellite imagery.

To assess the impacts of the ACS Modification works, the following legislation, guidance and standards were used:

- the statutory planning framework and appropriate legislative context (refer to **Chapter 5 Legislation, Planning Policy and Approach**);
- the National Water Quality Management Standards and Guidelines;
- *Floodplain Development Manual – the Management of Flood Liable Land* (DIPNR, 2005); and
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy*, ANZECC 2000.

This assessment is predominantly qualitative in nature; however some quantitative data has been used where applicable.

Flooding impacts on the ACS Modification works have been assessed based on flood assessment undertaken during the demolition works SEE (URS, 2014).

10.3 Existing Environment

10.3.1 The Local Catchment

The Site is located on the Kurnell Peninsula surrounded by marine and estuarine surface water bodies, which in addition to land, constitute the receiving environments for surface water discharges from the Site. The main water bodies in proximity to the Site include the Tasman Sea, Botany Bay, Quibray Bay, Weeney Bay, and the Marton Park Wetland.

The Site is located within the Botany Bay catchment, which extends across an area of 1,165 km^2. The catchment is part of the Greater Sydney Region of Local Land Service NSW.

The Botany Bay Catchment has four main sub-catchments, based on the major river systems and other areas which drain to it. These are the:

- Georges River catchment;
- Cooks River catchment;
- Woronora catchment; and
- Botany Bay (direct discharge) catchment.

The Site is located in the catchment area that drains directly to Botany Bay. A substantial part of the catchment is highly developed with almost 40% of its area being used for urban, industrial or commercial purposes.

In order to facilitate a more accurate assessment of the potential impacts of the ACS Modification works, the main catchments of Botany Bay have been further divided into sub-catchments, based on smaller drainage areas and drainage lines. This Site falls within the Kurnell sub-catchment. Information from the Kurnell sub-catchment has been used to understand the existing pollutant loads from the area immediately around the Site.

The surface waters and related environments in proximity to the Site have varying environmental values and sensitivities. The ACS Modification works area is close to areas of ecological value including:

- Botany Bay;
- Quibray Bay;
- Towra Point Nature Reserve (including Ramsar wetland area and SEPP 14 wetlands);
- Towra Point Aquatic Reserve;
- Marton Park Wetland (a Groundwater Dependent Ecosystem); and
- Kamay Botany Bay National Park.

10.3.2 Stormwater Management

Stormwater generated on the Site is collected in the stormwater system, treated where necessary (via API oil/water separators) and discharged off-site to two receiving water bodies, Quibray Bay and Botany Bay. The key water quality management strategy adopted by the terminal has been to prevent, to the extent practicable, interaction between petroleum hydrocarbons and stormwater. Consequently the stormwater system only collects runoff from areas of the terminal that have been designated low risk with respect to interaction with petroleum products, such as roadways and building roofs.

The Site has a separate Oily Water Sewer System (OWSS) to handle water that is or may be impacted by petroleum products, including a proportion of stormwater runoff collected from areas where there is or may be interaction with petroleum products, e.g. tanks bunds. This water is treated at the Waste Water Treatment Plant (WWTP) prior to being discharged to the Tasman Sea.

There are seven main catchment areas on the existing Site, as shown in **Figure 10-1**. The catchments relevant to the ACS modification works are described in **Table 10-1**.

Table 10-1 Stormwater Drainage System Catchments

Catchment	Location Description
A	Eastern and northern area of the Site which includes the large eastern tank area and the biopile works area and a section of the pipeways.
B	Central area of the Site which contains majority of the refinery process areas as well as offices, cafe, workshops, store houses and the majority of the pipeways area; and western part of the Site which contains the WWTP, western tank area, LPG loading area and storage plant, the Quibray Bay Stormwater Retention Basin and parking area.
D	A small area west of the containment cell works area which contains a small section of pipeways, a flare stack and concrete channel.
E	South western corner of the Site occupied by the Caltex Soil Remediation Facility, a yard office, workshop, laboratory, maintenance, process units and tank compounds. A small portion of pipeways is located in this area.
F	South eastern corner of the Site, which predominately comprises relatively undeveloped land and a small area of tank compound, the landfarm area (which is a bioremediation site), a recycling area, a sludge lagoon and the containment cell works area

Topography within the Site is generally flat, and the soils within the Site are sandy and overly sandstone bedrock. Stormwater runoff generally flows from the eastern boundary through pipes and open channels towards the northwest where it ultimately discharge to Quibray Bay via aboveground drainage lines passing through a narrow strip of the Towra Point Nature Reserve and the mangrove wetland on the northern side of Quibray Bay.

Stormwater from the Site is discharged, ultimately, to two receiving environments. These include:

- discharge by open drainage lines to Quibray Bay through a narrow strip of the Towra Point Nature Reserve and the mangrove wetland; and
- discharge into Botany Bay at Silver Beach near the wharf.

There are various retention, retarding and treatment systems incorporated into the Site's stormwater system.

The systems incorporated into the stormwater system to regulate flow and discharge rates and prevent discharge of impacted stormwater from the Site are summarised as follows:

- provision for isolation of drainage in pipeways;
- installation of manually operated skimmer pumps at pump transfer points (pumping to the oily water sewer system);
- ability to redirect stormwater to the intermediate sewer (Catchment B (including Catchment D) only);
- retention in an onsite retention basin (Catchment B (including Catchment D) only);
- discharge via siphon systems; and
- treatment in API oil/water/solids separators.

Activities and infrastructure in Catchment F are not dissimilar to those generally in commercial urban areas. Much of Catchment F is undeveloped land. Runoff from these areas is, consequently, similar to urban or undeveloped land runoff and is discharged off-site without on-site treatment.

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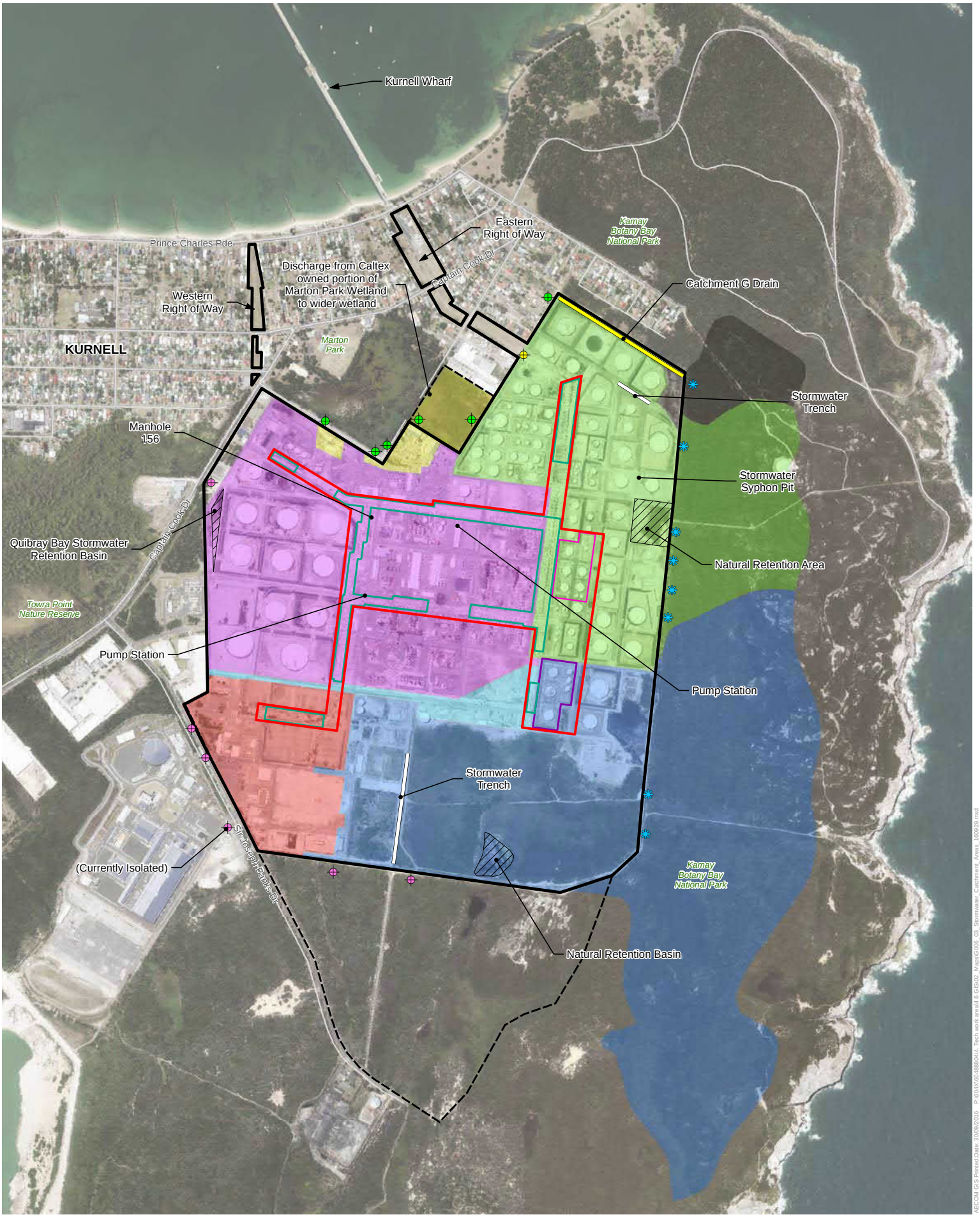

KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Pipeways to be excavated
- Biopile Works Area
- Containment Cell Works Area

Inflow Points
- From Kamay Botany Bay National Park

Discharge:
- To Botany Bay
- To Marton Park Wetland
- To Quibray Bay
- Stormwater Trench
- Catchment G Drain
- Natural Retention Area

Catchments
- Catchment A
- Catchment B
- Catchment C
- Catchment D
- Catchment E
- Catchment F
- Catchment G

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SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE
FIGURE 10-1 EXISTING STORMWATER CATCHMENT AREAS AND DISCHARGE AND INFLOW POINTS

PROJECT
KURNELL ACS MODIFICATION

CLIENT
CALTEX PETROLEUM AUSTRALIA PTY LTD

		DATE	MAP #	REV	Project
DRAWN	MJB	30/09/2016			
CHECK	WM	30/09/2016	G006 03		60488804

Due to incidents of localised flooding on-site which resulted in oily water being discharged from the Site on three separate occasions in June 2010, March 2011 and April 2012, Caltex prepared a Stormwater Management Plan (SMP) which was submitted to the EPA on 5 October 2012. The SMP has now been partly implemented by Caltex and implementation is ongoing. Caltex continues to work with the EPA to implement the ongoing stormwater improvement strategy to prevent localised flooding.

Catchments A and B, the main Site catchments in which the review and improvement measures contained within the SMP are focussed, are the main areas where the excavation of the pipeways would take place. Key improvement measures that have been implemented that relevant to the ACS Modification works include:

- Modification of the Main Pipeway siphon system and installation of a new oil skimmer to improve performance of these systems.
- Construction of retention walls to prevent stormwater from the Main Pipeway in Catchment A from entering Pipeway A and B in Catchment B.
- Increase in the bund height of some OWSS infrastructure to reduce the potential for interaction between this system and stormwater;
- Hydraulic improvement to stormwater retention and treatment systems in Catchment B to reduce the potential for flooding in this area; and
- Stormwater flow monitoring to improve understanding of current Site stormwater flows has commenced.

The actions within the SMP would continue to be implemented concurrently with the ACS Modification works.

10.3.3 Stormwater Quality

The current stormwater treatment systems are designed to address suspended solids (settleable) and phase separated petroleum hydrocarbons. The key water quality management strategy adopted by the Site has been to prevent, to the extent practicable, interaction between petroleum hydrocarbons and stormwater.

The main stormwater quality threats arise from Catchments A and B. The remaining catchment areas have a lower risk of impacting significantly on stormwater quality. It is expected that when stormwater flows are within the hydraulic and treatment capacity of the Site's stormwater treatment systems, the stormwater quality would exhibit similar characteristics to stormwater runoff from the surrounding urban areas. This assessment is based on:

- the nature of the Site's existing infrastructure, products, and activities within the stormwater system catchments;
- the fact that the Site's stormwater management system separates stormwater and oily water; and
- the reduced risk of discharging impacted stormwater as a result of retention treatment of stormwater for the removal of oil and sediment.

10.3.4 Oily Water Management

The existing OWSS at the Site collects process effluent and rainfall runoff from areas of the Site where there is potential for interaction of water streams with petroleum products. Oily water is collected in the OWSS and is transferred to the WWTP.

Oily water is treated in the WWTP. The treatment process utilises physical, chemical and biological treatment to treat the oily water. Under the current EPL conditions, all wastewater must be treated using the biotreator in the WWTP or the oil-water separators/induced air floatation system prior to discharge at Yena Gap.

Following the shutdown of the refinery, the overall oily water volume and contaminant load has reduced substantially. The WWTP has continued to operate following the shutdown of the refinery under the EPL for the Site. Options for managing run-off from the OWSS are being reviewed and improved as part of PRP U25: Terminal Operation Wastewater Characterisation to ensure that wastewater continues to be managed efficiently and in line with required EPL conditions and the NSW EPA's expectations.

10.3.5 Flood Risk

The Site lies at south eastern portion of the Kurnell township catchment. According to the *Kurnell Township Flood Study Final Report* (WMAwater, 2009), prepared on behalf of Sutherland Shire Council (SSC), Kurnell is susceptible to flooding from both rainfall and tidal inundation. Its localised depression and low lying topography can make it vulnerable to extensive flooding (WMAwater, 2009).

Flooding within the Kurnell Catchment may occur as a result of the following factors, which can occur in combination or in isolation:

- high tide or storm surge which causes water levels to elevate in Botany Bay and Quibray Bay;
- intense rainfall which causes water levels to elevate within the open channel that runs beside Captain Cook Drive and along roads and through private property. The rise in water level may also be affected by constrictions, e.g. culverts, blockages, fences and buildings;
- local runoff ponding in low lying areas that has limited potential for drainage. Flooding may be exacerbated by inadequate or blocked local drainage provisions and restricted overland flow paths; and
- tsunami impact on the east coast of Australia from a tsunami arising from subduction zone earthquakes in the Pacific.

The proximity of the Site to Quibray Bay means flood behaviour for the Site is influenced by storm tide effects. Flooding of the Site can be caused by:

- high rainfall over the catchment;
- elevated tidal levels at the drainage outfalls; or
- a combination of both.

Flooding of land from surface water runoff is usually caused by intense rainfall events. No flood modelling for the Site has been completed. The *Kurnell Township Flood Study Final Report* (WMAwater, 2009) provided flood modelling for the township of Kurnell but excludes the Site. This study concluded that Captain Cook Drive, near the western boundary of the Site will be overtopped during the 1% year (also known as a 1 in 100 year) Annual Exceedance Probability (AEP) flood. Similarly provisional hydraulic hazard mapping of the Kurnell Township indicated that most of the areas which were classified as 'High Risk' from flooding are wetlands (including part of the Quibray Bay wetlands and Marton Park wetland) located near the western and northern boundaries of the Site.

The impacts of flood events on the Site were not directly assessed in the WMAwater study (2009) for SSC. The Site is generally elevated above the surrounding low lying areas on the western and northern boundaries, and the on-site bunding around the containment cell works area and biopile works area effectively increases the flood height that would need to be present for any interaction between contaminated soils and flood waters to occur during construction.

The pipeways act as drains for the Site. Surface water flows through the pipeways to the Main Pipeway skimmer and syphon system. During high rainfall events, stormwater collects in the pipeways upstream of the skimmer and syphon system. Historically this led to stormwater management issues at the Site, but following the implementation of various measures under the Stormwater Catchment and Management Program at the Site (U10 PRP U24) these issues have been resolved. Nevertheless, during rainfall events, it is likely that surface water will flow and collect within the pipeways.

10.4 Impact Assessment

10.4.1 Stormwater Management and Quality

Construction

Construction works would be staged and would include the following works in the following catchments (shown in **Figure 10-1**):

- Excavation within the pipeways – Catchments A, B (including D) and E
- Construction of a biopiling area for soil processing – Catchment A
- Construction of the containment cell – Catchment F
- Transportation and handling of soil within these catchments.

Stormwater quality impacts could arise from:

- erosion and entrainment of dust, soil and other material in stormwater from areas where excavation or grading works are required;
- leaks of fuel and hydraulic fuel from various plant items required for the ACS Modification works potentially impacting stormwater quality; and
- impact on stormwater quality arising from interaction with contaminated soils potentially exposed by the ACS Modification works.

Catchments A and B both have controls in place that remove suspended solids from stormwater by sedimentation and remove oil by gravity separation. These would remain in place for the duration of the construction works (i.e. the works to excavate the ACS soils, to construct, fill and close the containment cell, and to establish, operate and close the ACS biopile). As discussed in **Section 8.4** controls would be implemented to control sediment run off during excavation works.

The containment cell works area and biopile works areas are located within existing bunds. Surface water from within these areas would continue to be directed to the Site's OWSS (refer also to **Section 10.5.2**). Equally, surface water that interacts with the excavation of ACS from within the pipeways would also be captured by the skimmer and syphon system and be directed to the OWSS.

Operation

The existing stormwater management system at the Site would remain intact once the construction works are complete. The Site's stormwater receiving environments would also not change as a result of the operation of the ACS Modification works.

However, following the closure of the containment cell the catchment of Catchment F would increase to include the extent of the containment cell previously diverted to the Site's OWSS. This includes the tank bund areas for tanks 225/224 and 333/334/335.

In order to direct stormwater off the containment cell cap to the existing stormwater system, a number of management features (refer to **Figure 4-6**) would be installed around the containment cell cap including:

- A cap drain along the western, northern and southern edge of the proposed containment cell;
- A swale drain along the eastern edge of the proposed containment cell to direct and slow stormwater flows; and
- Rock armour where the drains enter the existing stormwater system to slow the water and minimise the potential for erosion downstream.

The resultant increase in stormwater volume being directed to Catchment F would be reviewed in detail as part of the detailed design of the containment cell. However, a qualitative assessment of this has been undertaken for the containment cell concept design and determined that the existing infrastructure is considered acceptable to handle the increase in stormwater volume (refer to **Figure 4.6**).

The cap of the containment cell would consist of imported topsoil that is planted with native grass species. This would mean that stormwater flows from this area are highly unlikely to be contaminated and would be appropriate to be directed through the stormwater system.

Overall, the change in the volume and quality of stormwater discharged from the Site, arising from the ACS Modification works is not expected to be significant. The Site's stormwater system would continue to be reviewed and improved in line with the requirements of the Stormwater Management Plan (Caltex, 2012).

Stormwater management measures are discussed in **Section 10.5.**

10.4.2 Oily Water Management

Construction

The containment cell works area and biopile works areas are located within existing bunds. All stormwater runoff from within these bunded areas would continue to be routed to the WWTP via the Site's OWSS during construction. Within the containment cell, this stormwater runoff/leachate would be directed via a leachate tank, prior to connecting to the existing OWSS. This tank acts a holding point if required.

Stormwater from these areas is already directed to the OWSS. During ACS Modification construction works this would not change. As such no impacts to the OWSS are expected.

Flows to the OWSS are directed to the WWTP prior to discharge. Whilst the ACS Modification works would not increase the volume of water being directed to the WWTP, the management of the ACSs in the containment cell area and biopile works area may result in certain contaminants being mobilised into the stormwater. This would potentially increase the contaminant load within the wastewater stream from these areas. Despite this increase the WWTP is designed to treat the wastewater volumes and concentrations that would be expected from these areas, and as such, no impacts to the OWSS or WWTP would be expected.

Operation

Following completion of biopiling and closure of the containment cell the overall oily water volume and contaminant load would be reduced as runoff from containment cell cap would be directed to stormwater instead of the OWSS. Stormwater from the biopile works area would continue to be directed to the OWSS. Leachate from the containment cell would be directed to the WWTP via a designated leachate tank in the southern portion of the containment cell works area (refer to **Figure 4-6**). The maximum daily rate of leachate that is expected to be generated is $9m^3$/day.

The closing of the containment cell would result in less stormwater being sent to the OWSS and ultimately the WWTP. The volume of water treated by the WWTP has reduced substantially since refining ceased. As such, Caltex has been implementing a number of measures to operate the WWTP effectively to ensure that the conditions of the Site's EPL are met. Caltex is currently reviewing a number of options regarding the future of the WWTP in consultation with the NSW EPA under PRP U25: Terminal Operation Wastewater Characterisation. The change in flows to the OWSS resulting from the containment cell is not expected to be significant given the volumes involved and this change would be considered in the ongoing review of the OWSS and WWTP for the Site.

10.4.3 Flooding

The risk profile of the Site with respect to the ability to accommodate high rainfall events and/or broader flooding events would not significantly change as a result of the ACS Modification works.

Care would need to be taken when working within the pipeways to ensure that stormwater flows or pooling water do not present a risk to workers. Measures to manage this potential impact are provided below.

10.5 Mitigation

10.5.1 Construction

The potential surface water, wastewater and flooding impacts would be largely the same as those identified and managed within the DEMP for the Project. The DEMP includes a Soil and Water Management Plan (SWMP) which includes management measures for managing erosion and surface water flows. As noted in **Section 4.4.9**, the ACS biopile and containment cell constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities two additional subplans to the DEMP would be produced: a Containment Cell Management Plan; and an ACS Biopile Management Plan. These new subplans would reference other parts of the DEMP as necessary but would also include specific measures for the containment cell and ACS biopile.

Mitigation measures required beyond that identified in the DEMP, but required to manage the ACS Modification Works, include:

- Regular inspection of excavation areas, containment cell and biopile works areas, including following rainfall events;
- Excavation of the pipeways would be staged, effectively minimising the area of disturbance at one time. The ACS Modification works would be undertaken in a manner to minimise the potential for soil erosion and sedimentation;
- Stormwater management measures incorporated into the design of the containment cell would be regularly inspected during operation in line with the Site's existing Inspection Checklist and following heavy rain events;
- Local weather patterns would be monitored to ensure that workers completing the ACS Modification works at the Site were aware of predicted heavy rainfalls so that work could be stopped in the pipeways prior to them containing surface water flows.

A number of management and mitigation measures would be used to minimise soil erosion, sedimentation and contamination of nearby surface waters. Measures that would also avoid or manage potential impacts on soils and groundwater have been detailed in **Chapter 8 Soils, Contamination and Groundwater** and are not repeated here. These measures would help to manage potential impacts on surface water receptors.

10.5.2 Operation

The OEMP for the Site would be updated to include the following measures:

- the new stormwater management infrastructure for the containment cell would be regularly maintained to ensure that stormwater flows are properly conveyed to the wider catchment; and
- the leachate collection system including the tank would be regularly inspected to ensure that it is operating effectively and that no leaks have occurred.

11.0 Noise

11.1 Introduction

The following chapter assess the potential for construction noise issues during ACS Modification works. The assessment has been carried out by Wilkinson Murray Pty Ltd (WM) (2016). This chapter provides a summary of that assessment. The full assessment is provided in **Appendix A**.

The operation of the ACS Modification works only include the ongoing management of the containment cell. As such, an operational noise assessment is not necessary.

11.2 Assessment Methodology

11.2.1 Overview

The noise assessment has been carried out using the following methodology:

- Identification of nearby noise sensitive receivers potentially affected by the ACS Modification works in comparison to the previous noise assessment undertaken for the Project;
- Prediction of construction noise levels at the sensitive receivers using acoustic noise modelling software "CadnaA". The noise modelling considered the following factors:
    - The noise contributions from the demolition works (SSD 5544 MOD1) and the CSRF which could potentially contribute to cumulative noise level impacts with the ACS Modification works;
    - ACS Modification works equipment sound level emissions and location;
    - Sensitive receiver locations / ground topography;
    - noise attenuation due to geometric spreading;
    - ground absorption; and
    - atmospheric absorption.
- Comparison and assessment of predicted cumulative construction noise levels against the construction noise limits specified in the development consent for SSD 5544 MOD1;
- Comparison and assessment of predicted road noise traffic noise as a result of the truck movements associated with the ACS Modification works against relevant criteria at nearby sensitive receptors; and
- Identification of noise mitigation, monitoring and management measures, where required.

11.2.2 Noise Criteria

The noise assessment considered the approved construction noise limits identified in the development consent for Application SSD 5544 MOD1. These noise limits were deemed appropriate as they were established using the typical minimum background levels and are consistent with the *Interim Construction Noise Guideline* (ICNG). The noise limits are listed below in **Table 11-1**. Condition C16 of the consent (SSD 5544 MOD1) requires that construction noise does not exceed these criteria.

Table 11-1 Construction Noise Limits in SSD 5544 MOD1

Location	Day $L_{Aeq,15min}$ (dB(A))	Evening $L_{Aeq,15min}$ (dB(A))
R2 – 30D Cook Street	46	40
At any other residence or other noise sensitive receivers	50	45

The noise criteria for the assessment of traffic noise are provided in NSW Government's *NSW Road Noise Policy* (RNP). Based on the guidance provided in the RNP and the type of road, project and land use, the applicable traffic noise criteria for the ACS Modification works is 60 dBA ($L_{Aeq,15hr}$) during the day (7 am to 10 pm) and 55 dBA ($L_{Aeq,15hr}$) for the night (10 pm to 7 am). However, where the criteria are already exceeded as a result of existing traffic, the policy notes: '*For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.*

11.3 Existing Environment

11.3.1 Noise Sensitive Receivers

Potentially affected noise sensitive receptors for the ACS Modifications works are consistent with those identified for the approved Project. These industrial and residential premises and have been identified below in **Table 11-2** and are shown on **Figure 11-1**. It is noted that no residential receptors, which could be affected by noise from the ACS Modifications works, have been identified to the south of the Site.

Table 11-2 Identified Potentially Noise Affected Sensitive Receivers

Receiver ID	Location	Type	Description
R1	44-64 Cook Street	Industrial Premises	Industrial premises adjacent to the Site to the west and sharing a common boundary
R2	30D Cook Street	Residential	Residential property adjacent to the Site to the west and sharing a common boundary
R3	Reserve Road	Residential	Residential properties north of the Site
R4	Prince Charles Parade	Residential	Residential properties close to the eastern right of way
R5	Corner of Captain Cook Drive and Silver Beach Road	Residential	Residential properties north of the Site
R6	Tasman Street	Residential	Residential property west of the Site
R7	35 Cook Street	Residential	Residential property north of the Site
R8	End of Chisholm Road	Industrial Premises	Industrial premises adjacent to the Site to the west and sharing a common boundary
R9	Sir Joseph Banks Drive	Industrial Premises	Industrial premises on the other side of Sir Joseph Banks Drive to the west of the Site

11.3.2 Existing Traffic Conditions

The major access road to the Kurnell Peninsula on the southern shore of Botany Bay, from the wider Sydney road network is Captain Cook Drive. Captain Cook Drive, east of Gannons Road, had an average annual daily traffic flow of 38,810 (two-way) vehicles per day in 2012 (WM 2016). The existing traffic noise levels along the Captain Cook Drive exceed the noise criteria of 60 and 55 dBA for the day and night, respectively (refer to **Appendix A**).

KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Pipeways to be excavated
- Biopile Works Area
- Containment Cell Works Area
- Location of Noise Receivers

N

0 50 100 200 m

AECOM

SCALE 1:9,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE **FIGURE 11-1** - LOCATION OF NOISE RECEIVERS

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

		DATE	MAP #	REV	Project
DRAWN	MJB	30/09/2016			
CHECK	WM	30/09/2016	G004	03	60488804

AECOM GIS Printed Date: 30/09/2016 P:\60AX\60488804\4. Tech work area\4.6 GIS\02_Maps\G004_03_Sensitive_Receivers_160929.mxd

11.4 Impact Assessment

11.4.1 Overview

As discussed in **Section 4.4.4** , the construction phase of the ACS modification works are anticipated to take place over an 18 month period within the ACS Modification works area (refer to and **Figure 1-2**) and include the following stages:

- Cell construction;
- Excavation and transport of ACSs;
- ACS preparation (via biopiling);
- Cell filling & management; and
- Cell closure.

Table 11-3 presents the ACS Modification works construction stages and associated equipment information that has been considered in the noise modelling presented in **Section 11.4.2**.

Table 11-3 Construction Stages and Equipment

ACS Modification Works Construction Stages	Construction Equipment	Equipment Quantities	Sound Power Level per Plant Item (dBA)
Cell Construction	Water Truck	1	108
	Trucks with aggregate and liners	4 per day all week for up to 3 separate weeks over 6 months	105
	Compactor	1	107
	Manitou Forklift	1	95
	Small excavator – 5 T	1	100
	D6 Dozer	1	113
Excavation and Transport of ACSs	Excavator	1	108
	Truck and Dog	1	105
	Water Truck	1	108
ACS Preparation (via biopiling)	360 degree 30 tonne crawler mounted back actor-excavator	1	98
	Allu Screener Crusher Bucket (or similar)	1	103
	Water bowser with spray feed	1	107
	Trucks	2	105
	Whacker rammer	1	107
	Welder tools	1	90
	Bulldozer	1	113
	Small Excavator	1	100
	Tank and spray feed	2	95
	Vacuum blower	4	100
Cell Filling & Management	D6 Dozer	1	113
	Water Truck	1	107
	Compactor	1	107

ACS Modification Works Construction Stages	Construction Equipment	Equipment Quantities	Sound Power Level per Plant Item (dBA)
Cell Closure	D6 Dozer	1	113
	Water Truck	1	108
	Compactor	1	107
	Manitou Forklift	1	95
	Trucks with aggregate and liners	4 per day all week for up to 3 separate weeks over 3 months	105
	Small excavator – 5 T	1	100

Note: It is unlikely that the mobile plant items identified would all concurrently operate at full capacity. The calculated total sound power level includes a -5dB correction to account for the operational on-time of the identified plant items.

11.4.2 Construction Noise

The results of the construction noise modelling are presented in **Table 11-4**. These results show the worst-case noise levels predicted for the ACS Modifications works, in combination with noise contributions from the demolition works (SSD 5544 MOD1) and the CSRF.

Table 11-4 Predicted $L_{Aeq,\ 15min}$ Noise Levels

#	Sensitive Receptors	Predicted $L_{Aeq,15min}$ Noise Level				Day Criteria 07:00-18:00h $L_{Aeq,15min}$ (dBA)	Eve Criteria 18:00-22:00h $L_{Aeq,15min}$ (dBA)	Complies with Criteria (Yes / No)	
		ACS	Refinery Demolition	CSRF	Cumulative			Day	Eve
R1	Cook Street (Industrial Premises)	38	51	26	51	75	75	Yes	Yes
R2	30D Cook Street (Residential Premises)	40	**50**	25	**50**	46	40	**No**	**No**
R3	Reserve Road (Residential Premises)	35	**50**	23	**50**	50	45	Yes	**No**
R4	Prince Charles Parade (Residential Premises)	28	40	24	40	50	45	Yes	Yes
R5	Corner of Captain Cook Drive and Silver Beach Rd (Residential Premises)	32	42	30	43	50	45	Yes	Yes
R6	Tasman Street (Residential Premises)	29	44	27	44	50	45	Yes	Yes

#	Sensitive Receptors	Predicted $L_{Aeq,15min}$ Noise Level				Day Criteria 07:00-18:00h $L_{Aeq,15min}$ (dBA)	Eve Criteria 18:00-22:00h $L_{Aeq,15min}$ (dBA)	Complies with Criteria (Yes / No)	
		ACS	Refinery Demolition	CSRF	Cumulative			Day	Eve
R7	Cook Street (Residential Premises)	33	45	28	45	50	45	Yes	Yes
R8	End of Chisholm Road (Industrial Premises)	34	45	41	47	75	75	Yes	Yes
R9	Sir Joseph Banks Drive (Industrial Premises)	37	47	44	49	75	75	Yes	Yes

The predicted noise levels for the construction of the ACS Modifications works comply with the criteria at all identified receiver locations and would therefore not have an adverse impact on these receivers.

The cumulative impact results indicated that at receiver R2 (30D Cook Street, residential) there are exceedance during daytime and evening periods and at R3 (Reserve Road (Residential Premises) there is an exceedance of evening criteria. However this exceedance is wholly associated and controlled by the demolition works and the ACS Modification works are not expected to impact on these receptors.

Further, no cumulative noise increase is expected as a result of the ACS Modification works during the demolition works period, as the ACS Modification works noise contribution is at least 10 dB less than the demolition noise contribution for all receivers.

11.4.3 Off-site Traffic Noise

Vehicles for the ACS Modification works would access the Site from Solander Street via Captain Cook Drive (refer to **Figure 13-1**).

A maximum of approximately 180 trucks (truck and dogs) may be required to remove hazardous waste from the Site, depending on the success of the biopiling works (refer to **Section 4.4.3**). It is anticipated that this movement would occur over a number of months, which results in approximately three to four heavy vehicle movements a day.

As discussed above, the existing traffic noise levels along Captain Cook Drive already exceed the noise criteria of 60 dBA during the day and 55 dBA during the night and Captain Cook Drive had an annual average daily traffic flow of 38,810 (two-way) vehicles per day (in 2012). Based on these volumes, the noise contribution from traffic generated by the ACS Modification works would be negligible at residences on Captain Cook Drive (that is, less than a 2 dB increase).

11.5 Mitigation

The DEMP for the Project includes a Noise Management Plan. This includes a number of noise management measures. These measures include specified working hours and noise criteria limits.

As the noise assessment for the ACS Modification works has not identified further exceedances beyond those previously reported for the demolition works and as the works would be conducted in accordance with the conditions previously set out in the Development Consent for SSD 5544 MOD1, no additional noise mitigation measures are considered warranted.

12.0 Air Quality and Odour

12.1 Introduction

This chapter presents the findings of the air quality assessment undertaken to understand potential air quality impacts associated with the ACS modification works, and to identify suitable mechanisms to manage the potential emissions.

12.2 Scope

The consideration of air quality within this SEE has included the following scope:

- A review of the existing environment, sensitive receivers and existing air quality.
- A summary of the works being performed and the potential air emissions associated with specific processes and / or activities.
- A review of the scale of potential air quality impacts in the context of extent, duration and frequency.
- Nomination of mitigation measures and monitoring requirements proportionate to the scale and type of activity.

12.3 Legislative and Planning Policy

The primary instrument for the regulation of air emissions in NSW is the POEO Act. With respect to the management of air quality, the POEO Act includes general provisions which address:

- The requirement to maintain and operate plant in a proper and efficient manner.
- Emission of air impurities as prescribed by the regulations.
- The requirement to minimise air emissions.
- The emission of offensive odours.

Under the POEO Act, the *Protection of Environment Operations (Clean Air) Regulation 2010* (CAR) addresses a range of activities that generate air emissions, and also contains emission standards for a range of industrial activities and plant. The CAR addresses:

- Emission of air impurities from industrial activities and plant items.
- Domestic solid fuel heaters.
- Control of burning.
- Motor vehicles and fuels.
- Control of volatile organic liquids.

Given that the ACS modification works are largely consistent in nature with those undertaken as part of the demolition works (SSD 554 MOD1), relevant legislative requirements are primarily limited to the general provisions included within the POEO Act, and implemented under the EPL for the Site.

12.4 Assessment Methodology

The consideration of air quality within this SEE has incorporated a qualitative methodology for assessment of potential air quality impacts.

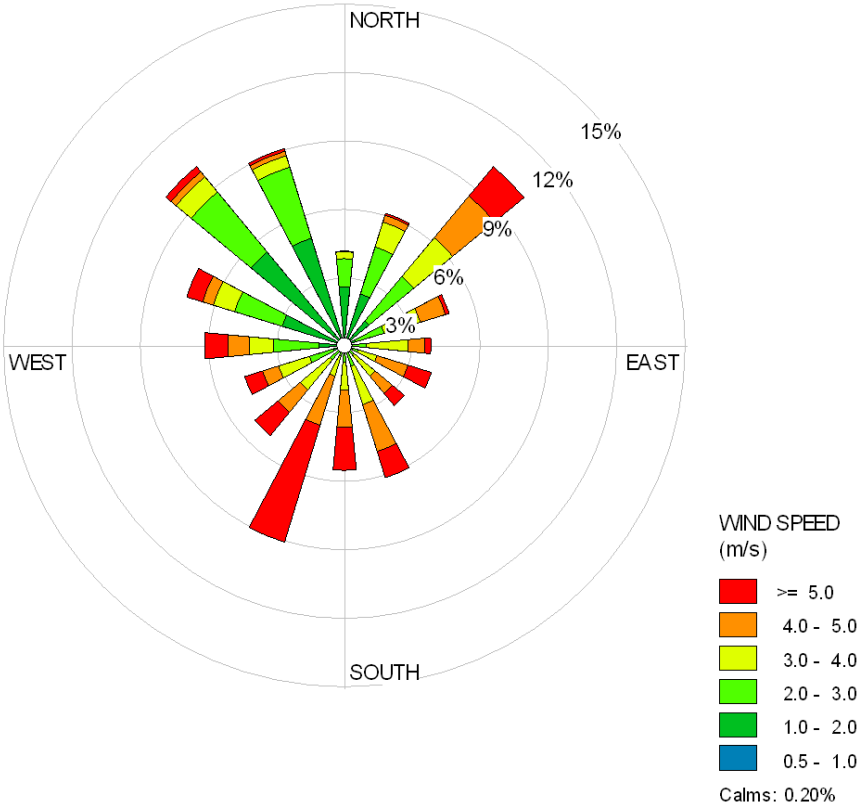
- A review of ACS Modification works activities and air emission potential; and
- Nomination of suitable mitigation measures and monitoring requirements for the scale and type of activity to ensure air quality is appropriately managed.

12.5 Existing Environment

12.5.1 Climate and Meteorology

The Site is located on the Kurnell Peninsula. Terrain across the Kurnell Peninsula is generally low-lying with the exception of the eastern-most portion of the headland where a ridge runs on a north/south alignment. The eastern boundary of the Site is bound by this ridge where elevations reach approximately 40 m above sea level. Winds at the Site are typical for coastal winds in the Sydney region, however higher than average wind speeds may be present due to the exposed nature of the Peninsula. Some sheltering of easterly winds has potential to be present due to the ridge to the east of the Site. **Figure 12-1** shows the wind rose for the Site from 2008. Winds are shown to be well distributed in all directions, with the slight accentuation of north easterly sea breezes, south-south westerly and north-westerly winds, as common to the coastal areas of Sydney. A large proportion of high wind speed conditions is also evident.

Figure 12-1 Wind Rose for the Site - 2008

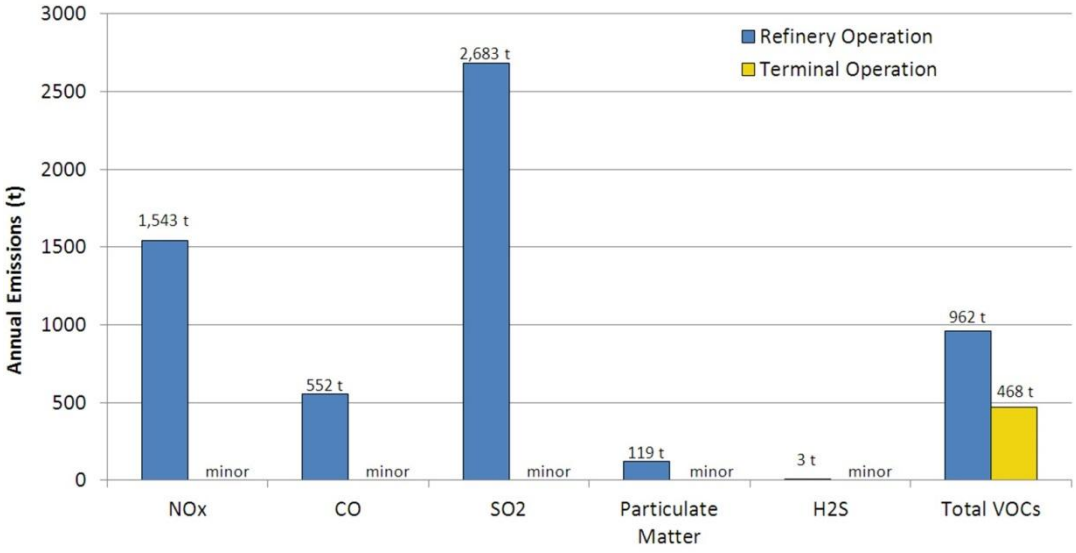


12.5.2 Existing Air Quality

Given the coastal location and isolation from main roads, local air quality on the Kurnell Peninsula, up until 2014, was primarily influenced by emissions from existing refinery operations within the Site. Such emissions included combustion products (e.g. oxides of nitrogen [NO_x], sulphur dioxide [SO_2], carbon monoxide [CO]) and Volatile Organic Compounds (VOCs) arising from both fugitive process emissions, and combustion processes.

With the transition of the Site from refinery to terminal operations in 2014, air emissions from the Site have reduced significantly. The shutdown of the refinery has been estimated to result in total VOC emissions halving in quantity. In addition, emissions of NO_x, carbon monoxide, sulphur dioxide, particulate matter and hydrogen sulphide have all significantly reduced with cessation of refining at the Site. This reduction is illustrated in **Figure 12-2** below from the EIS for SSD 5544. Refer to Appendix G of the Kurnell Refinery Conversion Project EIS Air Quality Impact Assessment (URS, 2013) for more detail.

Figure 12-2 Estimated Change in Emissions Profile with Transition From Refinery to Terminal Operation



12.5.3 Sensitive Receivers

Sensitive receivers for the ACS modification works have been identified and shown as receivers R1 through R9 in **Figure 11-1**. The nearest sensitive receivers relevant to potential air quality impacts are located within the township of Kurnell, adjacent to the north-eastern section of the Site. These include industrial receiver R1 and residential receiver R2 which border the Site on the Eastern Right of Way.

The proximity of sensitive receivers to proposed works varies depending on the location of activities as shown in **Table 12-1**.

Table 12-1 Proximity of ACS Modification Works to Nearest Sensitive Receivers

Operational Area	Nearest Receivers	Proximity to Works
Pipeway Excavations	R1/R2, R6	R1/R2: 200m to >1 km R6: 230m to >1 km
ACS biopile Works	R1/R2	Approx. 600 m
Containment Cell Works	R1/R2	Approx. 1 km

12.6 Impact Assessment

This section provides consideration of the potential air quality impacts through an analysis of the scale of the emission sources, the duration of operations, and the proximity of the ACS Modification works to sensitive receivers.

For the purposes of this analysis, the ACS Modification works have been segregated into the three separate categories:

- Pipeway excavations
- Containment cell works
- ACS biopile works.

12.6.1 Potential emissions to air

Based on the ACS Modification works description provided in **Chapter 4 Proposed Modification**, potential air emissions from the ACS Modification works include the following:

- Particulate matter and soil contaminant emissions (including asbestos) from the excavation, handling, transport and biopiling of contaminated soils.
- Emissions from biopile aeration systems.

- Particulate matter emissions from the construction of the containment cell.
- Particulate matter from transport of ACS on internal roadways.
- Combustion emissions from mobile plant (e.g. trucks, excavators, dozers).

Table 12-2 presents a summary of these potential air emissions attributable to each area and activity.

Table 12-2 Potential Air Emissions Attributable to Each Area and Activity

Area	Activity	Potential Air Emissions		
		Particulate Matter	Soil Contaminants	Combustion Emissions
Pipeways	Access of pipeways area	ü		ü
	Excavation and loading of ACS	ü	ü	ü
	ACS transport to works areas	ü	ü	ü
ACS biopile works area	Soil receipt	ü	ü	ü
	Soil stockpiling	ü	ü	ü
	Soil homogenisation	ü	ü	ü
	Biopile construction	ü	ü	ü
	Biopiling	ü	ü	ü
	Dismantling and transport	ü	ü	ü
Containment well works area	Cell construction	ü		ü
	Receipt of material and filling	ü	ü	ü
	Cell closure	ü		ü

Soil contaminants of potential interest include:

- Particulate Matter (including Particulate Matter less than 10 microns in aerodynamic diameter (PM_{10});
- Asbestos;
- Odour; and
- VOCs.

12.6.2 Soils to be Managed

As outlined in **Chapter 4 Proposed Modification**, the soils to be managed during the ACS Modification works comprise those situated within sections of the pipeways in which asbestos has been detected. For the purpose of characterising the soils within the pipeways, Caltex have commissioned waste classification studies that involved sampling of soils at a total of 84 locations within the pipeways (AECOM, 2013), (AECOM, 2016). Based on these studies it has been estimated that soils proposed to be excavated from the pipeways as part of the ACS Modification works include ACS with:

- no detected hydrocarbon contamination (~8,000 m^3) that constitute General Solid Waste.
- hydrocarbon contamination detected at levels that constitute Restricted Solid Waste (~ 2,300 m^3).
- hydrocarbon contamination detected at levels that constitute Hazardous Solid Waste (~ 2,900 m^3).

Soils with different classifications will be managed in different areas of the Site as outlined in **Table 12-3**.

Table 12-3 Soil Types Handled by Operational Area

Soil Type	Operational Area		
	Pipeway Excavations	Biopile Works	Containment Cell Works
ACS with no detected hydrocarbon contamination	ü		ü
ACS with hydrocarbon contamination detected at levels that constitute Restricted Solid Waste	ü		ü
ACS with hydrocarbon contamination detected at levels that constitute Hazardous Solid Waste	ü	ü	
Engineering fills/clay/soils for landfill construction, operation and closure			ü

A detailed review of the contamination is provided in **Chapter 8 Soil, Groundwater and Contamination**, however with respect to potential air emissions, it is noted that the contamination primarily includes:

- Petroleum hydrocarbons
- Asbestos.

Further review of these contaminants is provided in the following sections.

Petroleum Hydrocarbons

Where present, VOCs have the potential to be emitted to air during the excavation, handling and processing of contaminated soils.

A screening analysis of the hydrocarbon speciation has been made in order to understand the degree to which volatile compounds are present in ACS within the pipeways, with a view to understanding the potential for these compounds to be emitted during the ACS Modification works. In order to broadly reflect soils that will be excavated during the course of the ACS Modification works, this analysis has been limited to 35 samples in which asbestos was detected (i.e. noting that it is proposed to leave non asbestos contaminated soils in-situ).

When considering volatility, VOCs are commonly grouped by the number of carbon atoms contained within molecules of a given substance. With an increasing number of carbon atoms, there is a corresponding increase in molecular weight, a decrease in vapour pressure, and a decrease in the ability of the substance to volatilise. Petroleum hydrocarbon VOCs, as relevant to air quality considerations, include those within the C6-C10 range. **Table 12-4** lists key petroleum hydrocarbon VOCs by carbon number.

Table 12-4 Petroleum Hydrocarbon VOCs by Carbon Number

Carbon number	Substance
C6	Benzene, n-hexane, cyclohexane
C7	Toluene
C8	Ethylbenzene, xylenes
C9	Trimethylbenzenes, cumene

Note – as an example, C6 denotes substances containing 6 carbon atoms.

Table 12-5 presents a summary of the hydrocarbon speciation for ACS from the pipeways, including those soils classified as restricted and hazardous.

Table 12-5 Summary of ACS Hydrocarbon Speciation

Hydrocarbon Fraction	Hydrocarbon Mass Fraction (%)		
	All ACS Samples	ACS / Restricted	ACS / Hazardous
C6-C10	0.1%	0.02%	0.1%
TRH >C10-C16	6.4%	4.5%	6.6%
TRH >C16-C40	93.5%	95.5%	92%

Note: totals may appear non-additive due to rounding.

Based on the analysis presented in **Table 12-5**, VOCs typically comprise approximately 0.1% of hydrocarbon contamination present within soils to be handled as part of the ACS Modification works. At these levels, VOC emissions from the ACS Modification works are considered unlikely to be significant in the context of existing emissions from the terminal operations. It is also noted that Benzene was not detected in the ACS samples, whilst toluene, ethylbenzene and xylenes were detected within a single ACS sample.

Asbestos

Where present, asbestos has the potential to be mobilised during excavation, handling and storage of soils. As detailed in **Section 8 Soil, Groundwater and Contamination**, the soil classification work undertaken in 2013 and 2016 included analysis of soil samples for asbestos presence, as well as quantitative analysis with reporting of asbestos mass as a percentage by weight (wt%). As part of the quantitative analysis, asbestos (including chrysotile and amosite) was at or above detection limits in a total of 25[7] of 35 ACS samples. **Table 12-6** provides a summary of analytical results for these samples.

Table 12-6 Summary of Asbestos Weight in ACS Samples

Parameter	Value
Number of samples in which asbestos detected via quantitative analysis	25*
Detection limit	<= 0.001 wt%*
Minimum detected	0.0005 wt%
Average detected	0.05 wt%
Maximum detected	0.75 wt%

Note: Excludes 10 samples where asbestos was identified by visual presence but not detected quantitatively; "<=" means less than or equal to.

As shown in **Table 12-6**, the average quantity of asbestos detected via quantitative analysis varies between 0.005 wt% and 0.75 wt%, with the upper range being defined by two samples containing 0.75 wt% and 0.12 wt% asbestos. An overall average of 0.05 wt% was reported in soils in which asbestos was detected via quantitative analysis.

Given that designation of pipeway excavation areas has been undertaken by broad section, the soils excavated will encompass areas that include soils that reported non-detections for presence, as well as soils that reported detections for presence, but non-detections on quantitative analysis. Accordingly, based on the sampling undertaken to date, it is estimated that on average asbestos concentrations in ACS handled as part of the ACS Modification works would be below 0.05 wt%.

12.6.3 Emission Scale

Each operational area has been assigned a relative emission scale, based on the size of the source, and the equipment in use. Given the small working extent, and use of an excavator, the pipeway excavations have been assigned a "low" emission scale, whilst given the larger extents and use of dozers, a "moderate" emission scale has been assigned for both the ACS biopile and containment cell works areas. **Table 12-7** provides a summary of these emission scales.

[7] This figure does not include 10 samples that reported visual presence of asbestos but where quantitative analysis was below detection limits.

Table 12-7 Summary of Relative Emission Potential by Works Area

Area	Key Equipment	Physical Extent of Working Area*	Relative Emission Scale
Pipeway excavations	- Excavator - Truck and Dog	Approx. 10 x 10 m	Low
Biopile works	- Bulldozer - Truck and dog - Small excavator fitted with screener/crusher bucket. - Soil aeration systems	Approx. 20 x 20 m	Moderate
Containment Cell Works	- Bulldozer - Truck and dog - Small excavator	Approx. 20 x 20 m	Moderate

*Note: Working area extents have been nominated as being representative of the size of operations at a given stage within the course of the modification works, i.e. not the total size of the works area.

12.6.4 Qualitative Analysis

Potential air quality impacts for the ACS Modification works have been outlined in terms of:

- Key pollutants.
- Proximity to receivers.
- Duration of activities.
- Scale of emission sources.

Table 12-8 combines the findings and presents a summary of this analysis. Air quality risks as a product of proximity, duration and scale of emission sources, have been considered “moderate” without mitigation, and “low” with appropriate mitigation. Whilst pipeway excavations are proposed at areas closer to sensitive receivers, the small scale of the excavation and loading operation aligns the level of risk to be equal to that of the ACS biopile and containment cell works areas, which comprise a larger scale, but with greater separation distances. In addition, it is noted that these works are consistent with those undertaken and managed as part of the demolition works (SSD 5544 MOD1), which include the management of potential air quality impacts from the excavation and handling of soils contaminated with petroleum hydrocarbons and asbestos at a scale consistent with that proposed as part of the ACS Modification works.

Accordingly, the potential for the ACS Modification works to generate adverse air quality impacts is considered low and manageable with the implementation of appropriate mitigation measures, as consistent with those applied as part of the demolition works, but with specific allowances for the ACS biopile and containment cell works. These measures are discussed in the following section.

Table 12-8 Summary of Qualitative Analysis of Potential Air Quality Impacts

Operational Area	Proximity to Sensitive Receivers	Approximate Duration	Activities	Emission Scale	Key Air Quality Considerations	Air Quality Risk	
						Without Mitigation	With Mitigation
Pipeway excavations	200m to >1 km	6 months*	Vehicle movements Excavation and loading of ACS ACS transport to biopile / cell areas	Low	Potential dust and asbestos emissions from excavation operations.	Moderate	Low
ACS Biopile works	Approx. 600 m	11 months	ACS receipt ACS stockpiling ACS homogenisation Biopile construction Biopiling Dismantling and transport	Moderate	Potential dust, asbestos, VOC and odour emissions from ACS handling operations.	Moderate	Low
Containment cell works	Approx. 1 km	18 months:	Cell Construction Receipt of material and filling Cell closure	Moderate	Potential dust and asbestos emissions from ACS handling operations.	Moderate	Low

*Note: Total duration of pipeways excavations estimated at 6 months. This may occur over several smaller periods.

12.7 Mitigation

In order to manage the potential impacts outlined above, the existing DEMP would be updated to include management of the ACS Modification works. The Site's OEMP would also be updated to include management and monitoring of the containment cell during operation.

Recognising the consistency of pipeway excavations with activities already undertaken as part of the demolition works, it is recommended that pipeway excavations be managed in accordance with existing management strategies which include air quality and asbestos management plans that specifically address soil excavation.

The ACS biopile works and containment cell works constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities two additional subplans to the DEMP would be produced, one for the containment cell and one for the ACS biopile. These two subplans would reference other parts of the DEMP as necessary but would also include specific measures regarding air quality and asbestos. With regards to air quality and asbestos, these plans would include:

- A brief overview of site operations relevant to potential air emission sources.
- Identification of mitigation measures for each respective emission source including those measures outlined in the DEMP for the Site (where relevant to operations within each works area).
- Details of proposed monitoring and recordkeeping procedures.

In accordance with the review conducted here, specific mitigation measures are nominated for inclusion in the following sections. It should be noted, that the measures that are to be proposed are in addition to general provisions that apply for management of air quality and odour at the Site.

12.7.1 ACS Biopile Works Area

The following specific control measures are proposed for the biopile works area:

- Bucket crusher operation for the homogenisation process will be conducted so as to minimise potential dust emissions, including the use of:
    - directed water sprays throughout operation.
    - localised wind breaks within the soil screening area.
    - cessation of works during high winds (as defined within the DEMP).
- Aeration system emission vents will be monitored for VOCs using a Photo-Ionisation Detector (PID) on a weekly basis.
- The aeration system design will give consideration to potential asbestos emissions, and include emission monitoring for asbestos fibres prior to the commencement of continuous operations.
- Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable.
- Provisions for management of odorous material, including notifications from the pipeway excavation operations in the case that odorous material is encountered. These odour controls would be consistent with the measures contained within the DEMP.

12.7.2 Containment Cell Works Area

The following specific control measures are proposed for the containment cell works area:

- Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable.
- Directed water sprays will be used when required throughout ACS handling operations.
- A plastic sheeting would be placed immediately over ACS after it is placed in the containment cell. The use of suitably rigid plastic sheeting will minimise dust. Prior to the placement of the next load of ACS and at the start of each day the plastic sheeting would be stripped back to allow filling operations to continue.
- Stockpiles will be maintained in a moist condition, and covered if not in use or left overnight.
- Completed areas of the works area will be revegetated with native grasses as soon as is practicable.

13.0 Transport and Access

13.1 Introduction

This chapter provides an assessment of the potential traffic and access impacts of the ACS Modification works.

13.2 Assessment Methodology

The scope of this assessment is to provide a qualitative assessment of the potential traffic impacts that could arise from the ACS Modification works. A qualitative assessment was considered justified as potential traffic impacts to the local road network are likely to be limited to private vehicles accessing the Site and the arrival and departure of certain equipment to complete the excavation of ACS, manage the ACS biopile and construct, fill and close the containment cell. In addition, whilst unlikely, there may also be the requirement to remove the hazardous ACS from the Site. If this is required, then up to 180 truck and dogs may be required to remove this material over several days. This one off potential impact is also discussed further below.

To understand the existing traffic environment a review of recent traffic studies for the Site was completed. A summary of these assessments is provided below. This summary includes a discussion of the Level of Service (LoS) on the roads around the Site. **Table 13-1** below provides an explanation of LoS.

Table 13-1 SIDRA Intersection LOS Criteria

LOS	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Potential impacts have been qualitatively discussed in the context of the existing environment and the other activities that have taken place and are taking place at the Site.

13.3 Existing Environment

13.3.1 Local Road Network

Kurnell is located on the southern shore of Botany Bay and is accessed via Captain Cook Drive, the major access road connecting the Kurnell peninsula to the wider Sydney road network. It connects Taren Point Road to the west (and further to the Princes Highway via The Boulevard) with Prince Charles Parade to the east and the suburb of Kurnell. It has three lanes in each direction west of Gannons Road with a median strip separating each carriageway, reducing to two lanes in each direction and divided carriageways between Gannons Road and Woolooware Road. It further decreases to an undivided carriageway with one lane in each direction east of Woolooware Road to Kurnell.

A location plan showing the surrounding road network can be found in **Figure 13-1**.

KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Road Network

0 500 1,000 1,500 m

AECOM

SCALE 1:45,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE **FIGURE 13-1** - LOCAL ROAD NETWORK

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	MJB	DATE 29/09/2016	MAP #	REV	Project
CHECK	WM	DATE 30/09/2016	G009	03	60488804

AECOM GIS Printed Date: 29/09/2016 P:\60\X\60488804\4. Tech work area\4.6 GIS\02_Maps\G009_03_Local_Roads_160929.mxd

The road network serving the Site includes:

- **Captain Cook Drive** west of Gannons Road is classified as a State Road. To the east of Gannons Road, Captain Cook Drive is classified as a Regional Road. Captain Cook Drive provides primary vehicular access to the Site and connects Taren Point Road with the Kurnell Peninsula on the southern shore of Botany Bay. Within the vicinity of the Site, the carriageway is divided and comprises one traffic lane in each direction. A section of Captain Cook Drive between Woolooware Road and Elouera Road has been upgraded to two traffic lanes in each direction.
- **Taren Point Road** is classified as a State Road and follows a north-south alignment. Within the suburb of Taren Point, Taren Point Road is aligned parallel to and east of the Princess Highway and provides an alternate route. Generally, the carriageway is divided and comprises three traffic lanes in each direction with auxiliary turning lanes.
- **Solander Street** is classified as a Regional Road and provides vehicular access to the Site. It connects the Site's main car park with Captain Cook Drive. The carriageway comprises one traffic lane in each direction. Unrestricted parallel parking is permitted on both sides of the street.

As detailed with the EIS for the Caltex Soil Remediation Facility (URS, 2015), the Captain Cook Drive / Solander Street operates at LoS of A.

13.3.2 Public Transport

The Site is serviced by the Route Number 987 bus service that is operated by Veolia. The service connects Kurnell to Cronulla train station. This service operates approximately every hour between 6:00am and 7:00pm.

Regular train services are provided between Cronulla Railway Station and Bondi Junction via Hurstville and the Sydney CBD. In addition a number of bus routes servicing the greater Sutherland Shire area utilise the bus interchange located adjacent to Cronulla train station.

On-road bike lanes are provided along the length of Captain Cook Drive between Elouera Road and Torres Street. Near the Kurnell township, the bike lanes are shared with parallel parking.

13.3.3 Site Access

The main entrance to the Site is via Solander Street exiting from Captain Cook Drive. Vehicle access to the Site is also available from Sir Josephs Banks Drive.

The intersection of Captain Cook Drive / Solander Street has sight distances well in excess of the minimum requirement of 97 m and are therefore compliant. It also has adequate signage with an unobstructed "give way" sign provided on the Solander Street approach. Lane markings are visible on all approaches. A recent swept path assessment indicated that two truck and dog vehicles can turn right (into) and left (out of) onto Solander Street at the same time (GTA, 2015).

Given the nature of Solander Street (i.e. its width, demarcation etc.) it is considered appropriate for use by heavy vehicles. Further, Captain Cook Drive and Solander Street are approved B-double (26 m) routes[8].

In summary, based on this information, the Captain Cook Drive / Solander Street intersection is considered appropriate from a safety and design perspective for use as access to the Site.

The ACS Modification works area does not have any frontages to the surrounding road network. As such, vehicle access to the Project Area would be via the existing internal road network to and from Solander Street.

The Site contains a number of established internal roads. The majority of the movements associated with the works will be contained within the Site.

13.3.4 Car Parking

The Site contains numerous unused car parking spaces reflective of the reduction of staff numbers at the Site following the conversion of the refinery to a terminal and the associate reduction in staff numbers (refer to SSD 5544). As such, car parking will not be a concern for the ACS Modification works.

[8] Roads and Maritime website - http://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/index.html

13.4 Impact Assessment

13.4.1 Private Vehicle Traffic Generation

Section 4.4.9 presents the likely workforce and traffic movements for the ACS Modification works. As noted previously, the works could require up to 30 contractors at any one time for up to 18 months (2017 to 2018). Assuming that all of these workers arrive in their own vehicle and do not use public transport, this would result in 30 private vehicles or 60 movements per day.

As noted above, the Captain Cook Drive / Solander Street operates at LoS of A. This conclusion was made when both the conversation and demolition works at the Site were being completed in 2015 and included the worst case vehicles movements from the Caltex Soil Remediation Facility. During this time the conversion works had a workforce of 100 and the demolition works had a workforce of 230 (refer to **Table 4-4**).

The conversion works at the Site will be completed this year and will no longer require a workforce. The demolition works will continue until the end of next year but with a workforce of only 130. The Caltex Soil Remediation Facility only requires an additional 5 staff at the Site.

As shown in **Table 4-4** in 2015, up to 410 employees and contractors were expected on the Site. In 2017, including the ACS Modification works, up to 355 employees and contractors are expected on the Site.

The Site has been progressively converted from an active refinery to a storage and distribution facility (terminal). As a result of the change in use the number of employees on-site has reduced significantly. In turn, traffic generation from the Site has significantly reduced in recent years (refer to the EIS for SSD 5544).

Against existing traffic volumes in the vicinity of the Site and having regard for the historic traffic volumes generated by the Site, the additional traffic generated by the ACS Modification works is not expected to compromise the capacity of the surrounding road network and as such no traffic impacts are expected.

13.4.2 Heavy Vehicle Traffic Generation

Approximately 24 heavy vehicle movements would be required to bring and remove the equipment and plant required to complete the ACS Modification works. These heavy vehicle movements would be concentrated on 4 to 6 days throughout the 18 month program.

Of greater note is the unlikely but potentially required removal of the worst case 5,390 tonnes ACSs classified as Hazardous Waste. Assuming that a truck and dog can carry 30 tonnes of soil, this would require about 180 trucks to remove this material from the Site.

In both cases the heavy vehicle movements would be sporadic rather than regular and would be confined to specific days. Over the 18 month program there would typically be no heavy vehicle movements.

As noted above the demolition works at the Site are currently underway and will continue until the end of 2017. The traffic assessment for the demolition works assumed that "*at any one time there would be a peak of approximately 30 heavy vehicles per day (60 daily return trips) required to access the Site.*"

Whilst the peak of 30 heavy vehicles was assessed, often no heavy vehicles access the Site for the purpose of the demolition works. As such, this peak of 30 heavy vehicles a day (60 movements) provides sufficient flexibility to accommodate the delivery and removal of equipment and plant for the ACS Modification works and the removal of the ACSs classified as Hazardous Waste (should it be required).

In addition the conversion works assumed a maximum of 20 heavy vehicles a day accessing the Site. These works will be ending before the ACS Modification works commence.

As the heavy vehicle movements for the ACS Modification works can be accommodated within the maximum heavy vehicle movements for the demolition works, and as the Captain Cook Drive / Solander Street operates at LoS of A, it is considered unlikely that these works would have an adverse impact on the local road network.

13.5 Mitigation

Traffic related impacts as a result of the ACS Modification works are highly unlikely. Nevertheless certain mitigation and measures would be required to ensure that the works can be managed in line with the other activities at the Site. The following measures would be implemented:

- A measure would be included in the TMP for DEMP that would require heavy vehicle movements from the demolition works and ACS Modification works to be coordinated to ensure that off-site heavy vehicle movements do not exceed 60 movements a day.
- The traffic related to the ACS Modification works would be managed under the Traffic Management Plan (TMP) that forms a sub-plan to the Demolition Environmental Management Plan (DEMP). Condition C36A outlines what is included in the TMP.

14.0 Other Issues

14.1 Heritage

14.1.1 Introduction

This section considers the potential impacts to both Aboriginal and Historic (or Non-Aboriginal) heritage values associated with the ACS Modification works.

The Site has previously been investigated for heritage values as part of the approved Project (SSD 5544) (the conversion works) and approved Project modification (SSD 5544 MOD1). Studies undertaken for these works have been relied on to provide background information for the discussion below. These studies include:

- A Heritage Impact Assessment (HIA) undertaken by AMC in 2013 for the conversion works EIS (SSD 5544);
- A Heritage Management Strategy (HMS) undertaken by AMC in 2014 to manage potential impacts to heritage of the conversion and demolition works, following approval of the project in January 2014; and
- A Heritage Impact Assessments (HIA) undertaken by Australian Museum Consulting (AMC) in 2014 for the proposed demolition works SEE (SSD 5544 MOD1), approved in August 2015.
- The Heritage Assessment for the Permanent Soil Regeneration Facility completed in July 2015 and contained within the EIS for this project (July 2015).

14.1.2 Existing Environment

14.1.2.1 Aboriginal Heritage

The identified Aboriginal sites in the vicinity of the Site are shown on **Figure 14-1**. One potential Aboriginal site has previously been identified in the immediate vicinity of the Site, a Potential Archaeological Deposit which extends 100 m into the Site between Solander Street and Road 14 (Kurnell Pipeline PAD; not registered on AHIMS). This area and the whole Site has been subject to extensive disturbance from the industrial development, including roads, installation of pipelines, tanks and a stormwater basin, and ongoing maintenance of subsurface infrastructure, as well as exotic plantings. As such, it is unlikely that midden deposits, subsurface artefact occurrences or burials are present below the ground surface. Equally the HIA for the EIS for SSD 5544 determined that, due to the disturbed nature of the Site, it was highly unlikely that any Aboriginal Heritage items remained on the Site.

14.1.2.2 Historic Heritage

The Kurnell Peninsula was only formally settled by Europeans in 1815. The peninsula was used for farming, timber in the 1800s and for sand extraction in the early 1900s.

In the 1950s the Caltex commenced the construction of the Kurnell Refinery commenced. The work to build the refinery involved draining swamps, clearing scrub and installing roads (Captain Cook Drive), water supplies and sewerage facilities. This activity led to further development of the peninsula and village of Kurnell.

There are four identified historic heritage items or places in the immediate vicinity of the Site (**Figure 14-1**). The Project Area falls within the heritage curtilage of the locally significant 'Australian Oil Refinery' (as listed on SSLEP 2015). The locally significant 'Silver Beach and roadway' is also located adjacent to the Site. Other heritage items on the Kurnell Peninsula are at a distance of at least 150 m or more from the Site and would not be affected by the ACS Modification works. These items have not been discussed further in this assessment.

The locally significant four wheel drive track (Captain Cook Drive) is closely associated with the north-west and south-west boundaries of the Site. However, there is no physical evidence of the track within the boundary of the Site today. The nationally significant Kurnell Peninsula Headland adjoins the eastern boundary of the Site.

The proposed locations of the Containment cell and the ACS biopile are within parts of the Site where the former tanks have been demolished in line with the demolition works consent (SSD 5544 MOD1). These locations are currently vacant and have no heritage value now that the tanks have been removed. Equally the pipeways are located on previously disturbed land. The ACS within the pipeways has built up over a number of years following construction of the refinery. As noted in the HMS for the Site the pipelines within the pipeways have heritage significance for the Site, however the removal of some of these pipelines was considered within the demolition works consent (SSD 5544 MOD1). The pipeway itself a certain pipelines remain.

KEY

- The Site
- Caltex Land Ownership
- Kurnell Peninsula Headland (National Heritage List)
- National Park
- Towra Point Nature Reserve
- Towra Point Aquatic Reserve
- Four wheel drive track
- ACS Modification Works Area
- Pipeways to be excavated
- Biopile Works Area
- Containment Cell Works Area

Noxious Weeds

- Chrysanthemoides monilifera subsp. rotunda
- Lantana camara
- Ludwidgia peruviana
- Ricinus communis

Heritage Site Types

- Artefact Scatter
- Burial
- Burial/s, Midden
- Midden
- Midden, Open Camp Site
- Midden, PAD
- Open Camp Site
- PAD
- Rock Engraving

AECOM

N 0 200 400 600 m

SCALE 1:18,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE **FIGURE 14-1** - ECOLOGY AND HERITAGE

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

		DATE	MAP #	REV	Project
DRAWN	MJB	30/09/2016			
CHECK	WM	30/09/2016	G007 03		60488804

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14.1.3 Impact Assessment

14.1.3.1 Aboriginal Heritage

Considering all works involved in the ACS Modification works would be contained within previously disturbed areas within the Site boundary, no impacts to Aboriginal heritage values are expected.

14.1.3.2 Historic Heritage

The ACS Modification works will not require the permanent removal or loss of any infrastructure at the Site. The pipeways would not be affected by the removal of the ACS and therefore their heritage significance for the Site would not be impacted.

The demolition works have already resulted in the removal of the tanks that were previously located within the containment cell area and the biopile works area. These activities would not result in the loss of any notable heritage values at the Site. As these areas contain no items of heritage value, no historic heritage impacts are expected.

14.1.4 Summary

No specific mitigation measures are required for the management of Aboriginal and non-Aboriginal cultural heritage. Nevertheless as the ACS Modification works would be managed under the DEMP for the Project, the applicable heritage related management and mitigation measures from this document would apply to the works. These include unexpected find procedures for Aboriginal and non-Aboriginal cultural heritage, as well as a commitment to continue to implement the strategies outlined in the Kurnell Refinery HMS (AMC, 2014).

14.2 Ecology

14.2.1 Introduction

This Section provides an overview of the ecological considerations for the ACS Modification works.

The Site has been investigated for ecological values as part of the SSD 5544 and SSD 5544 MOD1 applications (Biosis 2012 and 2014). These studies have been utilised for this assessment.

14.2.2 Existing Environment

The Site is located on the Kurnell Peninsula south of Botany Bay. The original vegetation has been extensively cleared on the Kurnell Peninsula. Only remnant patches of vegetation remain in some of the areas of more significant ecological value including:

- Botany Bay;
- Marton Park Woodland and Wetlands (a Groundwater Dependent Ecosystem which includes fringing Swamp Oak Floodplain Forest);
- Towra Point Nature Reserve (Ramsar wetland);
- Towra Point Aquatic Reserve; and
- Kamay Botany Bay National Park.

There are some ecological features, including vegetated areas, threatened biota records and noxious weeds in across the Site (Biosis, 2014), however, the Project Area is largely devoid of vegetation and has been highly modified in the past.

The containment cell area, the biopile works area and the pipeways are largely kept clear of vegetation. As such these areas have no real value as fauna habitat.

14.2.3 Impact Assessment

The ACS Modification works would be wholly confined to the ACS Modification works area provided on **Figure 1-2**. Access to this area would be via existing roads within the Site.

The ACS Modification works would have no significant impacts on the ecological values within the Site. This is due to the following factors:

- the ACS Modification works would be undertaken in a highly modified and disturbed landscape, devoid of native vegetation or fauna habitat;
- the ACS Modification works would not involve the removal or modification of any remnant native vegetation; and
- there is low likelihood of threatened biota and/or Threatened Ecological Communities being present within the ACS Modification works area due to the lack of vegetation and/or foraging habitat.

The potential ecological impacts from ACS Modification works are as follows:

- potential discharge of stormwater run-off, sediment laden water, contaminated water and oily water off-site and into the groundwater system affecting nearby natural areas and GDEs;
- potential for further spread of existing noxious weed infestations; and
- potential impacts on fauna during dispersal including accidental trapping of amphibians in trenches.

These impacts are expected to be of negligible to minor significance and would be mitigated further through the implementation of the management and mitigation measures contained within the DEMP for the Project. The DEMP and its sub-plans contain a suite of measures to manage potential impacts related to erosion, stormwater, groundwater, noxious weeds and ecology. These measures, alongside specific measures presented in **Chapter 8 Soil, Groundwater and Contamination** and **Chapter 10 Surface water, Wastewater and Flooding** would be implemented for the ACS Modification works.

In addition as the containment cell is progressively closed, it would be revegetated with native grass species to help stabilise the cap and mitigate against erosion. Once the whole cell is closed and capped, the whole containment cell cap and the adjacent swale would be planted with appropriate native vegetation (e.g. grasses, rushes etc.).

14.2.4 Summary

No ecological impacts are expected as a result of the ACS Modification works provided that the measures contained within the DEMP and its subplans are implemented.

14.3 Hazards and Risk

14.3.1 Introduction

As outlined in Section 5.3.2.1, the ACS Modification works are not classified as industry and therefore the provisions of SEPP 33 do not apply. Nevertheless the works are located on the Site of a MHF and do involve handling hazardous substances. As such a brief hazards and risk assessment has been provided below.

14.3.2 Existing Environment

Caltex has a commitment to meet the intent and specific requirements of the *NSW Work Health and Safety Act 2011* (WH&S Act) and the *NSW Work Health and Safety Regulation 2011*. Caltex has numerous policies and procedures to create and maintain a safe workplace at the Site. These are regularly reviewed, modified as necessary. The conversion and demolition works at the Site comply with these procedures and controls.

The ACS Modification works would comply with current and relevant safety codes and statutory requirements with respect to safe working conditions. In particular, this would include standards and requirements relating to the handling and management of hazardous/flammable/contaminated materials. Personnel required to work with these substances would be trained in their safe use and handling and would be provided with all the relevant safety equipment.

Emergency procedures have been developed for the Site. The Site has a manager with overall responsibility for safety, who is supported by experienced personnel trained in the operation and support of the plant and associated facilities.

Procedures are currently in place to manage incidents and injuries. This includes an established incident reporting and response process. These processes would be implemented for the ACS Modification works.

Persons involved with the ACS Modification works would be provided with appropriate personal protective equipment (PPE) suitable for use with the specific hazardous substances.

Personnel who are first-aid trained are listed on company noticeboards across the Site.

14.3.3 Discussion

14.3.3.1 Hazardous Materials

The biopiling part of the ACS Modification works would store a range of potentially hazardous materials used in the bioremediation of contaminated soils. These materials include:

- di-ammonia phosphate;
- urea;
- mono-ammonium phosphate;
- triple super phosphate;
- potassium sulphate; and
- activated carbon.

None of these materials are classified as dangerous goods in accordance with the definition in the Australian Dangerous Goods Code.

As a worst case it is assumed that 5,390 tonnes (around 3,600 m^3) of Special Hazardous Waste has been determined to be present within the pipeways. The actual figure is lower than this but this number includes a contingency. The classification of Special Hazardous Waste has been based on the presence of elevated concentrations of petroleum hydrocarbons and asbestos fibres. Analysis has shown that the hydrocarbons generally occur in the carbon band range $C_{15} – C_{36}$ which is generally non-volatile or semi-volatile. The measured concentrations in the $C_{10} – C_{36}$ range are between less than 50 mg/kg to 106,000 mg/kg with a mean of 19,087 mg/kg and a median of only 915 mg/kg, indicating that the higher concentrations are sporadic and that the material is not homogeneous (AECOM, 2016a).

Given the presence of elevated petroleum hydrocarbons and asbestos fibres in this soil, strict management measures and controls would be implemented regarding the handling and biopiling of this material. These measures are outlined in greater detail in **Chapter 8 Soil, Groundwater and Contamination**.

In the unlikely event that the ACS biopiling works are not successful in reducing the classification of ACSs from Special Hazardous Waste to Special Restricted Solid Waste, then this material would be sent to an offsite licenced facility. By this point the ACS in the biopiles would have been homogenised to a typical hydrocarbon concentration is no greater than 50,000 mg/kg.

The Special Hazardous Waste would be removed from Site in truck and dogs that can carry loads of approximately 32 tonnes. For this quantity of soil, an equivalent DG amount of 3 tonnes equates to an average TPH concentration of greater than 93,000 mg/kg. As noted, following the homogenisation process the typical hydrocarbon concentration is likely to be no greater than 50,000 mg/kg. As such the levels of TPH are below the levels that would be considered a risk.

14.3.3.2 HAZDEM

The SEE for the demolition works included a Hazards in Demolition (HAZDEM) assessment for the Project. This HAZDEM included a comprehensive identification of possible causes of potential incident scenarios and their consequences to public safety and the biophysical environment followed by a detailed risk assessment. Each risk was then given a level of risk from 1 to 10 using the Chevron Integrated Risk Prioritization Matrix. Recommendations were the provided for risk priority rankings 1 to 5, as well as for events or conditions with low likelihood and high consequence that may require further risk evaluation. Further details on the methodology used to identify and assess potential risks are provided in the SEE for SSD 5544 MOD1 (URS, 2014).

The ACS Modification works would be completed as part of the demolition works at the Site. As such the hazards that could occur as a result of these works are the same to those presented for the demolition works.

Table 14-1 below provides a summary of the hazards identified for the demolition works.

Table 14-1 Summary of Identified Demolition Hazards

Hazard	
Process Safety Related Hazards	
Scenario 1:	Damage to adjacent plant or equipment due to uncontrolled and/or unplanned falling of structure, object or crane collapse
Scenario 2:	Damage to live pipework during removal or inadvertent cutting into live pipe or pipeline
Scenario 3:	Failure to isolate process equipment
Scenario 4:	Damage to underground cables and/or oily water sewer
Scenario 5:	Introduction of ignition sources in area classified as Hazardous Area
General Health and Safety Related Hazards	
Scenario 6:	Crushing or impact injuries
Scenario 7:	Fall from heights
Scenario 8:	Working over water with a potential for drowning
Scenario 9:	Worker trapped (at end of wharf, at height etc.)
Scenario 10:	Subsidence and collapse/fall into excavation
Scenario 11:	Public and traffic hazardous interaction on public roads or footpath
Scenario 12:	Loss of material in transit leading to traffic incident and potential injury
Scenario 13:	Exposure to airborne hazardous material, or skin contact with such material (heavy metals, asbestos etc.)
Scenario 14:	Damage to overhead power lines
Scenario 15:	Injury during diving operations
Loss of Amenity to Workforce and Community	
Scenario 16:	Discomfort from odour associated with removal and disposal of cooling water pipelines (smell – no health hazard)
Scenario 17:	Offensive odour and community complaints from mercaptan
Scenario 18:	Noise generation (no health risk to community)
Other Risk to the Biophysical Environment	
Scenario 19:	Incorrect classification of waste leading to contamination of trucks and potential delivery to wrong landfill location
Scenario 20:	Re-contamination of opened pipework

Some of the hazards listed in **Table 14-1** are more applicable than others to the ACS Modification works. This difference is due to the larger scale and scope of the demolition works.

As noted above these hazards were subject to a risk assessment which allocated risk priority rankings. The scenarios for demolition works compared with the operating terminal were summarised as follows:

- no scenarios with risk levels one to five were identified for the operating terminal or for the terminal during the demolition works.
- two scenarios were identified as risk level six for demolition works. These two scenarios are ranked the same for the terminal during operation.
- the remaining scenarios were ranked with risk levels seven or eight, both for the demolition works and the operating terminal.

A further assessment was then completed looking at the potential impact of Scenarios 1, 2, 3 and 5 on the risk profile of the terminal. The result of this assessment concluded that the demolition works has very little to no impact on the overall risk profile of the Site.

Nevertheless through the process 17 risk reduction measures were identified.

The HAZDEM concluded that:

"*The hazard and risk assessment of demolition works has found that the levels of risks to the biophysical environment and to the safety of the public, staff and contractors are reduced to So Far As Is Reasonable Practicable (SFAIRP) levels as long as:*

- *Caltex continue to implement established processes for managing the Site;*
- *the demolition contractors undertaking the demolition works complete the works in general accordance with Demolition Code of Practice (2013) and relevant Australian Standards; and*
- *the measures listed in Section 8.7 are implemented.*

The risks associated with demolition activities were assessed qualitatively by examining potential scenarios and/or incidents. The activities associated with demolition would be subject to rigorous scrutiny by Caltex and by the demolition contractor, safeguarding delivery and operation of the works in a manner that minimises the risk to workers, contractors and the community.

The potential for incidents is well understood and the management of demolition activities would minimise the probability of an incident happening and mitigating an incident if it did occur.

The management and mitigation measure presented in Table 8-5 would be implemented as part of the demolition works." (URS, 2014)

The ACS Modification works would be managed by the demolition team at Caltex and would be managed under the DEMP. In many regards the ACS Modification works involve the same activities and the same hazards as detailed above. For example, the demolition works involved work in the pipeways, and the ACS Modification works involves work in the pipeways. The demolition works involve potential "*exposure to airborne hazardous material, or skin contact with such material (heavy metals, asbestos etc.)*" as do the ACS Modification works. As such a number of the 17 recommendations listed within the SEE for the demolition work are applicable to the ACS Modification works and would be implemented.

14.3.4 Summary

Whist no risks are considered likely to occur, a number of related measures would be implemented to help ensure that appropriate controls are in place during the ACS Modification works:

- Personnel required to work with hazardous/flammable/contaminated materials would be trained in their safe use and handling and would be provided with all the relevant safety equipment; and
- Procedures are currently in place to manage incidents and injuries at the Site. This includes an established incident reporting and response process. These processes would be implemented for the ACS Modification works.
- The 17 recommendations listed within **Section 8.7** of the Kurnell Refinery Demolition SEE would be reviewed and implemented where applicable by the contractor completing the ACS modification works.

These measures will be summarised in **Chapter 16 Revised Management and Mitigation Measures**.

15.0 Cumulative Impacts

15.1 Introduction

Certain technical assessments have considered not only the impacts of the ACS Modification works alone, but also the potential cumulative effects of the ACS Modification works and the other works at the Site. Where necessary a Cumulative Effects Assessment (CEA) was included in the technical chapters of this SEE. This chapter summarises the findings of those cumulative assessments.

15.2 Legislation and Planning Policy

15.2.1 Environmental Planning and Assessment Act 1979

Under Part 5 of the EP&A Act there is a duty for a determining authority to consider the environmental impacts of the proposed works. The supporting *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) states that '*for the purpose of the EP&A Act, the factors to be taken in to account when consideration is being given to the likely impact of an activity on the environment include…any cumulative environmental effect with other existing or likely future activities*'.

There is no provision in Part 4 of the EP&A Act explicitly requiring a consideration of the cumulative environmental effect in determining a development application. However, when determining a development application, the consent authority is required, under section 79C(1)(b) of the EP&A Act, to take into account the '*likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality*'.

There is also case law where the consideration of cumulative impact assessment has been successfully contested under the EP&A Act.

15.3 Method of Assessment

15.3.1 Introduction

CEA is a receptor based assessment, whereby in order to have a cumulative effect, two projects or impacts need to affect the same receptor. Therefore, if a project or activity is not affecting a receptor or group of receptors 'alone' then it cannot have a cumulative effect with another project or activity. The only exception to this rule is if one of the potential cumulative projects weakens a management or mitigation measure to the point where a residual impact generated by the ACS Modification works becomes significant again. As such, CEA focusses on the residual impacts (i.e. those impacts that remain post mitigation) from a project.

15.3.2 Approach

The first stage of the CEA is to understand the adverse residual impacts of the project or activity. The second stage is to identify other development nearby that may affect the same receptors and/or change the effectiveness of the other project's or activity's mitigation and management measures. Other relevant projects that may generate a cumulative impact have been identified using the following assessment parameters:

- **Spatial parameter** – The spatial parameter depends on the characteristics of the environmental impact and the likely area over which a residual impact would occur. For example, an air quality impact would potentially affect a wider area than a noise impact and would therefore affect different human or environmental receptors in different ways.
- **Temporal parameter** – The temporal parameter relates to how far into the future, or the past, the assessment considers cumulative proposals or activities. Projects that are operational have already been considered as they form part of the existing environmental baseline for each environmental aspect assessed in this SEE (refer to **Chapters 8-14**). Projects that are not yet on exhibition have been discounted as their assessments do not contain enough detail on residual effects or final design to allow a robust cumulative impact assessment to take place.

15.3.3 Guidance and Standards

There is no guidance on undertaking interactive or cumulative impact/effect assessments in NSW or Australia. Therefore, this assessment has made reference to the European Commission (EC) Guidelines for the *Assessment of Indirect and Cumulative Impacts as well as Impact Interactions 1999* and the Canadian Environmental Assessment Agency *Cumulative Effects Assessment Practitioner's Guide 1999*.

15.4 Cumulative Impact Assessment

As discussed, for a cumulative effect to occur, two impacts need to affect the same receptor. The ACS Modification works have the potential to cause a number of environmental impacts. These have been grouped, assessed and discussed under nine different environmental aspects (refer to **Chapters 8-14**). For all of these aspects, there are expected to be no significant residual impacts as a result of the ACS Modification works on any sensitive receptors.

It is noted that the noise assessment (refer to Chapter 11) presented an assessment that considered other activities at the Site. This assessment showed that the noise impacts from the ACS Modification works would be screened by other activities at the Site and would not alone impact nearby receptors. As such an adverse cumulative noise effect is not expected as a result of the ACS Modification works.

Equally, in the unlikely event of the ACSs classified as hazardous waste being sent off site for disposal, the necessary truck movements would need to be coordinated with other activities at the Site to avoid an adverse cumulative traffic effect. A management and mitigation measures has been included to manage this potential risk.

Therefore provided the management and mitigation measures (refer to **Chapter 16 Revised Management and Mitigation Measures**) are implemented and remain effective, it is considered highly unlikely that the proposed activity would result in significant adverse cumulative effects on any nearby sensitive receptors (e.g. local residents, ecological values, heritage values, local roads etc.).

15.5 Conclusion

The majority of the potential impacts related to the ACS Modification works would be avoided or mitigated through the implementation of the measures outlined in **Chapter 16 Revised Management and Mitigation Measures**. The assessments within this SEE have concluded that the ACS Modification works are unlikely to result in significant adverse cumulative impacts on the surrounding community or environmental receptors.

16.0 Revised Management and Mitigation Measures

The preceding chapters of this SEE describe the potential impacts of the ACS Modification works and identify a suite of measures and controls for managing risk to avoid, mitigate or offset potential impacts. This chapter provides a summary of the proposed management and mitigation measures. These measures would provide a basis for the conditions of consent that would be issued to Caltex should the ACS Modification works be approved.

This chapter details how mitigation and management measures would be implemented and monitored through the existing Demolition Environmental Management Plan (DEMP). The ACS biopile and containment cell constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities two additional subplans to the DEMP would be produced: a Containment Cell Management Plan; and an ACS Biopile Management Plan. These new subplans would reference other parts of the DEMP as necessary but would also include specific measures for the containment cell and ACS biopile.

Management and mitigation measures that would be implemented during the operation of the ACS Modification would be implemented and monitored through the existing Operational Environmental Management Plan (OEMP) for the Site.

16.1 Draft Mitigation and Management Measures

The adoption of the mitigation and management measures discussed in **Chapters 8-15** is an important component of the Project and reinforces Caltex's commitment to controlling its potential impact on the environment. These measures would be complemented by an ongoing process of community and regulatory engagement, before, during and after the ACS Modification works.

Table 16-1 below contains a consolidated set of mitigation and management measures for the whole Project (i.e. the conversion works, the demolition works and the ACS Modification works), and confirms the stage at which each measure would be implemented. This table includes:

- Measures that only apply to the conversion works and therefore remain the same as presented in the development consent for SSD 5544;
- Measures that only apply to the demolition works and therefore remain the same as presented in the development consent for SSD 5544 MOD1;
- Measures that apply to the conversion works, the demolition works and the ACS Modification works therefore have been amended from those presented within Appendix C of the development consent for SSD 5544 MOD1 (any changes from the mitigation measures as they were presented in SSD 5544 MOD1 are shown in bold in the table below); and
- Measures that only apply to the ACS Modification works (shown in bold).

If required, these measures may be modified following review of formal submissions received during the exhibition of this SEE, and as a result of subsequent discussions with NSW Department of Planning and Environment (DP&E) and other stakeholders.

In **Table 16-1** the following acronyms have been used to describe each stage:

- CD – Conversion Design;
- Conv – Conversion;
- Op – Operation;
- DD – Demolition Design;
- Dem – Demolition; and
- Con – Construction.

Table 16-1 Consolidated Management Mitigation Measures

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
General								
A1	Caltex would carry out the proposed works in accordance with the EIS, the SEE**s** and the approval conditions.	ü	ü	ü	ü	ü	ü	ü
A2	Caltex would implement reasonable and practicable measures to avoid, or minimise impacts to the environment that may arise as a result of the Project.	ü	ü	ü	ü	ü	ü	ü
A3	Caltex would ensure that the Project contractor prepares and implements a Construction Environmental Management Plan (CEMP) for the conversion works and a Demolition Environmental Management Plan (DEMP) for the demolition works **(inclusive of the ACS Modification works)** to manage any Project impacts. This would be reviewed and approved by a Caltex Environmental Management Representative (EMR). Elements of these plans may be shared as required.		ü			ü	ü	
A4	Caltex would appoint an EMR to monitor the implementation of all required environmental mitigation and management measures. The EMR would ensure that all measures were being effectively applied during the proposed works and that the work would be carried out in accordance with the CEMP, the DEMP and all environmental approvals and legislative conditions.		ü			ü	ü	
A5	Caltex and the various works' contractor personnel would undergo training in accordance with the CEMP, the DEMP and currently implemented environmental and safety measures agreed as part of the Project approval.		ü			ü	ü	
A6	Caltex would provide Sutherland Shire Council the opportunity to review and comment on the CEMP prior to the commencement of conversion works.		ü					
A7	Prior to the demolition works commencing for a particular structure or group of structures, Caltex would develop a specific demolition management plan (DMP) for each structure or group of structures to be demolished. The DMPs would be made available to the appropriate regulators prior to being implemented if requested. The DMPs for the two concrete stacks (power plant and common stacks) and for the tall complex structures (two catalytic cracker units (plants 4 and 34)) would be provided to the EPA for comment ahead of the demolition works for these structures taking place.					ü		
A8	Caltex would provide a draft of the DEMP and SWMP to NSW DPI for review and comment prior to finalising.				ü			

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
A9	Caltex would provide NSW Health with a copy of the DEMP and Asbestos Management Plan (AMP) for review and comment prior to finalising.				ü			
A10	Caltex would provide NSW OEH with a copy of the Biodiversity and Weed Management Plan (BWMP) for review and comment prior to finalising.				ü			
A11	**Following the ACS Modification works, Caltex will update the Asbestos Management Plan for the Site and Asbestos Register.**							ü
Hazards and Risk								
B1	A program of routine testing, inspection and maintenance would be developed for each new piece of equipment or function of instrumentation to be added to the preventative maintenance program already established for existing plant and equipment.		ü	ü				
B2	The recommendations of the Fire Safety Study would be implemented for the design and operation of the terminal.	ü	ü					
B3	The Process Hazard Analysis Recommendations would be implemented for the design and operation of the terminal.	ü	ü					
B4	The spill response plan for the Site would be updated for the proposed terminal.		ü					
B5	Caltex would review hardware protection in place and proposed to ensure the risk of filling low flash point material into tanks designed for high flash point usage is minimised. Particular attention to human factors issues at manifolds.	ü	ü					
B6	Caltex would determine need for additional means of communication, e.g. for lone worker on the proposed terminal.		ü					
B7	Caltex would review the procedures used for potentially hazardous manual operation to ensure they are appropriate and sufficient for any increased frequency of use.		ü					
B8	The bullet pointed measures listed in Section 8.7 of the SEE would be implemented to ensure that the conclusions of Appendix C Hazards and Risks Assessment of the SEE remain valid.				ü	ü		
B9	**Personnel required to work with hazardous/flammable/contaminated materials would be trained in safe use and handling and would be provided with all relevant safety equipment.**						ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
B10	**Procedures are currently in place to manage incidents and injuries at the Site. This includes an established incident reporting and response process. These processes would be implemented for the ACS Modification works.**						ü	ü
Soils, Groundwater and Contamination								
C1	A Soils and Erosion Management Plan would be developed as part of the Construction Environmental Management Plan (CEMP) to manage the excavation, testing, stockpiling, reuse and rehabilitation of soils. This plan would outline: - the areas where soil disturbance is likely; - soil testing procedures; - soil handling procedures; - locations where soil would be stockpiled on-site for either removal, treatment or reuse; - procedures to reduce erosion and the spread of dust; - restricting traffic to defined roads or tracks where necessary; and - the rehabilitation of bare soil following completion of the construction works.		ü					
C2	All materials would be stockpiled in accordance with 'The Blue Book' *Managing Urban Stormwater - Soils and Construction Volume 1 and 2* (Landcom, 2004). Principal controls would include the following: - silt fences would be installed around stockpiles to reduce erosion and protect vegetation or Site infrastructure as necessary; - silt and sediment traps would be installed across stormwater drains in proximity to excavation areas; - stockpiles would be restricted to cleared areas and not impact any vegetation; - stockpiles would be placed on impermeable sheeting; - stockpiles would be covered and wetted down in order to reduce dust creation; - stockpiles would not be located in close proximity to any stormwater drainage systems; - Caltex would not stockpile in areas that are prone to flooding as identified in Figure 4-10 of Appendix D of the SEE; and - Stockpile locations and erosion and sediment control requirements associated with the Project would be reviewed by a suitably qualified person to ensure that the recommended measures achieve the environmental outcomes for the Site.		ü			ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C3	The Soils and Erosion Management Plan would also outline the inspection program for any erosion control structures and bunded areas.		ü					
C4	Excavated soils would be tested for both contaminants and odour using standard practices (e.g. soil vapour and soil sampling etc.)		ü					
C5	Clean materials would be separated from contaminated materials for reuse as backfill where required.		ü					
C6	A Contamination Management Plan would form part of the CEMP for the Project. This plan would outline measures for testing, classifying, handling, storing and managing contaminated soils and contaminated groundwater.		ü					
C7	Suspected contaminated materials would be assessed and classified in accordance with EPL requirements and NSW (2009) *Waste Classification Guidelines: Part 1: Classifying Waste*, batched, further tested (where required) and disposed by a licenced contractor.		ü					
C8	Disposal of any contaminated soils or groundwater would be in accordance with EPL requirements and NSW DECCW's *Waste Classification Guidelines* and the Contamination Management Plan (CMP) for the Project. Contaminated materials would be sent to appropriately licensed facilities in accordance with the *Contaminated Land Management Act 1997*.		ü					
C9	If Acid Sulfate Soils (ASS) are encountered during construction **or the ACS Modification works**, an ASS Management Plan would be prepared in accordance with the ASS Manual (ASS Management Advisory Committee 1998).		ü			ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C10	A Groundwater Management Plan (GWMP) would be developed and included within the CEMP. This plan would outline the measures that would be used to manage the testing, dewatering, storage, movement and treatment of any groundwater intercepted during the construction phase. Measures would include: - the use of appropriate drip trays and interception techniques for any construction specific liquids stored on the Site; - bunding of any fuel or chemical storage area at the construction Site; - regular inspection of construction equipment to ensure any leaks are minimised and rectified; - management of vehicles leaving the Site to reduce soil on roads, production of dust and the introduction of contamination to the groundwater and/or stormwater system; - appropriate and timely disposal of any contaminated soil, water or waste generated during construction; - regular inspection of erosion control structures and bunded areas; and - regular inspection and testing of containment areas, drainage lines and process pipe work.		ü					
C11	Any runoff that may accumulate in excavations would be periodically tested for elevated levels of contamination. Water that is found to have elevated levels of contaminants would be collected and sent to the on-site Wastewater Treatment Plant in accordance with the established refinery wastewater management procedures.		ü					
C12	Runoff entering any excavations would be limited by using bunds or similar structures as required.		ü			ü		
C13	Construction/demolition workers would be instructed in appropriate health and safety and handling protocols for minimising human contact with contaminated soils and groundwater.		ü			ü	ü	
C14	During the cleaning of the crude and finished fuel tanks, measures would be implemented in line with Caltex's existing Turnaround and Inspection process to contain and collect any potentially contaminating material for appropriate disposal to the on-site wastewater treatment plant, landfarm or appropriate off-site disposal facilities. This process would be detailed within the CEMP.		ü					
C15	Permits would be required to work in the areas where potential soil and groundwater contamination exists. The work permit includes requirements such as monitoring and PPE. No unauthorised entry into these areas is permitted, without a permit.		ü			ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C16	Appropriate inspection, assessment, maintenance and repair programmes that would be implemented as part of the operation of the Project. These safeguards would be incorporated into the updated management plans for the proposed terminal. The Project would be appropriately licenced under the *Protection of the Environment Operations Act 1997* and would be managed in accordance with EPL requirements.		ü	ü				ü
C17	A Contamination Management Plan would be developed to outline measures for monitoring, handling, storing and managing contaminated soils and contaminated groundwater. It would include the following: - During excavation visual and olfactory indicators of impact would be monitored. Where there is potential for volatile organic contaminants (based on known ground conditions) or where hydrocarbons are seen or smelt during excavations, soils would be inspected for hydrocarbon impacts using a PID and/or testing. Excavated soils would not be used for backfill if they are impacted at levels exceeding commercial/industrial as defined by Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013*. - All excavations would be sampled for asbestos. Asbestos assessment would be undertaken in accordance with Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013.* - Asbestos impacted soil **not found in the pipeways** would be **disposed of at the ACS containment cell or** removed from the Site as soon as practicable **if excavated**. If these soils need to be temporarily stockpiled they would be stored at a defined location at the former CLOR site, covered and labelled as asbestos waste. Asbestos impacted soil would be classified in accordance with NSW EPA guidelines for transport and disposal at **either the ACS containment cell or** a licensed landfill (and in accordance with the Site waste management system and the Demolition Waste and Resource Management Plan (DWRMP) for the demolition works. The excavation, transport and disposal of asbestos impacted soil would be undertaken by a licenced contractor and comply with NSW WorkCover requirements. - Hydrocarbon impacted soil would not be temporarily stockpiled adjacent to the excavation. If these soils need to be temporarily stockpiled they would be stored at a defined location at the former CLOR site.					ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
	- Excavated soils would be separated into stockpiles according to odours, staining and other environmental indicators. Soils that are potentially contaminated (following visual and olfactory inspection and or use of monitoring equipment) would be placed on impermeable sheeting into uniquely identified stockpiles and appropriately bunded and managed. The bunds would be impermeable and of sufficient capacity to ensure that runoff from these stockpiles is contained prior to being sent to the WWTP. - Where no contamination issues are identified, excavated material would be used as backfill to bring the excavated area back to grade as soon as practicable. If required, certified VENM, ENM or appropriated remediated material would be used to provide additional backfill material. - If excavated material cannot be re-used or managed on-site then it would be removed off-site as waste to an appropriately licensed facility. - Further, excavated material; would be classified in accordance with EPL condition O5.1 which requires "any liquid and/or non-liquid waste generated and/or stored [at the Site] is assessed and classified in accordance with the NSW (2009) *Waste Classification Guidelines: Part 1: Classifying Waste*, batched and further tested (where required, for example Toxicity Characteristics Leaching Procedure (TCLP) testing)". - The method of disposal or reuse would be in line with the materials' classification in accordance with specifications set out in a DWRMP. - Where soils are reused on Site (i.e. are not considered to be impacted at levels exceeding commercial/industrial as defined by *Schedule B1 Guidelines, Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013)* a record would be kept (in the Waste Management Database) of where these soils are reused, the volumes reused; the type and levels of contaminants present in the soils and the soil classification.							

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C18	The Soil and Water Management Plan would outline management measures for any soils that are excavated or stored on-site during the demolition works **and ACS Modification works** and water management requirements. It would identify: - the areas where soil disturbance is likely; - how excavations would be staged so that the length of time that excavations are left open and temporary stockpiles are required is minimised; - locations where soil would be stockpiled on-site for either removal, treatment or reuse; - that if additional backfill material is required, only certified VENM, ENM or appropriated remediated material would be used; - procedures to reduce erosion and the spread of dust; - restricting traffic to defined roads or tracks where necessary; - measures to protect excavations from increased stormwater runoff (e.g. by using bunds or similar structures where required); - measures to manage the storage of demolition **and ACS Modification works** specific liquids at the Site and the appropriate bunding or containment of demolition related fuel or chemical storage areas; - demolition **and ACS Modification works** equipment is maintained and operated in a proper and efficient condition to reduce the likelihood of spills or leaks; - measures to manage vehicles leaving the Site to reduce soil on roads, production of dust and the introduction of contamination to the groundwater and/or stormwater system; - measures for the dewatering, storage, movement and treatment of groundwater encountered in excavations. Dewatered groundwater would be collected and sent to the on-site Wastewater Treatment Plant in accordance with the established Site wastewater management procedures, unless it is tested and is of suitable quality to be directed to stormwater; - procedures for dewatering, including the need to liaise with NOW to ensure the necessary water licences are obtained, if required; and - how the rehabilitation of bare soil would be managed across the Site once areas are returned to grade.					ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C19	The Soil and Water Management Plan would also: - be developed in accordance with *'The Blue Book' Managing Urban Stormwater – Soils and Construction Volume 1 and 2* (Landcom, 2004); - outline the inspection program for erosion control structures and bunded areas; - continue the existing groundwater monitoring program; and - include a plan for corrective action should an unexpected increase in COPC be observed in the groundwater monitoring					ü	ü	
C20	An Asbestos Management Plan would be developed in accordance with the relevant guidelines. Caltex would utilise existing registers, procedures and plans in place for the Site for the preparation of an Asbestos Management Plan.					ü	ü	
C21	**Additional sampling would be undertaken to ensure that the area of soil disturbance is restricted as far as practicable to asbestos impacted areas only.**						ü	
C22	**ACS in the pipeways would be wetted down prior to excavation, loading and transport.**						ü	
C23	**ACS classified as hazardous under the Waste Classification Guidelines would be transported to the ACS biopile for processing prior to placement in the containment cell. Hazardous soils would not be placed into the containment cell.**						ü	
C24	**ACS classified as general or restricted under the Waste Classification Guidelines would be transported directly to the containment cell. Excavation works would be staged to allow placement of ACS directly into the containment cell to minimise the need to stockpile ACS.**						ü	
C25	**Where hazardous ACS cannot be appropriately managed on-site, it would be taken off-site for treatment and disposal at an appropriately licensed facility.**						ü	
C26	**All vehicle tyres would be cleaned before exiting the containment cell works area and the biopile works area via a temporary truck wash system.**						ü	
C27	**The containment cell area and biopile works area would remain bunded to prevent water flowing out of the respective areas except via the OWSS and WWTP.**						ü	ü
C28	**Stormwater within the containment cell works area and biopile works area would be directed to the OWSS and treated at the WWTP.**						ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C29	**Stormwater from within excavated areas of the pipeways would be sent to the WWTP unless it is tested and is of suitable quality to be directed to stormwater, as per normal operation of the pipeways.**						ü	
C30	**Two groundwater monitoring bores would be installed at the north and west of the containment cell. Quarterly monitoring would be undertaken during construction, filling and closure of the cell.**						ü	ü
C31	**A marker layer would be installed during the final capping of the containment cell to identify the presence of asbestos as a safeguard for potential future use.**						ü	
C32	**Following excavation of ACS, an independent licenced asbestos inspector would be employed to verify that the friable asbestos has been removed from the pipeways and that the Exemption Order under Section 419 of the Work, Health and Safety Regulation 2011 is no longer required.**						ü	
C33	**The OEMP for the Site would be updated to include the following measures:** - **Quarterly groundwater monitoring for two years for the two installed monitoring wells. Following this time, annual groundwater monitoring would be undertaken to provide ongoing demonstration that the containment cell liner is operating effectively. Monitoring of these bores would occur in accordance with the existing groundwater monitoring program for the Site.** - **Regular inspections of the containment cell to monitor the effectiveness of the erosion and sediment control measures incorporated into the design of the containment cell, in line with the Site's existing Inspection Checklist and following heavy rain events.**							ü
Human Health and Ecological Risk								
D1	Construction/demolition personnel would be made aware of the potential presence of Non Aqueous Phase Liquids (NAPL) and would be shown how to identify its presence. The CEMP/DEMP would include management measures to appropriately deal with any NAPL found on Site.		ü		ü		ü	
D2	Construction/demolition staff would be inducted and provided with training prior to working with potentially contaminated soil as part of the Project, to prevent unnecessary disturbance (e.g. dust generation, asbestos fibre liberation, contaminant mobility and volatilisation).		ü		ü		ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
D3	The location of potentially contaminated areas would be noted in the CEMP/DEMP and provided to construction/demolition personnel involved in soil excavation and handling. The CEMP/DEMP would also identify the type of contamination found in each area. Where necessary, safety training and appropriate PPE would be provided.		ü	ü	ü	ü	ü	
D4	Caltex would continue to monitor groundwater quality in areas that are known to contain impacts to ensure that significant mobilisation of COPC from groundwater to surface water is not occurring.		ü	ü	ü	ü		
Waste Management								
E1	The Project would be integrated into existing resource efficiency, waste management and handling, emergency response and preparedness plans for the existing Site.	ü	ü	ü	ü	ü	ü	ü
E2	Construction and Operation Waste and Resource Management Plans (WRMP) and Demolition Waste and Resource Management Plans (DWRMP) would be compiled prior to the each phase commencing. **The DWRMP would be updated to include reference to management of waste generated by the ACS Modification works prior to construction works commencing.**	ü			ü		ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E3	The WRMPs and DWRMP would: - identify requirements consistent with the waste and resource hierarchy; - ensure resourcing efficiency is delivered through the design and responsible construction, demolition and operational practices; - **ensure procurement of pre-fabricated materials to eliminate off-cuts on-site, and the re-use of materials where possible;** - provide consistent clear direction on waste and resource handling, storage, stockpiling, use and reuse management measures (consistent with current management practices relating to Caltex's Kurnell Waste Management System); - **provide separate waste containers/skips to ensure waste material segregation and maximise the opportunities for re-use and recycling;** - identify disposal and management routes consistent with current management practices as adapted for the Project; - set out clear requirements for meeting legislative and regulatory requirements; - **ensure safe storage and disposal of waste ensuring least amount of harm to surrounding environment;** - define requirements to support Caltex's sustainable procurement objectives through effective, design, construction, operation and procurement; and - set out processes for disposal, including on-site transfer, management and the necessary associated approvals.	ü	ü	ü	ü	ü	ü	
E4	The WRMP and DWRMP would incorporate the requirements of the waste and resource hierarchy and cleaner production initiatives.	ü	ü	ü	ü	ü	ü	
E5	The WRMP and DWRMP would include a process for auditing, monitoring and reporting, which would include regular inspections off-site activities and the waste management area(s). The WRMP and DWRMP would be subject to regular auditing and a system would be used to record and report the types, volumes and management measures for all waste and resource arising from/used for the works.	ü	ü	ü	ü	ü	ü	
E6	Project-generated waste would be segregated at the source and stored in accordance with current Site practices. Site management practices would potentially need adapting to consider additional storage requirements. Regardless, all waste would be stored in suitable containers and designated waste management areas.		ü	ü		ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E7	Caltex's existing procedures for the disposal of sewage, greywater, hazardous materials, general waste and recyclable materials would be adopted for the Project (and modified if required). This would include using licensed contractors to remove and transport waste from the Site.						ü	ü
E8	A Waste Register would be prepared, used and maintained by the Demolition Contractor to track all wastes generated from demolition works. The Demolition Contractor would retain waste receipts to indicate evidence of waste disposal. The database would also be used to track all materials reused at the premises including its reuse location, type of waste and classification. **A Waste Register would be prepared, used and maintained by the Contractor to track all wastes generated from the ACS Modification works and used to record and report the types, volumes and management measures for all waste and resources arising from/used for the works. This would be subject to regular auditing.**				ü	ü	ü	
E9	Stockpiled wastes would be: - appropriately segregated to avoid mixing and contamination; - clearly labelled; - contained in bunded areas and if necessary on an appropriate lining; - less than 5m in height; and - located >40m away from any sensitive receivers, heritage, ecological areas and watercourses.				ü	ü	ü	
E10	Materials to be re-used would be analysed to ensure material is not contaminated and re-use is appropriate.				ü	ü	ü	
E11	An Asbestos Management Plan would be prepared and implemented in accordance with relevant legislative and other requirements. This plan would outline proposed methods of managing asbestos waste by the contractor. **The Asbestos Management Plan would be updated to include the ACS Modification works.**				ü	ü	ü	
E12	The Site's existing Asbestos Waste Register would be amended as appropriate, implemented and maintained to track asbestos wastes generated during the works.				ü	ü	ü	ü
E13	If stored on-site, asbestos wastes would be located away from operational areas and properly sealed and contained to minimise human exposure and clearly labelled. Signage and barriers/fencing would be installed to ensure all employees, contractors and visitors would keep away from the area at all times.					ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E14	The removal and disposal of asbestos wastes would be undertaken by a licenced asbestos contractor.					ü	ü	
E15	A Decontamination Area would be provided on-site for all authorised personnel handling asbestos.				ü	ü	ü	
E16	Wastes (both liquid and non-liquid) generated from the works would be assessed, classified and managed. Wastes would be disposed of at an appropriately licenced facility.					ü	ü	
E17	**Recyclable wastes would be stored in suitable containers and designated waste management areas, to be transferred by a licensed waste contractor to an appropriate recycling facility where possible.**						ü	
E18	**Treated soils from the CSRF would be used where possible for the containment cell construction works in accordance with the conditions of the Caltex treated soil exemption 2016.**						ü	
E19	**New waste streams would be addressed as they arise and assessed to determine the most suitable management measures to use when handling, storing, transporting and disposing of the waste.**						ü	
E20	**Unidentifiable waste streams would be analysed and sent for testing in an accredited laboratory to assess the risks associated with handling and disposal of the waste.**						ü	
E21	**Additional sampling will be undertaken in the pipeways to further delineate the areas classified as asbestos contaminated in order to minimise the volume of soil classified as Special Waste and disposed of in the containment cell. In addition soils currently classified as hazardous waste will have additional sampling undertaken to ensure only hazardous soil is being processed at the ACS biopile.**						ü	
E22	**Caltex would complete inspections following periods of extended heavy rainfall to confirm that pumps within the containment cell sumps are directing leachate to the Site's WWTP.**						ü	ü
E23	**Hazardous waste removed from the site would be tracked using the NSW EPA online waste tracker and each delivery would be provided with a consignment authorisation and transport certificates which would be provided to Caltex;**						ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E24	**Special waste removed from the site would be transported in accordance to Part 7 Transportation and Management of Asbestos Waste of the POEO (Waste) Regulation 2014. This outlines the requirements for waste transporters to record and monitor the movement of more than 100 kilograms of asbestos waste or more than 10 m² of asbestos sheeting from the Site of generation to the final disposal point using the NSW EPA online system called WasteLocate. The removal and disposal of asbestos wastes would be undertaken by a licenced asbestos contractor.**						ü	
Surface Water, Wastewater and Flooding								
F1	The Construction Environmental Management Plan (CEMP) for the Project would include a Soil and Erosion Management Plan. This plan would include the following measures: - All materials would be stockpiled in accordance with '*The Blue Book' Managing Urban Stormwater – Soils and Construction Volume 1 and 2* (Landcom, 2004); - Silt fences would be installed around stockpiles to reduce erosion and the movement of suspended solids as necessary; - Soil stockpiles and any polluted materials would be stored in designated areas which are not in close proximity to any stormwater drainage systems; - Erosion control structures, bunded areas, containment areas, drainage lines and interception measures would be subject to regular inspection; - Clean materials would be separated from contaminated materials; and - Soil erosion and sedimentation devices would remain in place until the disturbed ground surface is restored. These devices would also capture any gross pollutants.		ü					

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
F2	A Soils and Water Management Plan would be developed as a sub plan to the DEMP. Measures to be included in the plan and implemented during the demolition works to protect stormwater quality would include: - Stormwater or groundwater ponded in excavations would be sent to the WWTP, unless it is tested and is of suitable quality to be directed to stormwater; - Stormwater that is captured in the bunds around the contaminated soil stockpiles would be collected and sent to the WWTP; - Silt fencing and/or alternate sediment control measures would be installed around soil stockpiles and disturbed areas or areas where dust suppression is being undertaken; - Regular inspection would be undertaken of soil stockpiles/excavation areas, including following rainfall events; - **Regular inspection of excavation areas, containment cell and biopile works areas, including following rainfall events;** - Regular inspections would be undertaken of stormwater drains down hydraulic gradient of disturbed areas; - **Stormwater management measures incorporated into the design of the containment cell would be regularly inspected during operation in line with the Site's existing Inspection Checklist and following heavy rain events;** - If stormwater quality is impacted during the demolition works **and ACS Modification works** in areas that have been disturbed, water would be diverted to the intermediate sewer system; and - During the demolition works **and ACS Modification works**, following notable but prolonged rainfall events (over three days) or following heavy rainfall events over a shorter timescale, water sampling would be completed at the stormwater retention basin to ensure that the quality of the water is of an appropriate standard to be discharged from the Site. Water that is not of an appropriate quality would be either treated in situ or directed to the WWTP.					ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
F3	Caltex would continue to implement the measures within the Stormwater Management Plan (SMP) for the Site. This plan has been produced in response to Environment Protection Licence No. 837, PRP U24.1: Stormwater Catchment and Management Plan. The SMP has committed Caltex to implementing a Stormwater Management Strategy and completing a number of stormwater management measures in a staged manner. Measures include: - Ongoing maintenance of the existing stormwater system; - Implementation of a number of projects to improve the infrastructure, reduce the potential for the refinery to flood, and prevent contaminated stormwater leaving the refinery premises; - Working with the NSW Office of Environment and Heritage (OEH), NSW EPA and Sutherland Shire Council to divert to flow of stormwater from the National Park away from the Site's stormwater system to the Sutherland Shire Council's stormwater infrastructure; - Carrying out stormwater flow monitoring; and - Updating the Site's stormwater system performance model to account for the changes to the stormwater system infrastructure that can then be used as a tool to assess future modifications, as necessary. This work would be completed in consultation with NSW EPA.	ü	ü	ü	ü	ü	ü	ü
F4	Discharges from the Wastewater Treatment Plant would be within existing EPL limits during demolition, construction and operation. Any required change to this Oily Water Management System would be discussed and agreed with NSW EPA.	ü	ü			ü	ü	ü
F5	The measures and processes currently in place at the Site to prevent any loss of contaminant would be maintained throughout the demolition, construction and operation phases of the Project. All bunds on tanks which are retained in service would meet the capacity requirements of *Australian Standard AS1940* during the operation of the Project.	ü	ü			ü	ü	ü

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
F6	Improvements to monitoring would be initiated to ensure that if a loss of containment into a bund occurs it is detected early and contingency actions can be taken promptly. The measures for tanks containing low flash materials include: - explosive vapour detectors within the bunds; - triple infrared scanners on tank roofs; and - CCTV in conjunction with infrared cameras as a confirmation for alarms. All tanks on-site would be subject to: - an automated high level shut off system; and - continuance of a comprehensive inspection/repair program.			ü				
F7	Caltex undertakes a flood study, commencing within 3 months of completion of demolition works that assesses potential flood risks from the Site to the Kurnell township, with a particular emphasis on the impacts from surface water entering the Site from land to the east and south of the Site and whether current diversion methods are appropriate. Caltex to remain in consultation with Sutherland Shire Council throughout the flooding investigation works to identify a mutually acceptable solution to potential flood risks along the north eastern boundary of the Site. The timing and form of consultation is to be mutually agreed by both parties (Caltex and Sutherland Shire Council) and outlined within a written document to be produced by Caltex prior to commencement of the flood study. It shall include regular reporting updates and milestone meetings, for example, at the Scope of Works, concept design, at the issuing of the draft report to discuss results and recommendations as a result of the study.			ü		ü		

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F8	The following measures would be employed during and following the demolition of the refinery process units and associated infrastructure: - Appropriate bunding and controls would be put in place to prevent stormwater runoff from the demolition works area entering the stormwater system. - Following the completion of the demolition works and removal of redundant infrastructure, the former refinery process area would be regraded. The regrading would aim to ensure that water does not pool in this area. - As part of the regrading works, the surface material in this area would meet the commercial/industrial criteria as defined by Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013*. A crushed aggregate made from clean concrete and asphalt from the demolition works would also be spread across the surface to help reduce soil erosion. - Stormwater runoff collected in the stormwater system would be subject to the controls within this system (such as the oily water separators) prior to being discharged.					ü		
F9	**Excavation of the pipeways would be staged, effectively minimising the area of disturbance at one time. The ACS Modification works would be undertaken in a manner to minimise the potential for soil erosion and sedimentation.**						ü	
F10	**Local weather patterns would be monitored to ensure that workers completing the ACS Modification works at the Site were aware of predicted heavy rainfalls so that work could be stopped in the pipeways prior to them containing surface water flows.**						ü	
F11	**The OEMP for the Site would be updated to include the following measures:** - **the new stormwater management infrastructure for the containment cell would be regularly maintained to ensure that stormwater flows are properly conveyed to the wider catchment; and** - **the leachate collection system including the tank would be regularly inspected to ensure that it is operating effectively and that no leaks have occurred.**							ü

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		CD	Conv	Op	DD	Dem	Con	Op
Noise and Vibration								
G1	The CEMP/DEMP for the Project would include a Noise and Vibration Management Plan (NVMP). The NVMP would outline: - The locations of noise sensitive receptors; - Construction noise monitoring procedures; and - Construction equipment maintenance to ensure good working order.		ü			ü		
G2	Low-noise plant and equipment would be selected, where practicable, in order to minimise potential for noise and vibration. All equipment would be regularly checked to ensure that the mufflers and other noise reduction equipment are working correctly.		ü			ü	ü	
G3	Community consultation with local residents would be undertaken to assist in the alleviation of community concerns. Prior to the proposed demolition works commencing within the Eastern and Western Right of Ways, at Silver Beach, on the Wharf or prior to particularly loud demolition works occurring on the main terminal site, potentially affected residents within Kurnell would be notified in advance. Should complaints be received, the complaints register would continue to be maintained and managed in line with the existing feedback process at the Site.		ü	ü		ü	ü	
G4	Any noise complaint(s) would be investigated immediately. Reasonable and feasible measures would to be implemented to reduce noise impacts.		ü	ü		ü	ü	ü
G5	Construction/demolition equipment would be located to reduce noise emission to sensitive receptors, where practicable.		ü			ü	ü	
G6	The majority of the conversion works for the Project would typically be completed between 7.00am to 10.00pm seven days a week. Some works consistent with Caltex's existing day-to-day operational and maintenance procedures would occur over a 24 hour period as regulated by the Environmental Protection Licence (No. 837) (EPL) for the Site.		ü			ü	ü	

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		CD	Conv	Op	DD	Dem	Con	Op
G7	Construction/Demolition staff and contractors would undergo training in environmental noise issues including: - minimising the use of horn signals and maintaining a low volume. Alternative methods of communication should be considered; - avoiding any unnecessary noise when carrying out manual operations and when operating plant; and - switching off any equipment not in use for extended periods during construction work. - ensuring works occur within approved hours.		ü			ü	ü	
G8	Should any unexpected construction activities occur which could potentially generate significant noise not described in this report, monitoring would be undertaken to ensure construction noise emission levels do not exceed EPL limits.		ü				ü	
G9	Pipeline removal works would be confined to 7.00 am to 6.00 pm Monday to Saturday as per Condition C19 (for SSD 5544).					ü	ü	
G10	Demolition works near 30D Cook Street (i.e. within 500m) would be confined to 7.00am to 6.00 pm Monday to Saturday as per Condition C19.					ü		
G11	Demolition noise monitoring would be undertaken when necessary to ensure compliance with demolition noise criteria.					ü	ü	
G12	Caltex would ensure that the noise generated by the demolition works does not exceed the criteria defined in Table 2 (from Condition of Consent C16 of SSD 5544) unless the reasonable and feasible noise mitigation strategies outlined within the DNVMP have been implemented. Reasonable and feasible noise mitigation strategies would include appropriate respite periods during particularly noisy or prolonged activities.					ü		
G13	The DNVMP would describe where demolition noise limits from Table 2 (from Condition of Consent C16 of SSD 5544) are likely to be exceeded and what reasonable and feasible noise mitigation would be employed to minimise noise.					ü		

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		CD	Conv	Op	DD	Dem	Con	Op
G14	To help ensure that the structures on Site that are to be retained with high or medium heritage significance are protected from potential vibration impacts, the DNVMP would also - Utilise Appendix H Heritage Impact Assessment to identify the medium to high heritage significance buildings to be retained; - Identify where works to demolish redundant structures are occurring within 20 m of a medium to high significance heritage building and the requirement to undertake vibration monitoring and management for these buildings to protect their integrity; and - Outline general monitoring and management measures to monitor vibration and manage buildings.				ü			
Air Quality and Odour								
H1	Dust emissions from the construction phase of the Project and during the demolition works would be monitored by construction/demolition staff. Visual inspections would be completed by demolition staff during the works. Demolition staff would also complete dust deposition monitoring during the demolition works (as per AS/NZS 3580) in appropriate locations on the Site boundary and in Kurnell. Staff would also monitor dust (PM_{10}) levels using the on site real time ambient air quality monitoring station. When required, during activities likely to cause high dust levels or adverse weather conditions etc., a designated worker would continuously monitor downwind emissions to the community or local residents, using the methods described above, and call a halt to activities if sensitive receptors are likely to be affected by airborne particulate matter. Should significant impacts be likely, appropriate measures would be taken to mitigate adverse air quality impacts.		ü			ü	ü	
H2	Within the refinery, vehicles would only travel on designated roads where possible and would be limited to a maximum speed of 10 km/hr in offroad areas, and 25 km/hr elsewhere.		ü			ü	ü	
H3	Where there is the potential for dust or odour generation from trucks carrying spoil, loads would be covered and all tailgates would be securely fastened. Vehicles would not be loaded higher than the sides and tailboard.		ü			ü	ü	
H4	Construction and potentially dust generating demolition activities would be limited during high wind events if sensitive receivers are likely to be significantly impacted.		ü			ü	ü	
H5	All plant would be maintained and operated in line with the manufacturer's specifications in order to minimise the emission of air pollutants and offensive odours. Plant and construction vehicles would be turned off when not in use.		ü			ü	ü	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
H6	Stockpiled material would be assessed for the potential for causing odorous or particulate emissions. If air pollutants and offensive odours are likely, controls would be put into place to manage adverse impacts.		ü			ü		
H7	All concrete cutting and coring would to be undertaken using “wet tools”.		ü			ü		
H8	An odour reduction program would be implemented in accordance with the existing EPL.		ü	ü				
H9	The guidepoles on the EFRTs in gasoline service would be fitted with sleeves.		ü	ü				
H10	Caltex’s Leak Detection and Repair (LDAR) Program would continue in accordance with the Environment Protection Licence.		ü	ü				
H11	All reasonable and feasible measures would be implemented to minimise dust and odour emissions during the demolition works					ü	ü	
H12	VOC and Odour Monitoring would be undertaken by demolition workers (i.e. visual and olfactory monitoring) and monitoring equipment during excavation activities where potential hydrocarbon contamination is present. Contractors would notify the Caltex Environment Specialist of any significant odours identified during demolition.					ü	ü	
H13	Soils or concrete with significant hydrocarbon staining or obvious hydrocarbon odours would be transported to the former CLOR area and stored appropriately. Stockpiles of contaminated soil stored on-site would be managed to prevent odorous VOC emissions and windblown particulate emissions.					ü		
H14	Excavation would be staged to manage potential VOC and odour emissions. Where practical, excavations would not commence prior to 8am nor after 4pm as weather conditions at these times are generally conducive to adverse odour air quality situations from fugitive emissions.					ü	ü	
H15	In unfavourable weather conditions (e.g. dry and windy conditions) or where dust sources are present near sensitive receivers, water sprays would be used to dampen down soils prior to excavation, handling and/or loading/unloading materials. All exposed surfaces (from recent excavations) and stockpiles (of excavated material) would also be watered, sprayed or covered where required, to minimise nuisance dust and odours.					ü	ü	

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		CD	Conv	Op	DD	Dem	Con	Op
H16	During adverse meteorological conditions and extraordinary events, such as events where elevated background dust is present, additional mitigation measures would be considered to prevent and minimise air quality impacts from demolition works. These measures would include, but not be limited to implementing the following during high wind events (e.g. > 8m/s hourly average): - Reducing working surface area - Commencing excavation during favourable wind conditions - Increase wetting agents for exposed surfaces - Increase covering of exposed surface areas.					ü	ü	
H17	Surface disturbance would be minimised. Exposed ground would be rehabilitated as soon as practicable.					ü	ü	
H18	Real-time dust monitoring would be undertaking during the operation of the concrete crusher. Details of this monitoring (and associated response actions) would be incorporated into the AQMP for the demolition works.					ü		
H19	During crushing, a number of dust suppression measures would be implemented. These could include regular watering of stockpiles, dust curtains and other measures as appropriate.					ü		
H20	Where biological matter is present within cooling water inlet pipework, the pipework would be removed be as soon as possible. This would help to minimise the potential for odour issues associated with the degradation and then exposure of the biological matter.					ü		
H21	Where visible dust emissions are observed appropriate management actions would be implemented to prevent impact.					ü		
H22	In the event of an odour complaint, an evaluation would be undertaken to confirm if the demolition works are the source of the odours. If the demolition works are confirmed as a potential ongoing odour source additional mitigation measures would be implemented which could include the use of water sprays to suppress odours and, if necessary, the use of odour suppressants. Off-site olfactory observations and VOC monitoring using equipment would also be undertaken if necessary. In the event of ongoing odour issues, excavation activities would be stopped and if necessary the excavation covered or backfilled.					ü	ü	

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H23	In line with Caltex's existing procedure, following a complaint and its subsequent investigation, feedback regarding the source and nature of the complaint would be provided to the affected community members.					ü	ü	
H24	Dust deposition monitoring would be undertaken during the demolition works (as per AS/NZS 3580). This would include monitoring points in appropriate locations on the Site boundary and in Kurnell.					ü		
H25	The on-site real time ambient air quality monitoring station would continue to operate throughout the demolition works. This station continuously monitors for PM_{10}, wind direction and speed, temperature and humidity and rainfall.					ü	ü	
H26	A summary of the air quality monitoring data for the demolition works would be provided to the community during Caltex's quarterly community meeting.					ü	ü	
H27	**The DEMP would include two new subplans: Containment Cell Management Plan; and an ACS Biopile Management Plan. With regards to air quality, these subplans would include:** - **A brief overview of site operations relevant to potential air emission sources.** - **Identification of mitigation measures for each respective emission source including those measures outlined in the DEMP for the Site (where relevant to operations within each works area).** - **Details of proposed monitoring and recordkeeping procedures.**						ü	

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H28	**The ACS Biopile Management Plan would include the following specific air quality control measures:** - **Bucket crusher operation for the homogenisation process will be conducted so as to minimise potential dust emissions, including the use of:** · **directed water sprays throughout operation.** · **localised wind breaks within the soil screening area.** · **cessation of works during high winds (as defined within the DEMP).** - **Aeration system emission vents will be monitored for VOCs using a Photo-Ionisation Detector (PID) on a weekly basis.** - **The aeration system design will give consideration to potential asbestos emissions, and include emission monitoring for asbestos fibres prior to the commencement of continuous operations.** - **Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable.** - **Provisions for management of odorous material, including notifications from the pipeway excavation operations in the case that odorous material is encountered. These odour controls would be consistent with the measures contained within the DEMP.**						ü	
H29	**The Containment Cell Management Plan would include the following specific air quality control measures:** - **Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable.** - **Directed water sprays will be used when required throughout ACS handling operations.** - **Plastic sheeting would be placed over ACS in the containment cell to minimise the generation of dust. Prior to the placement of the next load of ACS and at the start of each day, the plastic sheeting would be stripped back to allow filling operations to continue.** - **Stockpiles will be maintained in a moist condition, and covered if not in use or left overnight.** - **Completed areas of the works area will be revegetated with native grasses as soon as is practicable.**						ü	

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		CD	Conv	Op	DD	Dem	Con	Op
Transport and Access								
I1	Local Authorities and Kurnell residents would be informed of any Project related work which would affect the road network.		ü			ü	ü	
I2	A Traffic Management Plan would be developed for the construction/demolition phase. The Traffic Management Plan would comply with all relevant Regulations and By-Laws and in particular address safe access and egress to the public road network. The Transport Management Plan would include: - hours of permitted vehicle activity; - designated routes for construction and demolition traffic and defined access points to the Site and demolition works area; - duration of works; - permitted demolition vehicle types; - designated areas within the Site and demolition works area for truck turning movements, parking, loading and unloading to allow heavy vehicles to enter and leave the Site and demolition works area in a forward direction; - sequence for implementing traffic management measures should these be required; and - procedures and/or principles for construction and demolition vehicle speed limits and the safe operation of construction and demolition vehicles; and - **coordination of off-site heavy vehicle movements from the demolition works and ACS Modification works to ensure that heavy vehicle movements do not exceed 60 movements per day.**		ü			ü	ü	
I3	Works to remove pipelines from under the road reserves in Kurnell would not take place before a road opening application has been approved by Sutherland Shire Council and on the days the following events are taking place: - Australia Day (January); - The Festival of Kites (May); - The Boree Regatta (October). and - Water events for the Australian Scout Jamboree (first two weeks of January 2016).				ü	ü		
I4	**Traffic related to the ACS Modification works would be managed under the Traffic Management Plan that forms a sub-plan to the DEMP**						ü	

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Heritage								
J1	A Heritage Management Strategy would be prepared for the Australian Oil Refinery prior to shut-down of the refinery plant, to provide Caltex with a basic framework for the ongoing management of the Site's heritage during present and future works. The Strategy would include a review of the heritage significance of the overall Site. The review would clarify the extent and relative heritage value of the place by identifying key elements of industrial and built heritage as well as social values of the refinery, and the relative contribution of these elements to the overall significance of the Site. Recommendations would also address the future assessment and management of memorabilia and other significant items of moveable heritage maintained on-site.	ü						
J2	If any further heritage items were discovered throughout the Project, work would cease until an assessment is carried out by a qualified heritage professional.	ü	ü			ü	ü	
J3	An archival photographic record of the existing fabric and operations of the Kurnell Refinery would be prepared while the plant is still operational, and during the decommissioning process. The recording would be undertaken in accordance with the Heritage Council guidelines on *Photographic Recording of Heritage Items Using Film and Digital Capture* (2006). The archival recording would be maintained for the appreciation of present and future generations. To this end, the recording would be lodged with the Sutherland Shire Library and NSW State Library.	ü	ü					
J4	The Heritage Management Strategy (HMS) and the management strategies within it would continue to be implemented.				ü	ü		
J5	Opportunities to adaptively reuse redundant buildings identified in the HMS as having high or moderate heritage significance would continue to be reviewed prior to final demolition works.				ü	ü		
J6	The sculptural panels by Bert Flugelman would be retained and preserved.				ü	ü		
J7	Sandstone blocks from the informal sandstone wall along Silver Beach would be set aside in a secure location prior to works, and reinstated in the same location following removal of the cooling water outlet pipeline.				ü	ü		

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
J8	Appropriate mitigation measures would be implemented to reduce the likely damage to the interpretive footpath in front of the driveway entrance to the Kurnell Wharf. Measures would include: - Making a record of the current state of the pavement. - Removing the affected pavement in sections and storing these sections in a secure location. - Reinstating the pavement in the same location following the removal of pipelines; - If this is not practicable, a similar pavement treatment and a matching or compatible interpretative design would be reinstated.				ü	ü		
J9	If historical archaeological relics are unexpectedly found during the demolition works, works in the area of the relics would cease and the Heritage Council of NSW would be notified.					ü	ü	
J10	A Stop Works procedure would be implemented should any Aboriginal Heritage items be found. Works would cease at the vicinity of the item and OEH would be notified as soon as possible					ü	ü	
J11	If any human remains are disturbed, all work in the vicinity of the remains would stop immediately and the remains would not be further disturbed or moved. Works would cease at the vicinity of the item and OEH and NSW Police would be notified as soon as possible.					ü	ü	
J12	Prior to works commencing, all personnel and contractors involved in ground disturbance works would be briefed on the procedures to follow if human remains or unexpected heritage items are found.				ü	ü	ü	
J13	As part of the DEMP, a Heritage Management Section will be developed. This will incorporate previous Management and Mitigation Measures that are not already included in the HMS.				ü	ü	ü	

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		CD	Conv	Op	DD	Demo	Con	Op
Ecology								
K1	A Biodiversity and Weed Management Plan (BWMP) would be prepared in order to limit and control the spread of noxious weeds within the Site/demolition works area. It would include the following: - wash down procedures to reduce the spread of weeds via vehicles and machinery; - measures to target potential new weed outbreaks including soil stockpiles and any other disturbed areas; - outline monitoring programs for noxious and problematic weeds on site and in the surrounding areas; - measures for strict stockpiling control to help eradicate all noxious weeds as per NSW DPI specifications for Sutherland Shire LGA; - include a list of 'frog-friendly' and 'wetland friendly' herbicides such as Roundup Biactive or Weedmaster DUO for the control of noxious weeds; and ensure that only amphibian friendly herbicides are used; - wash down protocols for construction/demolition vehicles and machinery to prevent the spread of root-rot fungus (*Phytophthora cinnamomi*) and noxious weeds; - all personnel undertaking routine management activities of any noxious weeds should be appropriated trained and all contractors should hold the necessary permits and licenses. Noxious weed information sheets would be provided to demolition contractors to help identification of relevant noxious weeds.	ü	ü	ü	ü	ü	ü	ü
K2	A BWMP would be prepared in order to limit potential impacts to existing vegetation outside of the area of proposed works, but within the Site. It would include the following: - existing vegetation on Site would be clearly marked on all Site plans and construction diagrams, with clear indications of no-go zones within all vegetated areas; - existing vegetation would be clearly signposted and fenced off prior to the commencement of construction activities, and should remain fenced off until the completion of works (as per the Vegetation Exclusion Zones shown on Figure 17-1); and - absolutely all works would be limited to the defined construction/demolition footprint.	ü	ü	ü	ü	ü	ü	ü

Item	Management and Mitigation Measures	Conversion		Demolition			ACS Works	
K3	To minimise the potential for impacts to native fauna species, the BWMP would be developed and include following measures: - if any frogs are found within the Project Area, works would cease until frogs have been relocated to areas outside the area of impact; - if any threatened frogs e.g. Green and Golden Bell Frog or Wallum Froglet are identified within the Site, works would cease and active searching should be undertaken by a qualified zoologist experienced in the identification and management of the Green and Golden Bell Frog and Wallum Froglet; - all trenches would be inspected prior to works each morning. Any frogs that become trapped within trenches would be assessed by a suitably qualified ecologist or veterinarian and then released into the nearest suitable habitat if uninjured; - identification sheets would be provided to all construction workers on Site for the two threatened frog species predicted to occur within the Site; - wash down protocols to prevent the spread of Amphibian Chytrid Disease (chytridiomycosis) would be implemented at relevant work areas. Protocols would be consistent with OEH guidelines (DECC, 2008b); - 'frog-friendly' and 'wetland friendly' herbicides such as Roundup Biactive or Weedmaster DUO would be used for the control of noxious weeds; and - if fauna are found to be utilising the Site, or a nest, den or roost is found, work in the immediate area is to stop and the animals are to be allowed to move off freely, or relocated by an authorised person to an area outside the construction footprint.	ü	ü	ü				

Item	Management and Mitigation Measures	Conversion		Demolition			ACS Works	
K4	To minimise the potential impacts to native fauna during the demolition works the following measures would be included in the BWMP: - demolition workers would be provided with identification sheets relating to the threatened fauna species predicted to occur within the Site. - Stop work procedures would be implemented during the works on the chance encounter of any dispersing threatened frogs or the identification of nesting Pied Oystercatcher, Little Tern, Osprey or White-bellied Sea-eagle to avoid death or injury to frogs dispersing across the study area, or disturbance to nesting threatened birds. - Trenches/holes would be back-filled daily or covered overnight. Where this is not possible, other measures would be considered to prevent and/or mitigate fauna entrapment. Trenches/holes would be inspected prior to works each morning. Injured frogs that become trapped within trenches would be assessed by a veterinarian or ecologist. Uninjured frogs would be captured and released into the nearest suitable habitat to the south of the study area. - If threatened frogs, Green and Golden Bell Frog or Wallum Froglet are identified during demolition works, active searching would be undertaken by a qualified zoologist experienced in the identification and management of the Green and Golden Bell Frog and Wallum Froglet. - When open trenching/digging/excavating, Caltex would ensure that exclusion fencing is erected prior to works commencing each morning. Exclusion fencing shall be maintained during all seasons of the year, given the active season for the Green and Golden Bell Frog extends from September to April and the Wallum Froglet peak activity period occurs during the colder months. - If practicable, works at Silver Beach to remove the cooling water outlet should be completed outside of the known nesting periods for Pied Oystercatcher (August to January) and Little Tern (Spring/Summer). If nesting shorebirds are encountered in the Silver Beach foreshore area in the vicinity of works (within 20 m), works at Silver Beach would cease, a qualified zoologist would be consulted and appropriate actions would be implemented, prior to works recommencing. - If practical, works to remove tall structures on-site should be completed outside of the known nesting periods the threatened bird species (July to September for Osprey and June to January for White-bellied Sea-eagle). If not practical then tall structures would be inspected for active nests prior to commencing the demolition works.				ü	ü	ü	

Item	Management and Mitigation Measures	Conversion		Demolition			ACS Works	
K5	The following recommendations, would be contained in the Cooling Water Outlet Management Plan for managing the potential marine ecology impact and implemented during demolition works: - silt curtains would be installed seaward of the demolition works area but not directly above existing seagrass communities; - all plant and equipment used in the water column would be appropriately prepared, checked and cleaned to avoid potential release of contaminants; - plant and equipment used in the water column would be inspected to ensure fragments of the invasive algae *Caulerpa taxifolia* are not present; - spill kits would be used to contain and clean up any spills from demolition plant and equipment. Spill kits would be located within 20 m of demolition plant and equipment; - demolition works at Silver Beach (particularly those located in the water column) would be timed such that they do not coincide with high-tide conditions or during significant wave action.				ü	ü		
K6	Following the removal of the continental carbon pipeline and other infrastructure Caltex would develop a strategy to manage the redundant right of way (CCROW). The strategy would include measures to: - remove fencing, reprofile and allow natural regeneration the southern part of the CCROW (beyond the southern boundary of the Site) to promote consistent and connected vegetative communities across the southern part of Caltex's ownership; - remove and keep out noxious and invasive weeds, especially during the regeneration phase; and - reprofiling of the CCROW could include creating gaps in the raised easement to allow for hydrological exchange and habitat regeneration.					ü		
K7	Caltex would undertake the following prior to excavation along the Continental Carbon Right of Way: - pre-clearing inspections; and - implementing frog exclusion measures to ensure dispersing frogs are not captured and trapped in trenches during pipeline removal (e.g. exclusion fencing).					ü		
Coastal Processes								
L1	A Cooling Water Outlet Management Plan would be developed as part of the Demolition Environment Management Plan (DEMP). Rehabilitation works at Silver Beach would be in accordance with this Cooling Water Outlet Management Plan. The following measures would be included:				ü	ü		

Item	Management and Mitigation Measures	Conversion		Demolition			ACS Works	
L2	A detailed survey of the likely extent of the disturbed area at Silver Beach would be undertaken prior to commencing demolition works to ensure that the pre-existing topography is re-established following the works.					ü		
L3	The affected sand dunes (including the back-beach and sub-aerial beach) would be re-instated using the stockpiled overburden sand and if necessary, additional sand. Additional sand used for reinstating sand dunes would be of similar particle size and composition as the overburden sand.					ü		
L4	The affected sand dunes would be restored to match the previously surveyed topography. A smooth profile from the back-beach area to the dune would be re-established to ensure the aerodynamics are as consistent as possible with the undisturbed areas adjacent to the disturbed area. If necessary, liquid sprays or geotextiles would be used to help stabilise the beach and protect against erosion.					ü		
L5	The affected sand dunes would be re-vegetated using indigenous, native flora. The existing vegetation is limited to grasses, with no woody vegetation. The area would be re-planted with similar grass species in a manner that ensures minimal loss of wind-blown sand from the dune while the area is re-vegetating. All re-vegetated areas would: - contain signage to highlight these areas as rehabilitation zones that prohibit public and vehicular access; - be temporarily fenced, and - be maintained and monitored until vegetation is established using approved dune rehabilitation methods.					ü		
L6	Material of a similar sediment size and colour characteristics would be used as back fill material for the trench below the low tide mark. To account for later settling and consolidations, some overfilling would be undertaken to account for later consolidation (approximately 10 % would be recommended).					ü		

16.2 Environmental Management

16.2.1 Overview

Current operations at the Site comply with relevant legislative and regulatory requirements including EPL no. 837. This EPL is regularly updated to ensure the management of the Site meets certain environmental requirements. As the operations on the Site change the EPL will continue to be updated to ensure that it remains relevant to the activities being completed on-site.

In order to maintain compliance with relevant legislative and regulatory requirements, Caltex implements an Environmental Management System (EMS). The EMS consists of a suite of internal policy documents and plans. The EMS is overseen by a dedicated member of the Caltex Environment Team.

This SEE has outlined a suite of measures that would assist in avoiding, mitigating or managing the anticipated impacts associated with the ACS Modification works. These measures would be incorporated into the modified conditions of consent for the Project and during the ACS Modification works they would be implemented through the DEMP, associated existing sub-plans, and the new Containment Cell Management Plan and ACS Biopile Management Plan.

The DEMP would be updated to cover all environmental aspects associated with the construction works required as part of the ACS Modification works identified within **Chapters 8 - 15** of this SEE.

The DEMP and all associated subplans would help ensure that:

- all work complies with all relevant environmental legislation, regulations and standards;
- environmental factors are taken into account for each activity;
- maintenance of environmental compliance and performance is achieved through ongoing environmental monitoring and reporting; and
- regular audits are performed to confirm compliance with environmental policies and standards.

Any operational measures included in this SEE would be incorporated into the existing OEMP for the Site and operating procedures currently in place at the Site.

16.2.2 The DEMP

The DEMP outlines the procedures that would be implemented to address and manage environmental impacts associated with ACS Modification works for the Project. The DEMP would be updated by Caltex prior to commencement of ACS Modification works to incorporate a description of the ACS Modification works.

The primary purpose of the DEMP is to provide a reference document outlining the relevant safeguards and mitigation measures that are in line with the conditions of consent, and ensure that these are implemented and maintained. The DEMP would outline the key steps to be taken by personnel and contractors to manage the environmental hazards and risks associated with the demolition works and to effectively minimise the potential for environmental harm. The DEMP would be subject to ongoing review throughout the ACS Modification works period.

The DEMP shall include the following:

- a description of the demolition works and ACS Modification works;
- an outline of the proposed demolition works and ACS Modification works program;
- relevant statutory requirements – including applicable licences and approvals;
- standards and/or performance measures for the relevant environmental issues associated with the demolition works and ACS Modification works;
- a description of what actions and measures would be implemented to mitigate the potential impacts associated with the demolition works and ACS Modification works and ensure that these works would comply with the relevant standards and/or performance measures;
- a description of the procedures to ensure all personnel and contractors are trained in regards to their responsibilities under the DEMP;

- a description of the procedures that would be implemented to register, report and respond to complaints during the demolition works and ACS Modification works;
- a description of the procedures that would be implemented to manage environmental incidents and associated reporting requirements;
- identification of key personnel who would be involved in the demolition works and ACS Modification works, and provide their contact numbers;
- monitoring procedures and a description of the process to be followed if any non-compliance is identified; and
- detailed sub-plans including:
    - Soil and Water Management Plan (incorporating the Contamination Management Plan, Acid Sulfate Soils Management Plan and Groundwater Management Plan);
    - Asbestos Management Plan (Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres Guidance Document (Caltex, 2014);
    - Noise and Vibration Management Plan (NVMP);
    - Air Quality Management Plan (AQMP);
    - Traffic Management Plan (TMP);
    - Biodiversity and Weed Management Plan (BWMP);
    - Cooling Water Outlet Management Plan (CWOMP);
    - Demolition Waste and Resource Management Plan;
    - Containment Cell Management Plan; and
    - ACS Biopile Management Plan.

Where a sub-plan is not required, a specific section of the DEMP will be used to document additional management and mitigation measures.

These items are consistent with the management measures presented in **Table 16-1**.

16.2.3 The OEMP

An Operational Environmental Management Plan (OEMP) has been recently developed for the Kurnell Terminal. This OEMP contains the relevant operational requirements for the terminal. This OEMP would be updated to include the measures outlined in **Table 16-1** above should the ACS Modification works be granted consent.

17.0 Conditions of Consent

The conditions of consent provided in SSD 5544 (7 January 2014) and SSD 5544 MOD1 (10 August 2015) were reviewed based on the outcomes of the assessments within this SEE to determine their relevance to the ACS Modification works. **Table 17-1** identifies which conditions are relevant and if so, where a condition requires updating. The precise wording of the revised conditions will be developed following exhibition of the SEE and review of any submissions that may be received.

Table 17-1 Relevant Conditions of Consent for the ACS Modification Works

Development Consent Document	Condition No.	Condition Title and Summary	Comment
SSD 5544	Schedule A	Site Characteristics	Relevant - no change needed
SSD 5544	B1	Obligation to minimise harm to the environment	Relevant – update to include reference to this Modification and conditions of this consent.
SSD 5544	B2	Terms of consent – in accordance with specified documents	Relevant – no change needed
SSD 5544	B3	Terms of consent – inconsistency of above documents	Relevant – no change needed
SSD 5544	B4	Terms of consent – comply with Director-General requirements	Relevant – no change needed
SSD 5544	B5	Terms of consent – public availability of documents	Relevant – no change needed
SSD 5544	B6	Limits of consent – not store in excess of 925 ML of refined product on the Site	Not relevant
SSD 5544	B7	Limits of consent – construction works shall not exceed five years from date of approval	Relevant – update to include timeframe for ACS Modification works.
SSD 5544 MOD1	B7A	The demolition works associated with the development shall not extend beyond three (3) years from the date of consent of MOD1	As above
SSD 5544	B8	Lapsing of consent – consent shall lapse five years from date of consent	Relevant – no change needed
SSD 5544)	B9	Surrender of existing development consents	Not relevant - completed
SSD 5544	B10	Surrender of existing development consents Da 13/195 – stormwater drainage upgrade DA 12/0238 – Construction of a switch room	Not relevant
SSD 5544	B11	Nothing in this consent alters or modifies other development consents for the Site	Relevant – no change needed
SSD 5544	B12	Statutory requirements – all licences, permits and approval/consents are obtained	Relevant – no change needed
SSD 5544	B13	Amended environment protection licence (EPL) requirement – apply to vary the EPL to permit Development	Not relevant

Development Consent Document	Condition No.	Condition Title and Summary	Comment
SSD 5544 MOD1	B13A	Amended environment protection licence (EPL) requirement – apply to vary the EPL for demolition works	Not relevant
SSD 5544	B14	Structural adequacy – new buildings and structures and any alterations or additions are constructed in accordance with the Building Code of Australia	Not relevant
SSD 5544	B16	Operation of plant and equipment – ensure plant and equipment is maintained and operated in proper and efficient condition	Relevant – no change needed
SSD 5544 MOD1	B15	DELETED	Not relevant
SSD 5544	B16	Requirement to properly maintain and operate plant and equipment	Relevant – no change needed
SSD 5544 MOD1	B16A	Cooling Water Outlet Pipeline Removal	Not relevant
SSD 5544	B17	Protection of public infrastructure – prepare and submit a copy of the dilapidation report	Not relevant – completed
SSD 5544 MOD1	B17A	Protection of public infrastructure – prepare and submit a copy of the dilapidation report – demolition works	Not relevant – completed for demolition works
SSD 5544	B18	Protection of public infrastructure – repair./relocate public infrastructure that is damaged by the development	Relevant – no change needed
SSD 5544	B19	Staged submission of plans or programs – submit plans etc. on a progressive basis or combine plans etc.	Relevant – no change needed
SSD 5544	B20	Dispute resolution – refer matter to the Director-General	Relevant – no change needed
SSD 5544	B21	Compliance – employee, contractor and sub-contractor awareness of consent	Relevant – no change needed
SSD 5544	B22	Compliance – the Applicant is responsible for environmental impacts	Relevant – no change needed
SSD 5544	C1	Terms of Approval – carry out and implement measures and actions	Relevant – no change needed
SSD 5544 MOD1	C1A	Terms of Approval – carry out recommendation in the *Hazard and Risk Analysis of the proposed Caltex Kurnell Refinery demolition Works*	Relevant – no change needed
SSD 5544 MOD1	C1B	Terms of Approval – demolition works will be carried out in accordance with relevant Australian Standards / WHS Regulation 2011	Not relevant

Development Consent Document	Condition No.	Condition Title and Summary	Comment
SSD 5544 MOD1	C1C	Terms of Approval – major demolition works are undertaken by licensed demolition experts	Not relevant
SSD 5544	C2	Commissioning timetable	Not relevant
SSD 5544	C3	Pre-construction – prepare and submit studies	Not relevant
SSD 5544 MOD1	C3A	Pre-demolition – prepare and submit studies	Not relevant
SSD 5544	C4	Pre-commissioning – prepare emergency plan and safety management system	Not relevant – superseded by condition C4A
SSD 5544 MOD1	C4A	Pre-demolition – prepare emergency plan	Relevant – no change needed
SSD 5544	C5	Pre-commissioning plan and pre-startup review checklists for assets in C2.	Not relevant
SSD 5544	C6	Pre-startup Compliance Report (C2 assets)	Not relevant
SSD 5544	C7	Post-startup Compliance Report (C2 assets)	Not relevant
SSD 5544 MOD1	C7A	Fire Safety Study Review – one month prior to completion of the demolition works	Relevant – no change needed
SSD 5544	C8	Ongoing – Hazard audits	Relevant – no change needed
SSD 5544	C9	Ongoing – further requirements, comply with measures in reports submitted	Relevant – no change needed
SSD 5544 MOD1	C9A	Fire Risk Management during demolition	Relevant – no change needed
SSD 5544	C10	Discharge of Water – comply with section 120 of the Protection of the Environment Operations Act 1997	Relevant – no change needed
SSD 5544	C11	Erosion and sediment control – implement suitable erosion and sediment control measures	Relevant – no change needed
SSD 5544 MOD1	C11A	Imported Soil – permitted to use only VENM or other material that meets the conditions of the Resource Recovery Order, record keeping	Relevant – update to include use of imported soils during construction of the containment cell
SSD 5544 MOD1	C11B	Implement suitable erosion and sediment control measures	Relevant – update to reference ACS Modification works, including excavation and Biopiling
SSD 5544)	C12	Water Management Plan – prepare and implement	Relevant - update as per C12A

Development Consent Document	Condition No.	Condition Title and Summary	Comment
SSD 5544 MOD1	C12A	Soil and Water Management Plan – include measures for stockpiling and corrective actions	Relevant – update to include reference to ACS Modification works potential impacts to be managed under the Soil and Water Management Plan
SSD 5544 & SSD 5544 MOD1	C13 /13A	Groundwater – interception of groundwater	Relevant – no change needed
SSD 5544 & SSD 5544 MOD1	C14 / 14A	Acid sulphate soils (ASS) management plan – prevent further oxidation and cease work	Not relevant
SSD 5544	C15	Contamination management – prepare and implement a contamination management plan	Relevant - update as per C15A
SSD 5544 MOD1	C15A	Contamination management – update the plan to include measures for identification, monitoring and management of potential contaminated soils and groundwater	Relevant – update to include ACS Modification works controls
SSD 5544 MOD1	C15B	Asbestos management – asbestos encountered ruing demolition work is monitored, handing, transport and disposed appropriately	Relevant – no change needed
SSD 5544 MOD1	C16	Construction noise limits – comply with specific criteria	Relevant – no change needed
SSD 5544	C17	Operation noise limits – comply with specific criteria	Relevant – no change needed
SSD 5544 MOD1	C18	Hours of construction and operation – comply with specified hours	Relevant – no change needed
SSD 5544 MOD1	C19	Hours of construction and operation – high noise generating construction to comply with specified hours	Relevant – no change needed
SSD 5544 & SSD 5544 MOD1	C20	Hours of construction and operation – work outside of specified hours	Relevant – no change needed
SSD 5544	C21	Operating Conditions – comply with specified items during operation	Relevant – no change needed
SSD 5544	C22	Noise management plan – prepare and implement	Relevant - update as per C22A
SSD 5544 MOD1	C22A	Noise management plan – update to include demolition works	Relevant – update to include ACS Modification works potential noise impacts
SSD 5544 & SSD 5544 MOD1	C23	Construction vibration – aim to achieve specified vibration goals	Not relevant
SSD 5544 & SSD 5544 MOD1	C24	Dust generation during construction – carry out all reasonable and feasible measures to minimise dust	Relevant – update to reference ‘ACS Modification works’
SSD 5544 & SSD 5544 MOD1	C25	Dust generation during construction – trucks to be covered, not to track dirt onto roads and remove dirt from public roads	Relevant – update to reference ‘ACS Modification works’

Development Consent Document	Condition No.	Condition Title and Summary	Comment
SSD 5544	C26	Offensive odour – do not cause or permit emission of offensive odours during operation	Relevant – no change needed
SSD 5544	C27	Operating condition – implement dust and dour mitigation measures, prevent air quality impacts	Relevant – no change needed
SSD 5544	C28	Air quality management plan – prepare and implement	Relevant - update as per C28A
SSD 5544 MOD1	C28A	Air quality management plan – update the pan to include procedures for VOC, odour and dust monitoring	Relevant – Update to include controls specific to the ACS Modification works
SSD 5544	C29	Air quality verification of operations - carry out study	Relevant – no change needed
SSD 5544	C30	Archival Record – heritage management	Not relevant - complete
SSD 5544	C31	Heritage Management Strategy	Relevant – no changes needed
SSD 5544 MOD1	C31A	Heritage Management Strategy – continued implementation during demolition works	Not relevant
SSD 5544	C32	Heritage management and mitigation measures	Not relevant - complete
SSD 5544 MOD1	C32A / 32B / 32C	Adaptive reuse capabilities of significant buildings, archival records and Silver Beach	Not relevant
SSD 5544 & SSD 5544 MOD1	C33	Potential for discovery of Aboriginal and Non-Aboriginal objects – cease works and notify (heritage objects)	Relevant – update to reference ‘ACS Modification works’
SSD 5544	C34	Potential for discovery of Aboriginal and Non-Aboriginal objects – cease works and notify (Aboriginal objects)	Relevant – update to reference ‘ACS Modification works’
SSD 5544 & SSD 5544 MOD1	C35	Managing energy efficiency & greenhouse gas emissions – implement measures	Relevant – no change needed
SSD 5544 & SSD 5544 MOD1	C36 / C36A	Traffic management plan – prepare and implement	Relevant – Update to include a description of ACS Modification works
SSD 5544 MOD1	C36B	Pipeline removal works along road reserves limited times	Not relevant
SSD 5544 & SSD 5544 MOD1	C37	Car parking – provide sufficient facilities for construction personnel	Relevant – no change needed
SSD 5544 MOD1	C37A	Review of Cook Street approach	Not relevant
SSD 5544	C38	Waste management on-site – minimise, store, handle and dispose of appropriately	Relevant – no change needed
SSD 5544 & SSD 5544 MOD1	C39	Waste management on-site – classification of waste	Relevant – update to reference ‘ACS Modification works’
SSD 5544 MOD1	C39A	Hazardous materials identified in structures to be demolished are removed prior to demolition	Not relevant

Development Consent Document	Condition No.	Condition Title and Summary	Comment
SSD 5544 MOD1	39B	Reuse of materials on site must be fit for purpose and must not result in any adverse impacts to the environment	Relevant – no change needed
SSD 5544 MOD1	39C	Sort waste to maximise opportunities for the beneficial reuse and recycling of such waste materials	Relevant – no change needed
SSD 5544	C40	Waste management plan – prepare and implement	Relevant - update as per C40A
SSD 5544 MOD1	C40A	Waste management plan – prepare and implement	Relevant – update to include ACS Modification works estimated waste generation
SSD 5544	C41	Waste management from off-site – do not cause, permit or allow waste generated from outside the site to be received at the site	Relevant – no change needed
SSD 5544 MOD1	C41A	Cooling water outlet pipeline removal – minimise disturbance of *Caulerpa taxifolia*	Not relevant
SSD 5544	C42	Biodiversity management plan – prepare and implement	Relevant – no change needed
SSD 5544 & SSD 5544 MOD1	C43 / 43A	Pest, vermin & noxious weed management – implement suitable management measures	Relevant – no change needed
SSD 5544 MOD1	43B / 43C	Continental Carbon Pipeline – strategy for weed management and removal Cooling water outlet management plan – prepare and implement	Not relevant
SSD 5544	C44	Protection of Marton Park Wetland – measures implemented for sedimentation, erosion, contamination from stormwater.	Relevant – no change needed
SSD 5544	C45	Lighting – ensure lighting complies and relevant standard and does not cause a nuisance	Relevant – no change needed
SSD 5544	C46	Signage and fencing – no advertising to be installed	Relevant – no change needed
SSD 5544	C47	Site security – ensure fencing and security is installed and gates are locked	Relevant – no change needed
SSD 5544	D1	Construction environment management plan – prepare and implement	Not relevant – superseded by D1A
SSD 5544 MOD1	D1A	Demolition environment management plan – prepare and implement	Relevant – update to include construction works undertaken as part of the ACS Modification.
SSD 5544	D2	Operation environmental management plan – prepare and implement	Relevant – update to include operation works undertaken as part of the ACS Modification.

Development Consent Document	Condition No.	Condition Title and Summary	Comment
SSD 5544	D3	Management plan requirements – prepared in accordance with relevant guideline s and include specific items	Relevant – no change needed
SSD 5544	D4	Annual review – review environmental performance	Relevant – no change needed
SSD 5544	D5	Revision of strategies, plan & programs – within 3 months conduct reviews and audits	Relevant – no change needed
SSD 5544	D6	Incident reporting – notify incidents	Relevant – no change needed
SSD 5544	D7	Independent environmental audit – conduct audit	Relevant – no change needed
SSD 5544	D8	Independent environmental audit – submit a copy of the audit	Relevant – no change needed
SSD 5544 & SSD 5544 MOD1	D9	Access to information – make information available on the internet	Relevant – update to include reference to the ACS Modification works
SSD 5544	Appendix A	Figure 2 – Proposed development plan	Relevant – update to include a Figure showing the ACS Modification works area
SSD 5544	Appendix B	Consents to be surrendered	Not relevant
SSD 5544 & SSD 5544 MOD1	Appendix C	Management and mitigation measures	Relevant –update to include specific measures for ACS Modification works

18.0 Evaluation and Justification

18.1 Introduction

This chapter provides an evaluation of the proposed ACS Modification works and the outcomes of this SEE, including a discussion of the justification for proceeding with the ACS Modification works. The chapter also provides:

- an environmental risk assessment (ERA);
- an assessment of the ACS Modification works against the principles of Ecologically Sustainable Development (ESD);
- a description of the ACS Modification work's benefits;
- consideration of the consistency of the ACS Modification works with the objects of the *Environmental Planning and Assessment Act 1979* (EP&A Act); and
- The justification for the ACS Modification works.

18.2 Environmental Risk Assessment

The following ERA provides an analysis of the environmental risks that have been identified and outlined as part of this SEE.

An initial qualitative environmental scoping exercise was completed in Chapter 7 Environmental Scoping Assessment. This exercise identified the key environmental issues for the ACS Modification works, described them and categorised them according to their risk of impact.

The SEE process has confirmed the potential environmental impacts associated with the ACS Modification works, proposed mitigation measures for those impacts and potentially significant residual environmental impacts which still exist after the application of the proposed mitigation measures.

This ERA was undertaken using the methodology described below to determine the risk associated with each environmental issue. The ERA has been based upon the methodology outlined in Standards Australia's document *HB 203:2006 Environmental Risk Management – Principles and Process*, Australian Standard AS/NZ 4360:2004 Risk Management, and AS/NZS ISO 31000:2009 *Risk Management – Principles and Guidelines*.

The analysis categorised levels of risk for a given event based on the significance of effects (consequences) and the manageability of those effects (likelihood). The measures of likelihood categories and the measures of consequences categories as well as the risk ranking matrix are detailed in **Table 18-1**, **Table 18-2** and **Table 18-3** below.

Table 18-1 Measures of Probability Categories for the ERA

Rank	Likelihood	Description
A	Almost Certain	Happens often and is expected to occur
B	Likely	Could easily happen and would probably occur
C	Possible	Could happen and has occurred elsewhere
D	Unlikely	Unlikely to happen but may occur
E	Rare	Could happen, but only in extreme circumstances

Table 18-2 Measures of Consequent Categories for the ERA

Rank	Consequence	Description
1	Extreme	Permanent and catastrophic impacts on the environment; large impact area; reportable incident to external agency; large fines and prosecution; operational constraints; substantial community concern.
2	Major	Permanent and detrimental impacts on the environment; large impact area; reportable incident to external agency; may result in large fines and prosecution; operational constraints; high level of community concern.
3	Moderate	Substantial temporary or minor long term detrimental impacts on the environment; moderate impact area; reportable incident to external agency; action required by reportable agency; community interested.
4	Minor	Minor detrimental impacts on the environment; small impact area; reportable incident internally; no operational constraints; some local community interest.
5	Low	Nil or temporary impacts on the environment; small or isolated impact area; not reportable incident; no operational constraints; uncontroversial project no community interest.

Table 18-3 Risk Matrix for ERA

		CONSEQUENCES				
		1 Extreme	2 Major	3 Moderate	4 Minor	5 Low
Likelihood	A (Almost Certain)	VH	VH	H	H	M
	B (Likely)	VH	H	H	M	M
	C (Possible)	H	H	M	M	L
	D (Unlikely)	H	M	M	L	L
	E (Rare)	H	M	L	L	L

Risk Matrix is defined as follows: VH = Very High, H = High, M = Medium and L = Low.

Taking into account the location and nature of the ACS Modification works, the mitigation measures described in **Chapters 8 – 14**, the Cumulative Impact Assessment in Chapter 15 and the commitments provided in Chapter 16 Revised Management and Mitigation Measures, **Table 18-4** provides an assessment of the mitigated risks associated with the ACS Modification works, or the residual risk analysis. This has been completed for each potential environmental impact identified in **Table 18-4** based on the likelihood of occurrence and potential environmental consequence.

Table 18-4 Environmental Risk Analysis

Notes: PL: Potential Likelihood; PC: Potential Consequence; RP: Residual Likelihood; RC: Residual Consequence

Environmental Aspect	Potential Impacts Based On Unmitigated/ Inherent Risk	PL	PC	Potential Risk Before Mitigation	Actions/Proposed Mitigation Measures	RL	RC	Residual Risk Post Mitigation
Soil, Groundwater and Contamination Chapter 8	Excavation works within the pipeways generating dust and liberating asbestos fibres that could potentially affect on-site and off-site receptors.	A	3	H	Measures to manage dust and asbestos would outlined in the DEMP and relevant subplans. Specific mitigation measures are contained in **Chapter 8 Soils, Groundwater and Contamination**.	E	3	L
	Mobilisation of contamination from soils during excavation works.	B	3	H	Measures to minimise the potential for the mobilisation of contaminants during excavation works would be outlined in the DEMP and relevant subplans. Specific mitigation measures are contained in **Chapter 8 Soils, Groundwater and Contamination**.	D	4	L
	Biopiling (including homogenisation) and containment cell area works generating dust and liberating asbestos fibres that could potentially affect on-site and off-site receptors	A	3	H	Measures to manage dust and asbestos would be outlined in the DEMP, a Containment Cell Management Plan and an ACS Biopile Management plan, as relevant. Specific mitigation measures are contained in **Chapter 8 Soils, Groundwater and Contamination**.	E	3	L
	Spills and leaks from construction equipment potentially contaminating soil and groundwater.	C	3	M	Soil and water management measures, including equipment upkeep requirements, would be detailed in the DEMP. Specific mitigation measures are contained in **Chapter 8 Soils, Groundwater and Contamination**.	D	4	L
	Vehicles dispersing contaminated materials across the Site and off-site.	C	3	M	Measures to minimise the potential for the mobilisation of contaminants would be outlined in the DEMP, a Containment Cell Management Plan and an ACS Biopile Management plan, as relevant. Specific mitigation measures are contained in **Chapter 8 Soils, Groundwater and Contamination**.	D	4	L

Environmental Aspect	Potential Impacts Based On Unmitigated/ Inherent Risk	PL	PC	Potential Risk Before Mitigation	Actions/Proposed Mitigation Measures	RL	RC	Residual Risk Post Mitigation
Waste Management Chapter 9	The ACS Modification works could create additional waste streams that require management.	A	3	H	Measures to manage waste streams and ensure maximum resource efficiency is maintain would be outlined in the DEMP, a Containment Cell Management Plan and an ACS Biopile Management plan, as relevant.	C	5	L
Surface Water, Wastewater and Flooding Chapter 10	Potential impacts on stormwater such as contamination, erosion, sedimentation impacts during construction and operation.	C	3	M	Measures to manage surface water impacts would be outlined in the DEMP, a Containment Cell Management Plan and an ACS Biopile Management plan, as relevant.	D	4	L
	Changes in contaminant load to the WWTP during construction and operation	D	4	L	Continuing management of the WWTP in consultation with the NSW EPA under PRP U25: Terminal Operation Wastewater Characterisation.	E	5	L
	Changes to the quantity of stormwater flows to catchments during operation	B	4	M	The new stormwater management infrastructure for the containment cell would be regularly maintained to ensure that stormwater flows are properly conveyed to the wider catchment.	D	5	L
Noise Chapter 11	ACS Modification works could cause acoustic impacts at identified sensitive receptors.	C	4	M	Working hours and noise limits would be limited to within those specified in the conditions of consent for SSD 5544. No noise impacts are expected.	E	5	L
Air Quality and Odour Chapter 12	ACS Modification works could potentially generate air quality impacts such as particulate matter missions; VOC emissions, asbestos emissions and odour	B	3	H	Measures to manage the potential air quality impacts, measures would be outlined in the DEMP, a Containment Cell Management Plan and an ACS Biopile Management plan, as relevant. These controls would help ensure potential impacts are avoided or mitigated.	D	4	L

Environmental Aspect	Potential Impacts Based On Unmitigated/ Inherent Risk	PL	PC	Potential Risk Before Mitigation	Actions/Proposed Mitigation Measures	RL	RC	Residual Risk Post Mitigation
Transport and Access Chapter 13	Traffic related to the ACS Modification works could impact the local road network.	C	5	L	The Traffic Management Plan in the DEMP would be amended to manage the traffic impacts during the ACS Modification works. Refer to **Section 13.5**.	E	5	L
Other Issues Chapter 14	The ACS Modification works would have an heritage impact on the locally significant Oil Refinery Site.	E	3	L	No mitigation specific to the ACS Modification works is necessary, however, the works would be managed in line with the DEMP	E	3	L
	Potential discharge of stormwater run-off, sediment laden water, contaminated water and oily water off-site and into the groundwater system affecting nearby natural areas and GDEs;	C	5	L	Measures to manage these risks would be outlined in the DEMP, a Containment Cell Management Plan and an ACS Biopile Management plan, as relevant.	E	5	L
	ACS Modification works increase spread of noxious weed infestations.	C	5	L	The ACS Modification works would be managed in-line with the Biodiversity and Weed Management Plan which forms a sub-plan of the DEMP which includes specific measures related to the control of noxious weeds.	E	5	L
	Hazard and Risk - Potential for an off-site risk.	E	5	L	If the assumptions outlined in **Chapter 14 Other Issues** are implemented as part of the ACS Modification works, the risk to off-site receptors would be minimal.	E	5	L

18.2.1 Summary of Risk Analysis

The Environmental Risk Assessment in **Table 18-4** illustrates how the assessments and mitigation measures contained within Chapters 8 – 15 have helped understand the proposed ACS Modification works and reduce the potential environmental risks. The implementation of the identified mitigation measures in Chapter 16 Revised Management and Mitigation Measures, and careful management would help avoid and mitigate potential impacts as far as practicable.

It can therefore be concluded that, provided the management and mitigation measures presented in **Chapter 16** are implemented, remaining residual impacts would be negligible.

18.3 Ecologically Sustainable Development

18.3.1 The Principles

This section provides a review of the ACS Modification works, their impacts and associated safeguards against the principles of ESD in accordance with *the Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). The principles, as listed in the Section 7 of the EP&A Regulation, are as follows:

1. "The precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
2. Inter-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations;
3. Conservation of biological diversity and ecological integrity - namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration; and
4. Improved valuation, pricing and incentive mechanisms - namely, that environmental factors should be included in the valuation of assets and services."

These principles are discussed below.

18.3.1.1 Precautionary Principle

The precautionary principle deals with certainty in environmental and technical decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

A modification application undergoes a public process that allows for better examination of the potential effects of proposed activities or development. Thus, the assessment process can be defined as precautionary in nature. The requirement to assess the impacts of the ACS Modification works is a form of regulation designed to identify and address uncertainty about the effects of these activities.

Caltex has commissioned specialists to conduct detailed assessments on a range of environmental aspects identified during the Environmental Risk Assessment process as outlined in Chapter 7 Environmental Scoping Assessment. These assessments provide sufficient scientific understanding of the ACS Modification works, their interactions with the surrounding environment and implications they may have to enable a decision to be made that is consistent with this principle. The precautionary principle has driven the development of a number of management and mitigation measures presented within this SEE.

Modification Objectives

The ACS Modification works would be undertaken in a manner that reduces the severity of potential impacts and to reduce likelihood of potential impacts occurring. The ACS Modification works would also comply with environmental criteria, community expectations and the development consent, as well as relevant statutory requirements. This is achieved through appropriate design, and the proposed management and mitigation measures.

Assessment Approach

The approach to the assessments was precautionary in nature. The cumulative noise assessment consider all plant operating at once, when in actual fact it is unlikely that this would occur. Equally, the traffic assessment has considered all the Special Hazardous Waste from the pipeways being removed in 180 truck and dogs, when in fact this is unlikely to occur.

ACS Modification Works Safeguards

A number of safeguards specific to the ACS Modification works would ensure mitigation of impacts would be undertaken in a manner that would satisfy ESD principles. These include:

- A suite of highly precautionary measures that were previously agreed for the handling and management of contaminated soils as part of the demolition works conditions of consent and as described within the DEMP. These measures would be implemented for the ACS Modification works as applicable.
- Design of the containment cell which includes a cell liner system and leachate barrier system that connects to a storage tank and ultimately the Site's Oily Water Sewer System. These design features are further supported by the proposed installation of groundwater monitoring wells around the cell location to monitor for releases in case these systems fail.
- Precautionary measures to protect against highly unlikely ecology and heritage impacts.

18.3.1.2 Inter-Generational Equity

Inter-generational equity requires that the present generation pass onto the next generation an environment that does not limit the ability of those future generations to attain a quality of life at least equal to that of the current generation.

Through the implementation of mitigation and management measures for avoiding and minimising short-term or long-term environmental impacts, and the proposed rehabilitation of any disturbed areas, inter-generational social equality impacts have been addressed. Examples of matters that are relevant to the ACS Modification works are described below.

ACS Modification Works Safeguards

The proposed ACS Modification works would maintain inter-generational equity by ensuring components of the existing bio-physical, social and economic environment available now would also be maintained for future generations. Aspects of the ACS Modification works that would assist in achieving inter-generational equity include the following:

- no ecological features would be significantly impacted as a result the ACS Modification works;
- potential contamination risks would be reduced by managing risks through a suite of measures and controls;
- reducing the hygiene risk at the Site thereby assisting in the continued use of the Site as a liquid fuel depot in a safe manner; and
- ongoing consultation and engagement with the local community to provide an opportunity to ask questions and identify and manage areas of concern.

18.3.1.3 Conservation of Biological Diversity and Ecological Integrity

This SEE includes an assessment of the ecological impacts of the ACS Modification works. The ACS Modification works would not cause significant ecological impacts provided that certain mitigation measures were followed. These measures are outlined in the DEMP for the Project and would be implemented to avoid or mitigate potential ecological impacts.

18.3.1.4 Improved Valuation and Pricing of Environmental Resources

This ESD principle is premised on an assumption that all resources should be appropriately valued and that the value of environmental resources should be considered alongside any economic or cost benefit analysis for the life of the project.

Modification Objectives

The ACS Modification works would allow for the continued safe operation of the finished product terminal at Kurnell, thereby allowing the Site to operate efficiently into the future. The ACS Modification works would reduce the existing environmental cost of the terminal by removal and controlling the ACSs in the pipeways from the open environment.

18.3.1.5 Conclusion

The value placed by Caltex on environmental resources is evident from the extent of site-specific investigations, planning and environmental safeguards and measures that have been undertaken and which would be implemented to prevent damage to the local environment.

18.3.2 Compatibility with the Principles of ESD

The approach taken in undertaking the ACS Modification works has been multi-disciplinary. Emphasis has been placed on the avoidance of impacts through careful design as well as management and mitigation measures to minimise potential negative environmental, social and economic impacts, during the ACS Modification works. The principles of ESD have been incorporated into the proposed ACS Modification works.

18.4 Objects of the Environmental Planning & Assessment Act 1979

Consideration has been given to the consistency of the ACS Modification works with the objects of the EP&A Act as outlined below.

a. To encourage:

i. The proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.

The ACS Modification works would allow for the safe and continued use of the Site in line with existing land use designations.

ii. the promotion and co-ordination of the orderly and economic use and development of land.

The *Sutherland Shire Local Environment Plan 2015* (SSLEP) provides for the land use and zoning for the Site and surrounding area. Pursuant to the SSLEP, the Site is designated as IN3 Heavy Industrial. The objectives of this zone are: to provide suitable areas for those industries that need to be separated from other land uses; to encourage employment opportunities; to minimise any adverse effect of heavy industry on other land uses; and to support and protect industrial land for industrial uses. The ACS Modification works would support the existing and permissible land use at the Site by helping to ensure that existing hygine risks present across the Site are removed and contained. This will help allow the Site to operate more freely supporting the orderly and economic use and development of land.

iii. the protection, provision and co-ordination of communication and utility services.

The ACS Modification works would not directly impact on the provision and co-ordination of communication and utility services.

iv. the provision of land for public purposes.

The ACS Modification works would not permanently impact on the provision of land for public purposes.

v. the provision and co-ordination of community services and facilities.

The ACS Modification works would not impact on the provision of existing or future community services and facilities.

vi. the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.

The mitigation measures outlined within this SEE, would allow for the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.

vii. ecologically sustainable development.

An assessment of the ACS Modification works against the principles of ESD has been provided in **Section 18.3** above.

viii. the provision and maintenance of affordable housing.

The ACS Modification works would not impact on the provision or maintenance of affordable housing.

b. To promote the sharing of the responsibility for environmental planning between the different levels of government in the State.

The ACS Modification works is to be assessed as modification to a State Significant Development under Part 4 of the EP&A Act by the Department of Planning and Environment (DPE).

c. To provide increased opportunity for public involvement and participation in environmental planning and assessment.

Caltex undertakes regular consultation with the community through quarterly meetings. Proposed developments at the Site are presented to and discussed with the local community.

The SEE will be placed on public exhibition by the NSW DPE. In accordance with the requirements of the EP&A Act, stakeholders and the public are invited to make submissions. This process provides further opportunity for public involvement and participation in the environmental planning and assessment process for the ACS Modification works.

18.5 Project Justification

The ACS Modification works are an important part of making the Site as safe and viable as possible. They are linked to the ongoing process of converting the Site from an operation that contains both oil refining and liquid fuel depot land uses to a safe and viable finished fuel import terminal. The ACS Modification works would remove an existing hygiene risk and operational constraint from the Site and therefore help ensure that the objectives of the Project are met.

This SEE provides a comprehensive assessment of the ACS Modification works and includes investigations regarding all relevant environmental issues.

Potential impacts have been assessed and strategies to avoid, minimise and mitigate those impacts form a key part of the SEE. The SEE includes a number of commitments to manage environmental impacts during the ACS Modification works.

The ACS Modification works has, to the extent feasible, been designed to address the key issues of concern. Caltex has also considered impacts on the surrounding environment and community of Kurnell. Caltex firmly believes it can undertake the ACS Modification works in a manner which would safeguard local environment and public amenity in the area.

This SEE has concluded that the ACS Modification works should proceed because they would:

- Result in no long term adverse impacts to the environment or local community;
- Ensure the primary objectives of the Project continue to be achieved; and
- Satisfy the principles of Ecologically Sustainable Development as described in the EP&A Regulation.

This SEE has highlighted a range of issues which would be addressed through the careful undertaking of the ACS Modification works.

On the basis of the findings detailed within this Statement of Environmental Effects, the ACS Modification works are considered to be justified.

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