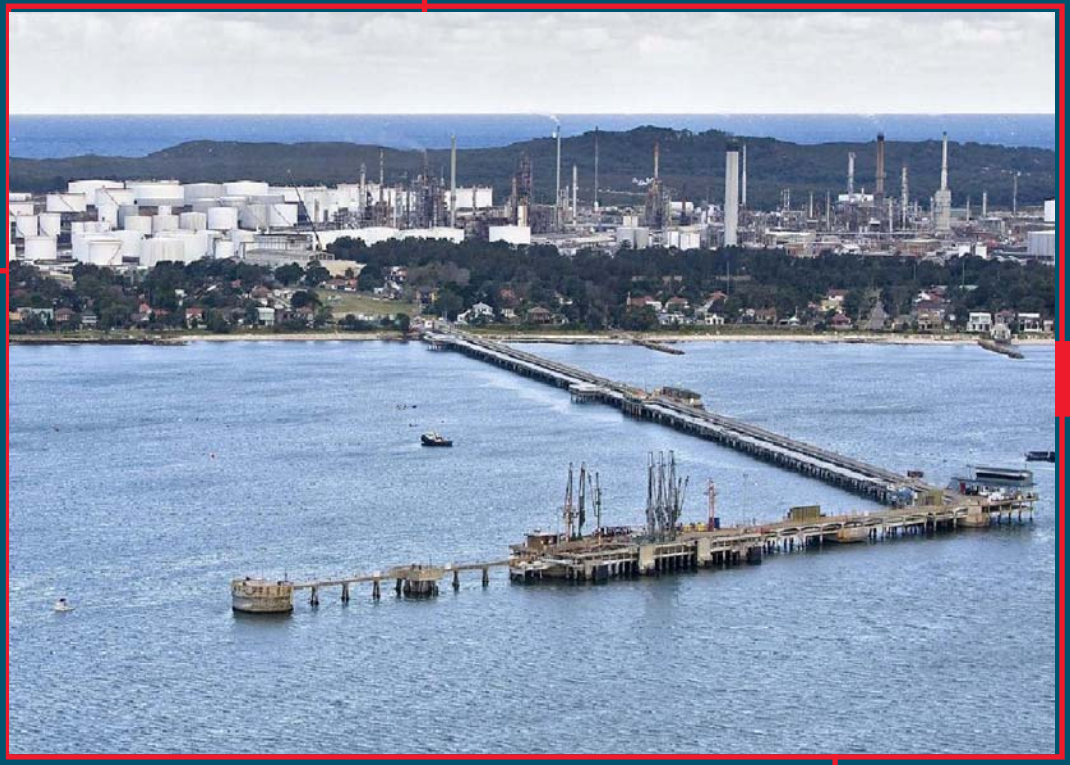
SUBMISSIONS REPORT



VOLUME 1

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June 2013

Kurnell Port and Berthing Facility

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Limitations

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Notes on Text

As determination of the proposed works will only be made after the Submissions Report has been considered, the future tense is used throughout this Report when describing the proposed works, describing the impacts and discussing mitigation measures. 'Would' is therefore used throughout the text in preference to 'will'. If all approvals are given for the proposed works to proceed, where applicable, all 'would' 'references should be interpreted as 'will, subject to form conditions of consent.

Abbreviations

Abbreviation	Description
ACT	Australian Capital Territory
ANZECC	Australia and New Zealand Environment Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASS	Acid Sulfate Soils
C'th	Commonwealth
CBD	Central Business District
CCP	Community Consultation Plan
CEMP	Construction Environmental Management Plan
cfm	cubic foot per meter
CM	Consultation Method
CMA	Catchment Management Authority
cms^{-1}	centimetres per second
cms^{-3}	cubic metres per second
CO	Carbon Monoxide
CSD	Cutter Suction Dredger
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DA	Development Application
dBA	Measurement of sound pressure level
DECC	NSW Department of Environment and Climate Change (now NSW EPA)
DEWHA	Department of Environment, Water, Heritage and the Arts
DGRs	Director General's Requirements
DO	Dissolved Oxygen
DP&I	NSW Department of Planning and Infrastructure
DSDMP	Dredge and Spoil Disposal Management Plan
DSMP	Dredge and Spoil Management Plan
DTIRIS	Director General, Department of Trade and Investment, Regional Infrastructure and Services
EA	Environmental Assessment
EC	European Commission
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EP&A Act	NSW Environmental Planning and Assessment Act
EP&A Regulation	NSW Environmental Planning and Assessment Regulation
EPA	Environmental Protection Agency
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act
EPI	Environmental Planning Instruments
EPL	Environmental Protection Licence
ERA	Environmental Risk Analysis
ESD	Ecological Sustainable Development
FM Act	NSW Fisheries Management Act
GD	Grab Dredger
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System

Abbreviation	Description
GPS	Global Positioning System
Ha	Hectares
ICNG	Interim Construction Noise Guidance
INP	NSW Industrial Noise Policy
ISQG	Interim Sediment Quality Guidelines
LEP	Local Environmental Plan
LGAs	Local Government Areas
LOR	Limit Of Reporting
m^3	metres cubed
MLWM	Mean low water mark
MMMP	Marine Mammal Monitoring Plan
MNES	Matter of National Environmental Significance
ms^{-1}	metres per second
MWMP	Marine Works Management Plan
NAGD	National Assessment Guidelines for Dredging
NATA	National Association of Testing Authorities
NCCOE	National Committee on Coastal and Ocean Engineering
NHL	National Heritage List
nm	Nautical Miles
NO_2	Nitrogen Dioxide
NOW	NSW Office of Water
NPSW	The National Parks and Wildlife Services Branch of NSW OEH
NPW Act	NSW National Parks and Wildlife Act
NPWS	NSW National Parks and Wildlife Services
NSGD	National Assessment Guidelines for Dredging
NSW	New South Wales
NSW DECC	NSW Department of Environment and Climate Change (now NSW OEH)
NSW DECCW	NSW Department of Environment, Climate Change and Water (now NSW OEH)
NSW DITRIS	NSW Department of Trade and Investment, Regional Infrastructures and Services
NSW DP&I	NSW Department of Planning and Infrastructure
NSW DPI	NSW Department of Primary Industries
NSW DTI	NSW Department of Trade and Investment
NSW EPA	NSW Environmental Protection Authority
NSW I&I	NSW Department of Industry and Investment (now NSW DPI)
NSW OEH	NSW Office of Environment and Heritage
NSW RMS	NSW Roads and Maritime Services
NTU	Nephelometric Turbidity Units
OH&S	Occupational Health and Safety
PAC	Planning Assessment Commission
PCB	Polychlorinated Biphenyls
PIRMP	Pollution Incident Response Management Plan
PM	Particulate Matter
PMST	Protected Matters Search Tool
POEO Act	Protection of the Environment Operations Act 1997
POP	Port Operating Procedure

Abbreviation	Description
PPE	personal protective equipment
PRIMP	Pollution Incident Response Management Plan
PSD	Particle Size Distribution
PTW	Permit to Work
Q2	Second Quarter
RBL	Rating background level
SAP	Sampling and Analysis Plan
SCP	Spill Control Plan
SD	Standard Deviation
SDP	Sea Dumping Permit
SEPP	State Environmental Planning Policy
SEWPAC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
SPC	Sydney Ports Corporation
SSD	State Significant Development
SWQMP	Sediment and Water Quality Monitoring Program
TBT	Tributyltin
TEC	Threatened Ecological Community
TOC	Total Organic Carbon
TSC Act	NSW Threatened Species Conservation Act
TSHD	Trailing Suction Hopper Dredger
UCL	Upper Confidence Limit
URS	URS Australia Pty Ltd
VOC	Volatile Organic Compounds

Glossary

Term	Description
Anoxia	A condition of oxygen depletion.
Anoxic	An environment which lacks oxygen.
Approaches	The area of the *dredge footprint* used by delivery ships for approaching and accessing the *Kurnell Wharf*.
Average Recurrence Interval	The average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration. It is implicit in this definition that the periods between exceedances are generally random.
Backhoe Dredging	A method of *mechanical dredging* that involves the use of a backhoe (excavator bucket) which is used to lift the sediments from the seabed.
Berthing Box	The aerial extent of the fixed berths comprising the width and length as measured at surface.
Bioaccumulation	Process in which chemicals are up-taken by an organism either by being directly exposed to a chemical, or by ingesting food that contains the chemical.
Bioavailability	Refers to the amount of a substance that becomes available to an organisms body when introduced. The rate of bioavailability depends on factors such as the type of substance (e.g. whether it is fat soluble or water soluble) and composition of diet.
Breasting Island	The structure located at the end of the *Kurnell Wharf* that contains the relevant loading/unloading infrastructure used by the berthing ships.
Cetacean	Order of marine mammals containing whales, dolphins and porpoises.
Chart Datum	A fixed height taken from measuring the tides in and around Australia.
Dredge Footprint	The defined area of proposed dredging works.
Elutriate Testing	A method of testing to agitate sediment samples (generally in a centrifuge) to determine the potential maximum concentration of a pollutant that would dissolve in water.
Fixed Berths	Location in a port or harbour used specifically for mooring ships while not at sea. Fixed berths are permanent locations into which ships are moored.
Hydrodynamics	The study of water movement, predominantly caused by tides and wind.
Kurnell Wharf	The 1 km structure located off the Kurnell Peninsula that is used by ships delivering petroleum products and crude oil (feedstock) to the Kurnell Refinery.
Longshore Transport (Longshore Drift)	Refers to the transportation of sediment along the coast at an angle to the shoreline. This depends on the wind direction, swash and backwash and occurs within close proximity to the surf zone.
Mean High Water	The highest average water level over a period of time.
Mean Low Water	The lowest average water level over a period of time.
Mechanical Dredging	A method of dredging that uses a physical arm or grab-action on the seabed.
Meteorological	The science that deals with the phenomena of the atmosphere.
Metocean	The science that deals with the interface and interrelationships of meteorological and oceanographic conditions in the marine environment.
Moonpool	Reference to area around the dredger in which sediments would be contained through the installation of a silt boom.
Oceanographic	The study of marine sciences (focussing on the study of waves, currents, tides and seabed geology).
Onshore Wave Directions	Occurs when the wind blows towards the beach, causing waves to lose their shape and crumble.
Organochlorin Pesticides	These have strong bonds between their chlorine and carbon components and are attracted to fats and are highly insoluble in water. They widely are used as an insecticide, and can leech into the environment via contaminated waste disposal or run off. These pesticides can enter an organism primarily through ingestion.
Overflow Dredging	Also referred to as *Overflow Water Dredging.* The process of removing surplus water removed with the dredged sediments.
Petroleum Product	Useful materials derived from refining crude oil.

Term	Description
Polyaromatic Hydrocarbons	Are atmospheric pollutants that occur in oil, coal and tar deposits and are by-products of fuel burning. Some compounds have been identified as carcinogenic, mutagenic and teratogenic. Naphthalene is the simplest example of a polycyclic aromatic hydrocarbon.
Polychlorinated Biphenyls	Consists of chlorine atoms attached to biphenyl (molecule composed of two benzene rings). Used as dielectric and coolant fluids.
RAMSAR	The Convention on Wetlands of International Importance, especially as Waterfowl Habitat. This is an international treaty for the conservation and sustainable utilisation of wetlands.
Relict Sand	Sand that was formed during previous historic sea levels. It may be covered with more recent sand deposits.
Semi-Volatile Organic Compounds	An organic compound which has a higher boiling point than water and may vaporise when exposed to temperatures above room temperatures. They include phenols and polynuclear aromatic hydrocarbons.
Spill Rate	The rate at which excess water is returned to the marine environment through overflow dredging operations.
Spring Tide	When the range of the ride is at its highest.
Stratification	Refers to the deposition or formation of sediment creating a layered effect.
Sub-Berths	A designated area in to which ships temporarily moor.
Swell	A series of surface gravity waves that are not generated by the local wind.
Swell Waves	A series of gravity waves with a long wavelength. They are generated by storms thousands of nautical miles away from the beach they will eventually break on. As such, the propagation of swells is only limited by the shoreline.
The Project Site	The area in which the proposed works would take place, including the dredge footprint and the breasting island.
Total Organic Carbon	Refers to the amount of carbon bound in an organic compound, often used as an indicator of water quality.
Total Petroleum Hydrocarbons	Any mixture of hydrocarbons found in crude oil.
Transformation Patterns	Refers to the changes that occur in wave behaviour as they approach obstacles such as a shoreline. For example, if a wave approaches a submerged structure such as a reef, it may overtop the reef. If waves meet a steep structure, reflection will occur.
Tributyltin	Formed in compounds containing a tin hydrocarbon. TBT was used as an antifouling agent on ships until its used was banned in Australian waters in 2008.
Turning Circle	The area of the *dredge footprint* where ships manoeuvre and turn in to the berths around the Kurnell Refinery.
Volatile Organic Compounds	Organic chemicals that have a high vapour pressure at room temperature conditions, and low boiling point, causing large numbers of molecules to evaporate from the liquid. VOCs can be naturally occurring or human made. Harmful VOCs can have long term health effects.
Wave Shoaling	Refers to the process in which surface waves enter shallower water, causing an increase in wave height. The wavelength is reduced while the frequency of waves remains constant.
Weighted Mean Wave Direction	Similar to the average wave direction, however some of the data contributes more than other data, to provide a more accurate average of wave direction analysed.

1 Introduction

1.1 Proposed Works and Planning Context

Caltex Refineries (NSW) Pty Ltd (ABN: 19 000 108 725) (Caltex) (the applicant) is seeking approval for the upgrade, continued operation and ongoing maintenance of its existing port and berthing facility located off Silver Beach in Botany Bay. The facility forms part of the infrastructure of the Kurnell Refinery. If approved, the works would extend the facility's operational life by 50 years.

The proposed works comprise two main elements: the requirement to dredge parts of the seabed associated with the facility, and the requirement to upgrade existing elements of the berthing infrastructure.

To assess the potential impacts of the proposed works, and ensure that any environmental impacts are either avoided or mitigated, an Environmental Impact Statement (EIS) was prepared under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EIS was placed on public exhibition between 28 February and 5 April 2013. This Submissions Report (the 'Report') responds to the submissions received as a consequence of the public exhibition.

1.2 Works Overview and Location

The Kurnell Refinery is located on the Kurnell Peninsula, Botany Bay, in the Sydney Metropolitan Area. The Refinery facilities include a jetty structure known as the Kurnell Wharf, which along with the associated shipping berths (two fixed berths and one sub berth), form the Kurnell port and berthing facility. The Wharf is located to the west of the Kurnell Peninsula Headland and extends approximately 1 km into Botany Bay off Silver Beach. It is the sole entry point for the Refinery's feedstock of crude oil and finished petroleum product imports. The Wharf is also used as a distribution point for some refined petroleum products, which are either shipped interstate or overseas. The port and berthing facility area is used exclusively by Caltex for accessing and berthing ships, and to allow loading and unloading to take place.

The proposed works would comprise the following principal components:

- dredging the seabed in the vicinity of the berths, turning circle and approaches;
- the reuse of a proportion of the dredged sediment to cover two exposed sections of the submarine fuel pipelines behind the sub berth and a former anchor point in the central portion of the turning circle;
- disposal of the remaining dredged sediment offshore;
- an increase in size of the fixed berths;
- the upgrade of the fixed berth #1 infrastructure; and
- the upgrade of the sub berth infrastructure.

Following completion of the upgrade, the port and berthing facility would receive fewer ships into its berths. The upgrade would also provide Caltex with greater operating flexibility by allowing the current shipping fleet to use all the berths. At present, the largest class of ship is restricted to using the sub berth, whilst the smaller class ships can only berth in the fixed berths.

This enhanced flexibility would optimise the supply chain by improving the overall berthing configuration and enabling the loading/unloading of ships to take place in more adverse weather conditions than is currently possible.

Further details regarding the proposed works can be found in **Chapter 4, Proposed Works Description** of the EIS.

1.3 Environmental Impact Assessment Process

The proposed works have been confirmed as 'State Significant Development (SSD)' under Section 18, Schedule 1 of the *State Environmental Planning Policy on State and Regional Development 2011* (SEPP SRD). Consequently, the works are subject to the planning provisions and assessment requirements set out under Part 4 of the EP&A Act. Under this process Caltex has submitted a development application to the NSW Department of Planning and Infrastructure (DP&I). Determination, as to whether the works would proceed will be made by the NSW Planning Assessment Commission (PAC) under powers delegated by the Minister for Planning and Infrastructure.

The EIS in support of the development application was prepared in accordance with the requirements of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) and project-specific Director General's Requirements (DGRs) issued by the NSW DP&I in its correspondence dated 9 August 2012.

The DGRs identified both general requirements and key issues to be addressed in the EIS. The key issues included:

- hydrological impacts relating to changes in hydrodynamic character and coastal processes resulting from the proposed works;
- issues relating to spoil and contamination, with specific reference to the characterisation, management and disposal of the dredged sediments;
- impacts on water quality, including sediment suspension, dispersion and settlement;
- impacts on flora and fauna, with note of the range of sensitive ecological resources and receptors located close to the proposed works;
- the issues of Aboriginal and historic heritage, with note of the potential for maritime heritage impacts;
- general construction issues, with reference to noise, vibration, hazards, risks, effects on Port Botany operations, and air quality; and
- general operational issues as relevant, including noise, air quality, hazards, risks and the operation of Port Botany.

These key issues were assessed and reported in the EIS. The EIS:

- identified the need for the proposed works;
- considered the alternatives available to address that need, and identified a preferred option (the proposed works);
- assessed the potential impacts resulting from undertaking the proposed works on the local environment;

- provided recommendations to mitigate any potentially adverse impacts where possible as well as management planning measures to ensure their successful implementation and monitoring controls to assess performance; and
- assessed the proposed works with respect to the principles of ecologically sustainable development (ESD).

The EIS was then submitted to NSW DP&I for consistency review to ensure that it satisfied the requirements of Part 4 of the EP&A Act, the EP&A Regulation and the DGRs. Once advised that the EIS was 'consistent' with the DGRs, it was placed on exhibition between 28 February and 5 April 2013.

Five submissions were received by the NSW DP&I following exhibition of the EIS. These were from:

- NSW Environment Protection Authority (EPA);
- NSW Department of Primary Industries (DPI);
- NSW Office of Environmental and Heritage (OEH);
- Sutherland Shire Council; and
- Randwick City Council.

Sydney Ports Corporation (SPC) and NSW Heritage Council (HC) also provided consultation letters after the end of the exhibition period. These letters have been considered in this report however not as a submission in accordance with the EP&A Act and EP&A Regulation.

The submissions were issued by DP&I to Caltex on 17 April 2013. The letters from SPC and NSW HC were issued on 24 April 2013 and 14 June 2013 respectively. Copies of the original submissions and letters are included in **Appendix A, Submissions**.

NSW EPA, NSW DPI (Fisheries) and NSW OEH provided supplementary submissions on a draft version of the Submissions Report provided to them for comment in May 2013. These submissions are also included in **Appendix A, Submissions**.

This Report responds to the issues raised in those submissions in terms of the provisions set out under Clause 89G(E) of the EP&A Act and Clause 85A of the EP&A Regulation. These require Caltex, as the applicant, to provide responses to submissions made on development applications in respect of SSD.

Once complete, this Report will be issued to NSW DP&I. NSW DP&I will make the Report available on its Major Projects website (application reference: 5353) as well as issuing a copy to each agency and council that provided a submission.

Once the DP&I is satisfied that the issues raised within the submissions have been addressed, the Director General of Planning and Infrastructure will prepare an Assessment Report. The report will contain the background to the proposed works, will provide a summary of any potential impacts and will recommend draft Conditions of Consent.

The EIS, Submissions Report and Assessment Report would then be submitted to the PAC for determination under powers delegated from the Minister.

1.4 Report Outline

The Submissions Report consists of the following seven chapters.

Introduction	**Chapter 1** provides an overview of the proposed works and the planning context under which the EIS and Submissions Report have been prepared.
Exhibition Consultation	**Chapter 2** describes the consultation process that has taken place since the EIS was exhibited. This includes an outline of the consultation that is proposed during completion of the proposed works.
Submissions and Responses	**Chapter 3** sets out the detail of each submission. A response has been prepared against each comment raised in each of the submissions.
Revised Management and Mitigation Measures	**Chapter 4** includes any revised management and mitigation measures that Caltex will commit to on undertaking the proposed works.
References	**Chapter 5** lists the documents that have been referenced in preparing this Report.

The Submissions Report is supported by four Appendices.

Submissions	**Appendix A** contains copies of the received submissions. It also contains the minutes of a meeting with the NSW Recreational Fishing Alliance.
Hydrodynamic Modelling Clarifications	**Appendix B** provides a short memo that clarifies the approach to hydrodynamic modelling.
Noise Contour Plots	**Appendix C** contains the noise contour plots that were not included in Technical Appendix G of the EIS.
Management Plans	**Appendix D** contains a draft version of the Dredging and Spoil Disposal Management Plan (DSDMP) and the Construction Management Plan (CEMP).
Consolidated SAP Implementation Report	**Appendix E** contains a single Consolidated Sampling and Analysis Plan (SAP) Implementation Report. This replaces Technical Appendix D1 and D2 included in the EIS. This Appendix is only provided electronically**.**
Supplementary Hydrodynamic Modelling Clarifications	**Appendix F** contains additional information describing the potential hydrodynamic impacts resulting from the proposed change to dredging with an open bucket (see **Chapter 3, Submissions and Responses**).

2 Exhibition Consultation

2.1 Stakeholder Consultation

As described in Section 6.2 of the EIS, a stakeholder consultation process was initiated by Caltex prior the proposed works being formally announced to the public.

Consultation started in September 2011 and involved discussions with NSW Department of Primary Industries (DPI), Sydney Ports Corporation (SPC) and NSW Environment Protection Authority (EPA). This was followed by a series of meetings and consultations with a range of stakeholders and interest groups. The specific objectives of consultation process were:

- identify relevant and key stakeholders;
- discuss assessment methods, survey data, assessment results and mitigation measures;
- identify key issues, latent issues and sensitivities surrounding the proposed works;
- improve awareness of the proposed works and understand concerns;
- communicate accurate and timely information concerning the proposals and approvals process;
- help the community, special interest groups and other stakeholders better understand the proposed works;
- provide opportunity for two-way communication between the applicant (and its representatives) and key stakeholders; and
- involve Government agencies in the planning of the proposed works.

Consultation continued during the preparation of the EIS and involved engagement with:

- landowners, custodians of the land and potentially affected landowners;
- Government agencies and authorities;
- special interest and community groups; and
- the public.

The approach to consultation is detailed in Chapter 6 of the EIS.

2.1.1 Additional Consultation

Since the EIS went on exhibition further consultation has taken place with a number of stakeholders and Government agencies as summarised in **Table 2-1** below.

Table 2-1 Ongoing Consultation

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)	
8 February 2013	On 8 February 2013 Caltex, and its consultants URS and WorleyParsons, attended a meeting with the Commonwealth Department of Sustainability, Environment, Water Population and Communities (SEWPaC) to discuss a number of issues relating to Caltex's application for a Sea Dumping Permit (SDP). This application is required to support the offshore disposal of the bulk of material dredged under the proposed works. This application would be supported by its own Environmental Impact Assessment (EIA) that would assess the potential impacts of loading, transporting and disposing of the dredged sediment in the north-west corner of the Sydney Offshore Spoil Ground located approximately 12 km east of Bondi Beach. The EIA is a requirement of the *National Assessment Guidelines for Dredging 2009* (NAGD) and involves a detailed characterisation of the Spoil Ground. The characterisation would involve collecting physical, chemical and biological data as well as modelling the dispersion and deposition of the disposed sediments that would be transferred offshore from Botany Bay. The application will be submitted in May 2013. SEWPaC has indicated that it will review the application and provide its decision by the end of June 2013.
NSW Recreational Fishing Alliance (NSWRFA) and the Australian National Sportsfishing Association (ANSA)	
2 April 2013	A meeting with the NSW Recreational Fishing Alliance and the Australian National Sportsfishing Association was held on 2 April 2013. The meeting was used as an opportunity to discuss concerns surrounding the proposed works relating back to the Alliance's November 2012 letter and follow-on lobbying of both State and Commonwealth Agencies.
NSW Environment Protection Authority (EPA)	
18 March 2013	A meeting was held with NSW EPA in March 2013 to discuss its preliminary comments on the exhibited EIS. Subsequently, Caltex provided NSW EPA with preliminary feedback on those comments. That feedback was consistent with information provided in this Submissions Report.
12 April 2013	A second meeting with NSW EPA took place in April 2013 to discuss issues relating to potential water quality impacts arising from the proposed works, and the potential impacts of TBT dispersion in Botany Bay. Caltex provided NSW EPA with its preliminary feedback following that meeting. A draft version of the Dredging and Spoil Disposal Management Plan (DSDMP) for the project was attached to the response.
18 June 2013	A third meeting with NSW EPA took place in June 2013 to discuss comments relating to the draft Submissions Report. This meeting focussed on the proposal by Caltex to dredge using an open bucket. Prior to the meeting Caltex provided NSW EPA with the information included in **Appendix F, Supplementary Hydrodynamic Modelling Clarifications**.
NSW Department of Primary Industries (DPI)	
30 April 2013	Following receipt of comments on the exhibited EIS from NSW DPI, Caltex met with the relevant NSW DPI representative to discuss the points raised in its submission.
Sutherland Shire Council	
22 April 2013	Following receipt of the comments on the exhibited EIS from Sutherland Shire Council, Caltex met with the relevant Council representative to discuss the points raised in its submission. Following the meeting Caltex provided Sutherland Shire Council with its preliminary response to the points raised in Council's submission. A draft version of the Dredging and Spoil Disposal Management Plan (DSDMP) was attached to the response.
Randwick City Council	
2 May 2013	Following receipt of the comments on the exhibited EIS from Randwick City Council, Caltex met with the relevant Council representatives to discuss the points raised in its submission.

2.2 Exhibition

The State Significant Development (SSD) process under Part 4 of the EP&A Act requires that the EIS be exhibited for at least 30 days unless the exhibition period falls over a school holiday, in which case this period can be extended up to 45 days.

As noted in **Chapter 1, Introduction**, the EIS for the proposed works was placed on exhibition for a period of 36 days from Thursday 28 February 2013 to Friday 5 April 2013. This reflected the fact that the Easter public holiday fell within the exhibition period but not any school holidays. During exhibition, members of the public, along with statutory agencies and other stakeholders were invited to make submissions on the proposed works.

The EIS was also made available on Caltex's website and the NSW DP&I's Major Projects website.

2.3 EIS Information Days

During the exhibition period, Caltex held two information sessions to allow members of the public and other stakeholders to speak directly with the project team. These sessions were communicated to attendees at the February meetings of the Kurnell Progress and Precinct Resident's Association meeting and the Port Botany Neighbourhood Liaison Group meeting. The information sessions were also advertised through mailbox drops to the Kurnell community, letters to Sutherland Shire Council and local State and Federal Members of Parliament, and letters to the non-government organisations who had made submissions during initial consultation.

These sessions were held at the following times and locations:

- Monday 11 March 2013 1600-1900: Kurnell Refinery; and
- Wednesday 13 March 2013, 1600-1900: Banksmeadow Terminal.

2.3.1 Exhibition Day Attendance

In total, four people attended the 'drop-in' sessions over the two days as summarised below:

- 3 people at the Kurnell Refinery session; and
- 1 person at the Banksmeadow Terminal session.

2.3.2 Issues Raised During Information Sessions

No specific issues were raised by any of the attendees. Those who attended were interested in general information about the proposed works along with the wider long-term proposal to convert the Kurnell Refinery to a Terminal. As the purpose of each session was to provide information no specific feedback forms were provided.

2.3.3 Submissions

Submissions received during and following the exhibition period were directed to NSW DP&I. A total of five submissions were received. These included three from NSW Government agencies and two from local councils. No submissions were received from community groups or members of the general public in relation to the proposed works. **Appendix A, Submissions** contains full copies of the received submissions.

2.4 Future Consultation (2013-2015)

Consultation activities are proposed to continue over the two-year period during which the proposed upgrade works would take place. This would include consultation during the proposed 23-week dredging and sediment disposal program. This process of ongoing consultation is consistent with Caltex's standard

approach to undertaking works, and would involve regular meetings, written correspondence, public forums and a clear and transparent process for stakeholders to raise concerns. It would be based on the following schedule.

- Attendance by the Community Relations Manager and/or Environment Superintendent at the monthly Kurnell Progress and Precinct Resident's Association meetings.
- Quarterly community briefings on site at the Refinery led by the Refinery Manager and Engineering Projects Manager.
- A Caltex Report in the bi-monthly, community publication *Kurnell Village News*.
- Ad-hoc letter box drops to the community, or sections of the community, to inform residents and users of the Bay and Spoil Ground of significant project events and detail any work or activities that may impact the community.
- Use of the Refinery's 24-hour community concerns hotline, which forms part of an established community feedback process. Comments and concerns are recorded and, dependent on the nature of the issues raised, these are then communicated to the Refinery Manager, the Community Relations Manager and the Head of the Caltex Environmental Group as appropriate. All calls received to the hotline fall under an established governance process whereby they would be logged, tracked and receive a response. The process requires that all calls received through the hotline are to be responded to within two hours unless an alternative call back time is specified by the caller.

The purpose of this consultation would be to provide forewarning of Caltex's intended program of works any key activities that may give rise to specific community and user group concerns. It also provides a mechanism for ensuring that regular communication is maintained with stakeholders throughout the proposed works, whilst any community feedback is addressed in a timely manner.

3 Submissions and Responses

3.1 Overview

The following Chapter provides responses to the five submissions and one consultation letter received by NSW DP&I for the upgrade of the Kurnell port and berthing facility in April 2013.

The five submissions were provided by:

- NSW Environment Protection Authority (EPA);
- NSW Department of Primary Industries (DPI);
- NSW Office of Environmental and Heritage (OEH);
- Randwick City Council; and
- Sutherland Shire Council.

Consultation letters were provided by Sydney Port Corporation (SPC) and NSW Heritage Council (HC).

This Chapter has been set out to provide responses to the issues raised in each of the submissions in turn. These responses are provided in **Section 3.2.2** to **Section 3.2.5** below. The points raised in the consultation letters are discussed separately at the end of the chapter in **Section 3.3**.

Each comment (which is provided in full) has been given an alphanumeric reference relating to the stakeholder who raised the submission. These references range from A1 through to G2. Comments marked:

- A: come from NSW EPA;
- B: from NSW DPI;
- C: from NSW OEH;
- D: from Randwick City Council;
- E: from Sutherland Shire Council;
- F: from SPC; and
- G: from NSW HC..

Where Caltex is proposing to supplement, revise or introduce additional mitigation measures, these are presented as part of the relevant responses, and they are summarised in **Chapter 4, Revised Mitigation and Management Measures**. A separate alphanumeric reference starting with M1 is given to each revised or new mitigation and management measure. Where revisions to the mitigation and management measure have been proposed, the original alphanumeric reference taken from Chapter 19 of the EIS is provided.

The following table shows how the submissions' comments relate to the chapters in the EIS.

Table 3-1 Consistency Table

EIS Chapter	Specific Comment	Submission Comment Reference
4: Project Description	Simple Clarification	A2, A3, A4, A5
5: Consultation	Approach to Future Consultation	A25, B7, B9, D5
8: Hydrodynamics & Coastal Processes	Changes to the Hydrodynamic Processes in Botany Bay	C2, E4, F1
9: Spoil & Contamination	Clarification of Reported Data	A7
	Inaccuracies in Reported Data	A8
	Formatting Error	A9
	Limitations on the Use of Overflow Dredging	A10, A12
	Offshore Disposal	B10, C1, E6
10: Water & Sediment Quality	Disturbance of TBT-Contaminated Sediments	A11, B3, D3, E3
	Additional Mitigation	A13
	Sediment Dispersion & Deposition	A14, B1, B2, E5
	Modelling Results	A15
	Dissolved TBT	A16
	Physicochemical Monitoring	A17
11: Ecology	Impacts on the Seagrass Communities	D1, D2
	Impacts on Marine Protected Species	D4, E2
	Marine Pest Species	B11
12: Heritage	Issuing of Photographic Archival Record	G1
	Side Scan Surveys	G2
13: Noise	Duration of Noise-Generating Works	A6
	Modelling Scenarios, Equipment and Sound Power Levels	A18, A19
	Noise Sensitive Receptors	A20
	Noise Monitoring & Management	A21, A22, A23
17: Amenity & Recreation	Generation of New Habitat	B4
	Recreational Fishing	B8
19: Mitigation & Management Measures	Licence Requirements	A1
	Spill Containment	A4
	Management Plans	A1, A24, A25, A26, A27, B5, B6, C3, E7, E8, E9

3.2 Submissions & Responses

3.2.1 NSW EPA

Introduction

A submission was received from the NSW EPA on 10 April 2013 (ref: LIC06/45-31:DOC 1 3/71 2S:CP). The NSW EPA submission noted that the Authority had '*no objection to the proposed works proceeding as described in the EIS subject to the comments outlined in its' [submission] and attachment being considered and adequately addressed*'. The submission provided specific comments on:

- licencing requirements;
- the project description;
- the assessment of impacts relating to spoil and contamination and water and sediment quality;
- the assessment of noise impacts; and
- the content of the environmental management plans.

Comment A1: Management and Monitoring (Environment Protection Licence)

Caltex has indicated that it will apply for a non-scheduled activity licence under the Protection of the Environment and Operations Act 1997 (POEO Act) for the purposes of regulating water pollution for the dredging activities.

Should project approval be granted, Caltex will need to make a separate application to EPA to obtain this Licence prior to the dredging operations commencing.

The conditions of the licence will be developed upon submission of the licence application form by Caltex. The Licence will need to take into consideration the information that will be provided as part of the Construction Environmental Management Plans (CEMPs) for both the Sheet Pile Wall and Rock Revetment component, and the Kurnell Wharf Infrastructure Upgrade component. The Licence would also consider the Dredging and Spoil Disposal Management Plan (DSDMP) and associated sub management plans. The conditions of the licence will be developed in consultation with Caltex and will likely involve the requirement to undertake water quality and noise monitoring at various locations in Botany Bay and the Kurnell area.

Response: Caltex is in the process of preparing an application to obtain a non-scheduled activity licence from NSW EPA. Once issued, the licence will need to reflect information provided in the CEMPs and DSDMP. In support of its application, Caltex has a prepared preliminary draft of each Plan. These are appended to this Submissions Report (see **Appendix D, Management Plans**).

The preliminary draft DSDMP includes a Sediment and Water Quality Management Plan (SQWMP). This sub plan sets out Caltex's commitment to continuous water quality monitoring. The CEMPs includes details of Caltex's proposed noise monitoring program that would be implemented during the proposed works.

These Plans will be revised following receipt of any comments provided by NSW DP&I on the Submissions Report. The plans will also be updated to include information on spill control and port operating procedures provided by the works contractors, and any requirements flowing from the conditions of consent, should the project be approved.

Comment A2: Project Description (Works Schedule)

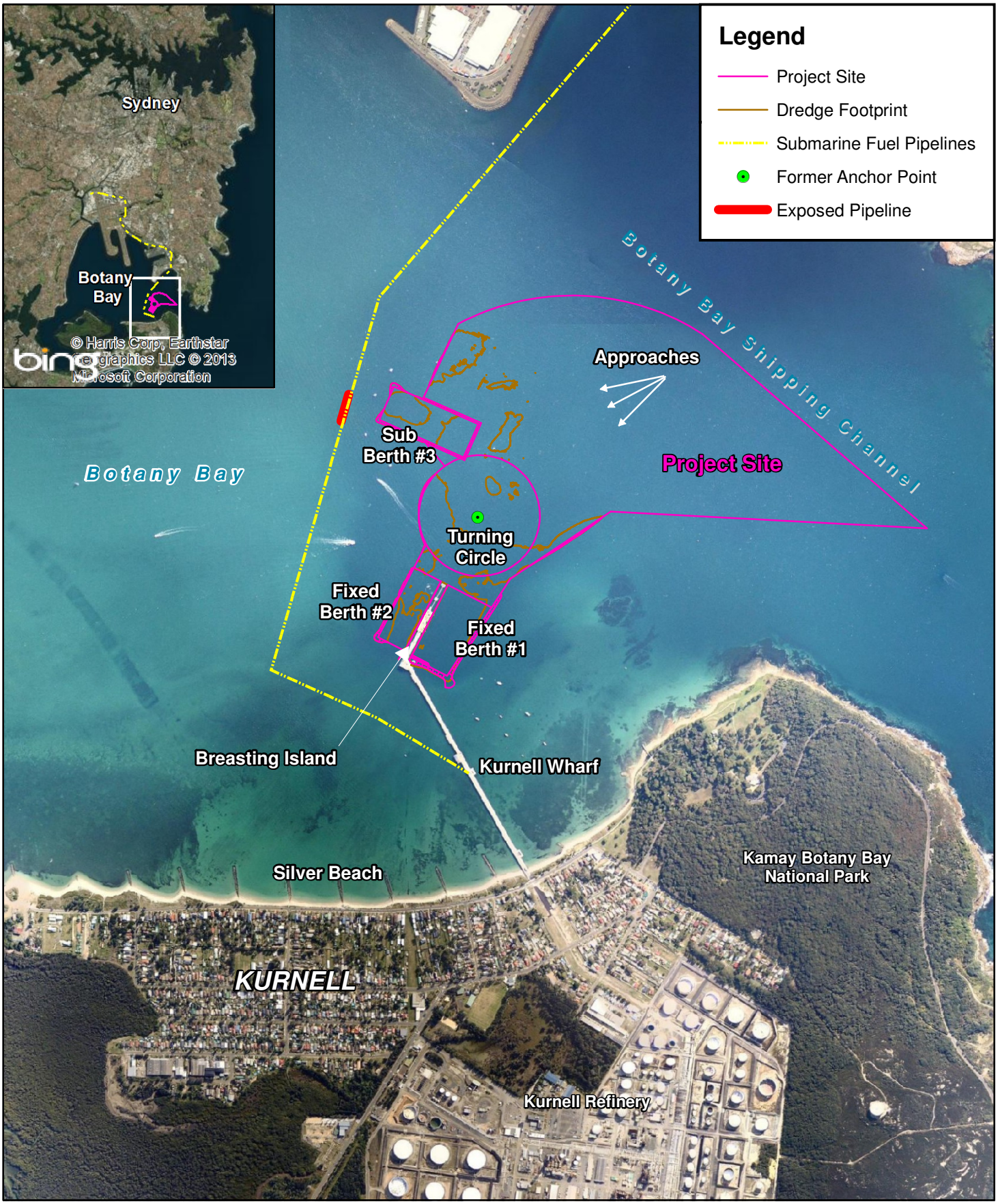
Section 4.4.4 of the Environmental Impact Statement states that for the Dredging Program there will be two rotational crews each working 12-hour shifts. Section 4.9.7 however states that crews would be working in three 8-hour shifts. Caltex should clarify this comment as more shifts may result in more frequent traffic movements to and from the site which may result in additional noise impacts.

Response: The dredging schedule would require the use of two crews working 12-hour shifts. The information in Section 4.9.7 is therefore incorrect and should be disregarded.

Comment A3: Project Description (Former Anchoring Hole)

Figure 4-6 shows the location of the Former Anchor Hole which would be filled with clean material during the dredging operations. Figure 1-1 shows a Former Anchor Point which is in a different location to Figure 4-6. It is unclear from the EIS whether these two points are the same or whether they are two separate reference points. Caltex should clarify this comment as Figure 1-1 has been included in a Caltex Community Information leaflet in February 2013.

Response: The location of the 'former anchor point' as shown on Figure 4-6 is correct. The anchor point on Figure 1-1 is mislabelled and actually represents the location of one of the current sub-berth anchor points. A corrected figure (see **Figure 3-1**) is provided below.



N
W E
S

0 100 200 400 600 800 Meters

Datum: GDA94
Grid: MGA Zone 56

Source: Aerial Imagery from Bing Maps © 2010 Microsoft Corporation and its data suppliers and Nearmap Hypertiles 2012.

CALTEX
Caltex Australia

KURNELL PORT AND BERTHING PROJECT

PROJECT SITE AND CONTEXT (REVISED FIGURE 1-1 FROM THE EIS)

URS

BOTANY BAY, NSW

Figure: 3-1

File No: 43177771.095.mxd Drawn: STB Approved: CF Date: 07/05/2013

Rev. A A4

Comment A4: Project Description (Spill Containment)

Section 4.7 outlines the specific environmental control measures that would be required to undertake the proposed works. Pages 4 to 35 describe a number of controls in relation to spill management and state that during an accident or emergency situation, operations would cease immediately with the requirement for the works' contractors to undertake any required repairs, modify their working methods and report the incident. NSW EPA recommends that these requirements also require contractors to implement clean up and/or containment measures in the event of a spill to minimise any potential environmental impacts.

Response: Caltex proposes the following amendment to Section 4.7 of the EIS as carried forward in to the mitigation and management measures in Chapter 19 of the EIS. Changes from the original text are italicised.

Mitigation Revision [M1]: As a revision of D7 in Chapter 19 of the EIS, *all contractors working on the port and berthing facility upgrade would be required to implement necessary clean up and/or containment measures in the event of a spill. A works-specific Spill Control Plan (SCP) (forming part of the DSDMP) would be prepared to control and manage spill ris*k.

The SCP would include the following provisions to handle an accident or emergency situation:

- a requirement for staff to understand the limitations, controls and methods to manage and prevent spills;
- a protocol for reporting spills and the consequential actions to cease works immediately;
- a need for regular inspections by the works' contractor to ensure the adoption of the relevant spill-management controls;
- a need to plan for regular equipment maintenance; and
- a requirement for spill containment provisions to be available to support the proposed works.

Comment A5: Project Description (Project Schedule)

Section 4.9.1 [of the EIS] details the overall work schedule and states that the proposed works would commence in the second quarter of 2013. This does not appear to be consistent with Table 4-4. Whilst EPA understands that Table 4-4 includes only the construction aspect of the works, Caltex should clarify what works will commence in the second quarter.

Response: The proposed works are anticipated to start in the third quarter (Q3) of 2013 (September) dependent upon development consent being granted, and the approval of the Sea Dumping Permit (SDP) application. No works are proposed to start before this date.

Comment A6: Project Description (Duration of Noise Generating Activities)

Table 4-4 [of the EIS] indicates that the rock revetment works and sheet piling works will take seven weeks to complete. Page ES-7 of the Executive Summary state[s] that these works will take 19 weeks [to undertake]. Given that these works will potentially be noisy, Caltex should clarify the actual duration of the works and ensure any associated noise impacts have been assessed.

Response: It would take approximately 8 weeks to install the sheet piling and 6 weeks to construct the rock revetment, i.e. 14 weeks in total. Accordingly, the text in Section 13.6.1 of **Chapter 13**, **Noise** of the

EIS should be revised to state the following (changes have been indicated by strikethroughs).

For the majority of the noise sensitive receptors there would be no impact during standard working hours. The exception would be when the proposed piling and rock revetment works would be taking place. [As indicated in the modelling results] these activities may result in an exceedance of the Noise Affected Management Level as follows:

- up to 4 dB(A) at 2-174 Prince Charles Parade under Scenario 1 when sheet piling works were taking place, lasting approximately 3 weeks (which includes for stoppages to facilitate shipping and 9 days stand-down allowance for bad weather);
- up to 3 dB(A) at 2-174 Prince Charles Parade under Scenarios 2 & 3 when the rock revetment works were taking place, lasting approximately ~~4 weeks~~ 6 weeks; and
- up to 1-2 dB(A) at 2-174 Prince Charles Parade under Scenarios 5-8 when the tubular piling works were taking place, lasting approximately ~~9 weeks~~ 5 weeks (allowing 1 week during that period for bad weather).

Comment A7: Spoil and Contamination (Technical Appendix D1 and D2)

The values provided for Tributyltin (TBT) normalised for the Fixed Berths in Table 9.3 are lower than the values provided in Table 3.2 of Appendix D1 and Table 1 in Appendix D2. The latter two tables also contain different values. The values in all three tables will need to be reviewed and updated to reflect the correct values. These values are important as Table 1 of Appendix D2 shows an exceedance of the ISGQ-high threshold whereas the other two tables do not. Caltex will also need to provide an explanation as to why these values were different and whether the corrected values affect the conclusions of the assessment.

The values provided for the elutriate TBT results for the Fixed Berths in Table 9.4 are lower than the values provided in Table 3.3 of Appendix D1. Caltex should provide a similar review of these values as required for Table 9.3 above.

Response: As stated under Section 9.4.5 of the EIS, 'the data in Technical Appendix D2 are more recent and should complement the information that is contained in Technical Appendix D1. Where inconsistencies occur, Technical Appendix D2 should take precedence over the data in Technical Appendix D1'.

The data included in both technical appendices were collected primarily to support the SDP application. Between 2009 and 2012 four separate geochemical and physical 'sampling programs' were undertaken within Botany Bay.

The 'dredge footprint' was divided into three areas for the purpose of sampling: Area 1 (the turning circle and approaches), Area 2 (the sub-berth) and Area 3 (the fixed berths). This is in accordance with the National Assessment Guidelines for Dredging 2009 (NAGD). To avoid confusion for the reader, these 'Areas' were not directly referenced in the EIS. They were however discussed in Technical Appendix D1 and D2.

- Technical Appendix D1 contains information on the geochemical and physical sampling that took place in all three Areas between 2009 and 2011.
- Technical Appendix D2 contains information on the geochemical and physical sampling that took place in Area 3 (fixed berths) in 2012. However, the Appendix does provide summary data for Area 3

(fixed berths) covering the whole sampling period (2009-2012).

Consequently, the data on Area 3 (fixed berths) contained in Technical Appendix D2 supersedes the data on Area 3 (fixed berths) in Technical Appendix D1.

Therefore Table 9-3 and Table 9-4 of Volume 1 of the EIS show the following:

- sediment-bound TBT data and elutriate TBT data for Area 1 (turning circle and approaches) and Area 2 (sub-berth) taken from Table 3-2 and Table 3-3 of Technical Appendix D1; and
- sediment-bound TBT data and elutriate TBT data for Area 3 (fixed berths) taken from Table 10 of Technical Appendix D2.

The assessment of impacts relating to spoil and contamination is therefore accurate and reflects the data collected across all four sampling programs. Consequently, the conclusions remain valid even accounting for the minor discrepancies discussed below in response to **Comment A8**.

Comment A8: Spoil and Contamination (Analyte Concentrations)

In addition to the TBT values, the values provided in Table 1 in Appendix D2 for Total Organic Carbon, Arsenic and Vanadium are different to the values provided in Table 3.2 in Appendix D1. Caltex should review the values in the Table and provide the correct values. Caltex should also advise whether the corrected values affect the conclusions of the assessment.

Response: WorleyParsons (as the author) has checked the data tables and identified the reason for the slight discrepancy in some of the reported mean and standard deviation (SD) results for Arsenic, Vanadium, Total Organic Carbon (TOC) and Tributyltin (TBT) that were reported within the two Technical Appendices D1 (Table 3.2) and D2 (Table 1).

- The differences in the SD concentration for Arsenic (4.9 $mgkg^{-1}$ versus 5.0 $mgkg^{-1}$) and mean and SD concentration for vanadium (mean: 5.9 $mgkg^{-1}$ versus 6 $mgkg^{-1}$ and SD: 5.8 $mgkg^{-1}$ versus 6 $mgkg^{-1}$) relate to rounding and reporting the data to an inconsistent number of decimal places between the two tables.
- The difference in the reported r mean and SD results for TOC and TBT relates to the reassigning of two samples from sample location VC5A (i.e. samples VC5A (0.5-1) and VC5A (1.5-2)) from Area 3 (fixed berths) to Area 1 (turning circle and approaches) (see Figure 9-1 of the EIS). Sampling location VC5A is just north of the turning dolphin. As the project and dredging areas developed, it was decided that the sampling location VC5A was more characteristic of Area 1 (turning circle and approaches) than Area 3 (fixed berths). This was based on the fact that ships manoeuvre north of the turning dolphin and berth south of the mooring dolphin (see Figure 4-10 of the EIS for their respective locations). It was considered that the greater deposition of paint flakes, which contribute to the presence of TBT in the dredge footprint, was more likely in the moored areas where ships spent more time, but unlikely at location VC5A.
- The two samples from location VC5A were only analysed for TBT and TOC. No other analytes were affected by reassigning sample location VC5A to Area 3 (fixed berths). This resulted in a change in the reported mean TOC (6.2% versus 6.5%) and reported SD of the TOC (11.6% versus12.1%), along with the reported mean TBT concentration (23 $\mu gSn.kg^{-1}$ versus 25 $\mu gSn.kg^{-1}$) and SD TBT

concentration (69 µgSn.kg^{-1} versus 73 µgSn.kg-^{1}).

- While the removal of the two samples from the statistical calculations for TOC and TBT results in a slight increase in the mean values from 6.2% to 6.5% (for TOC) and from 23 µgSn.kg^{-1} to 25 µgSn.kg^{-1} (for TBT) as both reported mean values (as well as the 95% Upper Confidence Limit (UCL) of the mean of TBT) exceed the National Assessment Guidelines for Dredging 2009 (NAGD) Screening Level there is no impact on the overall results.

WorleyParsons has consolidated the information from Technical Appendix D1 and Technical Appendix D2 into a single document to make it easier for the reader. This consolidated report is included in **Appendix E, Consolidated SAP Implementation Report** (only provided electronically) of this Submissions Report for reference. Please Note: the act of consolidating the data across the four sampling programs has resulted in different summary results being provided than reported in either of the two other Technical Appendices. Whilst the values have changed, their statistical significance in the context of the assessment and the validity of the conclusions remains unchanged. In all instances the data included in **Appendix E, Consolidated SAP Implementation Report** supersedes any other reported data in the previous Technical Appendices.

Comment A9: Spoil and Contamination (Formatting Issue)

The last column of Table 9 in Technical Appendix D2 is cut off. Caltex should provide a complete copy of this Table.

Response: Table 7 of **Appendix E, Consolidated SAP Implementation Report** provides a consolidated version of Table 3-2 in Technical Appendix D1 and Table 9 in Technical Appendix D2. To avoid further confusion, Caltex do not propose including a copy of Table 9 of Technical Appendix D2 in this Report. Reference should be made to Table 7 of **Appendix E, Consolidated SAP Implementation Report**.

Comment A10: Spoil and Contamination (Use of Overflow Dredging)

Section 9.5.5 (Page 9-12) of the EIS states that in the southern parts of the fixed berths, the central part of the sub berth, the northern end of the turning circle and the southern part of the approach channel sediment have been shown to contain highly elevated concentrations of TBT. Section 4.4.6 then states that overflow dredging would not be permitted within the fixed berths and in front of the sub berth due to the presence of contaminated sediments. It is unclear why overflow dredging would not be restricted in the other contaminated areas identified in Section 9.5.5. Caltex should provide further explanation around this comment.

Response: The concept design was based on there being no overflow dredging:

- in the fixed berths given:
  - the high percentage of friable fines that occur in the sediments of the fixed berths[1];
  - their proximity to the seagrass beds and aquaculture area;

[1] A high friable fines content correspondingly generates a high concentration of suspended sediment.

- in the northern section of the turning circle:
    - given the sediments in this location contain the most elevated concentrations of TBT recorded within the entire dredge footprint.

Whilst the EIS recognises that other areas of the project site (dredge footprint) contain elevated concentrations of sediment-bound TBT, the modelling and its interpretation in the EIS predict the spatial and temporal impacts arising from overflow dredging in these locations to be limited, given their position within the centre of Botany Bay.

Notwithstanding this, turbidity monitoring, backed by the proposal to limit spill rates and the use of overflow dredging, are included as mitigation measures. In this regard, Caltex has proposed to revise its mitigation measures to include more contingency in undertaking the proposed works. These revised mitigation measures are outlined below (revisions are italicised for clarity).

Mitigation Revision [M2]: The measure outlined in D4 of Chapter 19 of the EIS currently states that the measures listed below would be employed if there was a persistent exceedance of the monitored threshold criteria. Caltex has reviewed this mitigation measure and is now proposing to require the works' contractor to:

- *Cease overflow dredging should there be <u>any</u> recorded exceedance of the monitored threshold criteria, relative to ambient background concentrations, at the limit of the dredge footprint.*
- *Cease dredging where there are <u>three</u> exceedances of the monitored threshold criteria, relative to ambient background concentrations, within a 24-hour period at the limit of the dredge footprint.*
- *Reduce the rate of overflow dredging where there are <u>two</u> exceedances of the monitored threshold criteria, relative to ambient background concentrations, within a 24-hour period at any of the three monitoring locations covering the aquaculture site and seagrass beds.*
- *Cease overflow dredging where there are <u>three</u> exceedances of the monitored threshold criteria, relative to ambient background concentrations, within a 24-hour period at any of the three monitoring locations covering the aquaculture site and seagrass beds.*
- *Relocate the dredging activity when there is a <u>continued</u> exceedance of the monitored threshold criteria, relative to ambient background concentrations, over more than 24 hours at any of the three monitoring locations covering the aquaculture site and seagrass beds until the ambient concentration falls below <10mgL^{-1}.*

Caltex also proposes the following clarification in terms of the corresponding threshold criteria (revisions are italicised for clarity). .

Mitigation Revision [M3]: The measure outlined in D2 in Chapter 19 of the EIS states that continuous 'live' turbidity (over suspended sediment) monitoring would be undertaken during the dredging works based on the following criteria, *as measured relative to the prevailing ambient concentration of suspended sediment at the time:*

- *A limit of 50 Nephelometric Turbidity Units (NTU) (equivalent to 50 mgL^{-1}) (under normal dry weather conditions) at the outer limit of the dredge footprint.Note: This standard applies in both wet and dry conditions.*
- *A limit of 10 NTU (equivalent to 10 mgL^{-1}) (under normal dry weather) at the closest point between*

the dredge footprint and the seagrass beds.

Caltex would define the relevant NTU limit to correspond to an equivalent suspended sediment concentration prior to starting the monitoring program.

Comment A11: Water and Sediment Quality (Removal of TBT Contaminated Sediments)

It is recognised that the project will remove TBT contaminated sediments to prevent its current and potential redistribution around the Bay due to marine processes and ship movements. However, during dredging, no significant pollution is permitted to occur within a short distance of the operation of the dredge head and split hopper barges. The aim of the project should be to fully minimise the dispersal of TBT around the Bay and minimise TBT being dissolved into the water column, rather than base the decision on acceptable levels of accumulation in other areas. These areas (which have not been tested) may already be affected by TBT from shipping movement over the TBT contaminated areas and additional TBT deposition could lead to an exceedance of the sediment quality guidelines. Further information is requested on the practical measures that could be taken to further mitigate the dispersal of TBT affected sediments and generation of dissolved sediments in the water column.

Response: As noted in response to **Comment A12**, the TBT dilution modelling undertaken by Cardno confirmed that the dredging would be unlikely to affect the water quality of Botany Bay. The quantity of sediment-bound TBT dispersed in the marine environment would have some potential to accumulate to a depth above 15 mm, the point at which sediment depth would be sufficient to contain enough sediment-bound TBT to exceed the Interim Sediment Quality Guideline (ISQG) – low trigger values for ecological protection. However, the deposition and locations where this would occur, as shown on Figure 10-3 of the EIS and reproduced in **Figure 3-3** in this Report, were provided as an upper-limit benchmark prediction of the very worst case scenario.

The upper limit benchmark predictions show deposition above 15 mm to only occur a few hundred metres from where the modelling simulations used to create the deposition plot (see response to **Comment A14**) released the sediment into the environment. Under this conservative prediction method the sedimentation depth of 15 mm would not extend over the seagrass habitat or any other sensitive areas in the Bay.

A more likely outcome however would be a maximum deposition depth of 20 mm (instead of the 35 mm predicted and included in the EIS), centred further north than the maxima shown on **Figure 3-3**. This is for the reasons discussed in the response to **Comment A14**, and provides a further demonstration that any impact (in terms of TBT) as a result of deposition on the seagrass beds would be unlikely.

Any pollution of the marine environment resulting from this sediment-bound TBT becoming dissolved in the water column post settlement is also considered low (as noted in the response to **Comment A14**).

Consideration of the additional measures that could be taken to further mitigate the dispersion of sediment (and therefore TBT) is provided below in response to **Comment A13.**

<u>Conclusion</u>

In conclusion, the works would generate a low level of suspended sediment principally through overflow dredging. Restrictions on overflow dredging are such that it would only take place a minimum of 500 m from the sensitive areas in the southern part of the Bay. As the dredging operation proceeds, the dredger would move further north towards the centre of the Bay, increasing the separation distance between the hopper barge and the seagrass beds. As noted in response to **Comment A12** below, there would be no dispersion of dissolved TBT around the Bay above the Commonwealth *Guidelines for Fresh and Marine Water Quality 2000* (ANZECC/ARMCANZ), therefore removing the need for mitigation.

The dispersion of sediments would be limited and controlled through the use of a backhoe dredging method and the use of a silt boom (see the response to **Comment A13**), whilst the overflow dredging would not take place in two locations in the footprint and would be managed across the rest of the footprint through turbidity monitoring. An exceedance of the sediment quality guidelines would occur, but is only likely to occur within the locality of the dredge footprint for the reasons explained in response to **Comment A14**. This area is already subject to sediments that contain excessive concentrations of sediment-bound TBT, the majority of which would be removed from the Bay as a result of the proposed works.

Comment A12: Spoil and Contamination (Restrictions on Overflow Dredging)

The proposal to not use overflow dredging in areas with highly elevated TBT and the fixed berths is supported. However, due to the nature of TBT impacts at very low concentration, further restrictions on overflow dredging should be defined. It is recommended that overflow dredging should only occur in areas uncontaminated by TBT based on ANZECC 2000 sediment quality guidelines (ISQG-low). If overflow dredging is proposed on sediment with levels above the ANZECC (2000) sediment quality low guideline, then further information is requested on the likely concentration of TBT in the water column in the initial (near field) mixing zone of the proposed overflow dredging. ANZECC (2000) water quality guidelines for TBT will need to be achieved at the edge of an initial (near-field) mixing zone during any overflow dredging.

Response: The sediment-bound concentration of TBT in the dredge footprint is sufficient to generate an elutriate (dissolved) concentration of TBT that exceeds the water quality species protection levels included in the *Commonwealth Guidelines for Fresh and Marine Water Quality 2000* (ANZECC/ ARMCANZ).

The proposed dredging would disturb and agitate the sediment as the backhoe works the sediments from the seabed, lifts the material through the water column, and slews it into the hopper barge. Disturbance, agitation and transfer are all processes (along with overflow dredging) that have the potential to generate a solution of dissolved TBT. The concentration of the generated solution of dissolved TBT would depend on the concentration of sediment-bound TBT in the dredged sediments. It would also depend on a number of physical parameters such as the amount of disturbance and agitation caused through dredging and the overflow process, the size of the dredging bucket, the overflow spill rate and duration, and the rate of dredging as well as the characteristics of the receiving environment.

These parameters were accounted for in the modelling undertaken to assess TBT dispersion in the EIS (see Technical Appendix C). The modelling predicted the dispersion of the 95th percentile mean elutriate concentrations generated from the sediments sampled from each of the Areas described in response to **Comment A7**. The results (Figures 7-1 to 7-6 of Technical Appendix C of the EIS) showed the predicted concentrations that would occur from dredging in the three locations shown on **Figure 3-3** of this Report.

Using the elutriate concentration to predict dispersion provides an over estimate of the likely concentration of dissolved TBT that would be generated and dispersed during the dredging. This is because dredging would be unlikely to cause as much agitation of the sediment as the methods used to generate elutriate test results; that is the bucket picks-up a large portion of sediment, most of which is not exposed to the sea water, unlike a disturbing process such as elutriate testing. That is, the modelling is an over-estimate because it assumes all the dredge sediment to be available to produce a solution of dissolved TBT. In reality much of the sediment would be retained within the dredge bucket and within the

hopper barge, and therefore the TBT would not be able to enter into solution.

Despite these conservative assumptions, the modelling shows that during initial mixing the concentration would fall to below the *Commonwealth Guidelines for Fresh and Marine Water Quality 2000* (ANZECC/ARMCANZ). This would occur over the entire dredge footprint. In effect the above Guidelines would be achieved almost instantaneously due to initial mixing and instant dilution. As such, the dredging would be unlikely to affect the water quality of Botany Bay and would be highly unlikely affect water quality beyond the near-field mixing zone.

It was not the purpose of the modelling to predict the concentration dissolved TBT that would be generated once the sediment was dispersed and deposited. However as noted Section 10.6.2 of the EIS, when TBT is mobilised in its sediment-bound form through dredging, very little is released in a soluble form, limiting its bioavailability.

The concentration of sediment-bound TBT associated with the dispersed and deposited sediment would be substantially less than the sediment-bound concentration of TBT associated with the sediments in the footprint. Consequently, the corresponding maximum concentration of dissolved TBT that could be generated during dispersion and following deposition would be considerably less. It would therefore still be substantially below the Commonwealth Guidelines for Fresh and Marine Water Quality 2000 (ANZECC/ARMCANZ) trigger values. This is despite the potential for the deposited (fines fraction of) dispersed sediments to accumulate to a depth of 15 mm thereby exceeding the low trigger value for ecological protection within the Interim Sediment Quality Guidelines (ISQG).

Comment A13: Water and Sediment Quality (Additional Mitigation)

It is also recommended that further options are assessed to:

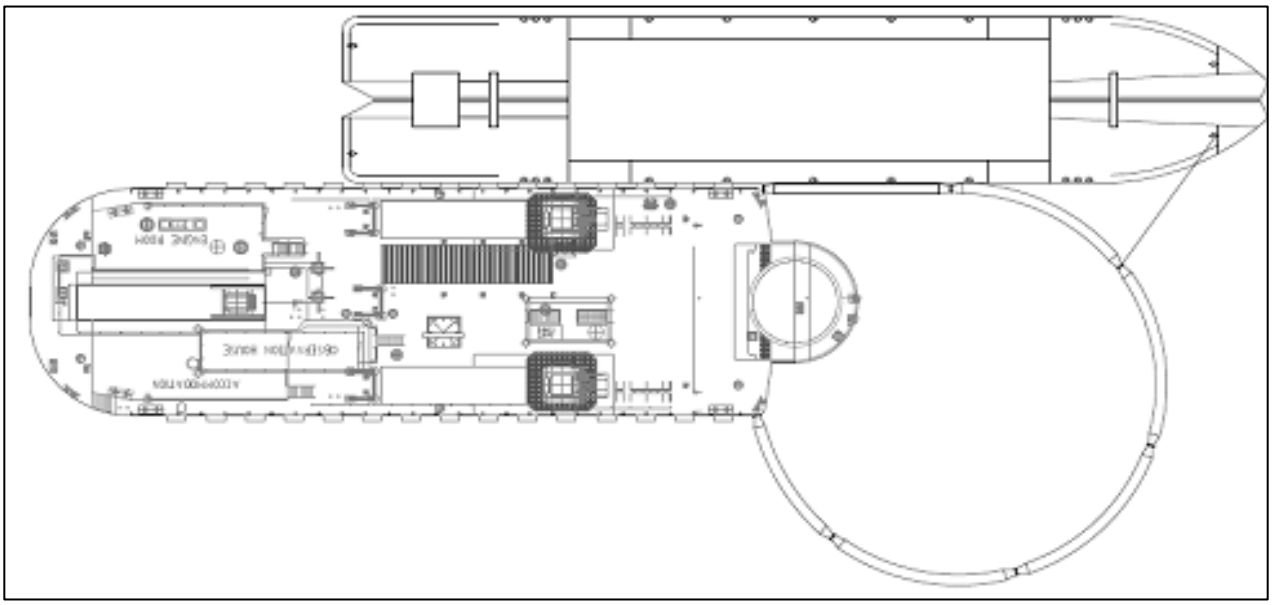
- Capture sediment that would otherwise fall into the water across slewing zones.
- Use any bucket head options or dredging procedures that minimise the amount of water removed (for example, "clamshell" bucket if different to the currently proposed "closed" bucket).
- Further mitigate TBT and fine sediment dispersal using modified dredging methods, including the method and rate of operating the dredge head and use of outgoing tides.
- Use silt curtains around barges used for the proposed local reuse of uncontaminated sediment within the Bay, prior to opening the hopper.
- Deploy silt curtains around any non-dredging activities that may generate sediment including sheet piling activities in the berth works.

Response: Caltex has further assessed the mitigation options available to limit sediment dispersion and reached the following conclusions.

Use of a Silt Boom: Caltex would require that the works' contractor use a silt boom around the dredger to capture sediment that would otherwise fall into the water across the slewing zones. The silt boom would form a 'moonpool' around the dredger as indicated on the illustration below. The boom would be 1.5 – 2 m deep, with the plume generally settling within the area enclosed by the moonpool. When the dredger moves the boom follows the dredge so by default any sediment in suspension inside the moonpool also

follows the dredge. The sediment that would be caught in the boom would remain there. The boom and the collected sediment would be removed and replaced on a routine basis throughout the dredging program.

Figure 3-2 Illustration Silt Boom



Additional Mitigation [M4]: A silt boom would be placed around the backhoe dredger at all times to limit sediment dispersion whilst lifting and slewing (transferring) the sediment to the hopper barge.

Use of a Closed Bucket: The EIS as submitted for exhibition said that the works would be undertaken using a closed bucket dredging method. However, Caltex had always proposed to use an open bucket dredging method in favour of a closed bucket method. The EIS use of the term 'closed bucket', which was introduced as a possible mitigation measure, was not picked up by Caltex in its review. This has been confirmed to, and discussed, with the EPA.

Notwithstanding this, and as discussed below, the results of the modelling and the validity of the conclusions of the EIS are unaffected by Caltex's proposal to use an open bucket method.

The implications of using an open bucket dredging method on the modelling results presented in the EIS are discussed in **Appendix B, Hydrodynamic Modelling Clarifications** and **Appendix F, Supplementary Hydrodynamic Modelling Clarifications**.

A summary of the information in Appendix F is provided below.

A hydrodynamic model was used in the EIS to assess the impacts of both dredging and overflow dredging. The results of that modelling are described in the EIS.

The results of the modelling and the validity of the conclusions of the EIS are unaffected through Caltex's proposal to use an open bucket method for the reasons explained below.

The main change from using an open bucket method compared to a closed bucket method relates to how sediment would be released into the environment when dredging. Unlike a closed bucket method, where

sediment would be released at the seabed, an open bucket method would release sediment both at the seabed and as the bucket is lifted through the water column.

In the EIS the model assumed sediment to be released at a continuous rate at the seabed over the dredging period (22 hours per day for 23 weeks). However, in reality, the sediment release at the seabed would be intermittent. This is because once an area was dredged the) bucket would be lifted to the surface to allow the sediment to be transferred to a hopper barge. The empty bucket would then be lowered to the seabed and the dredging 'cycle' would be repeated.

If an open bucket were used the same dredging cycle would occur, meaning that sediment release at the seabed would also be intermittent. However, unlike the closed bucket method, sediment would be released as the bucket was lifted through the water column.

Appendix F compares the effects of what was modelled (a constant release of sediment at the seabed) to what is proposed (the use of an open bucket method releasing sediment intermittently at the seabed and throughout the water column).

The conclusions of the comparison confirm the following:

- The mass of sediment introduced into the environment in the model was more (30 kg per minute) than would be introduced through using an open bucket method (28 kg per minute). This is because the model assumed continuous release of sediment whereas the open bucket method would only intermittently release sediment.
- When overflow dredging takes place, as would be the case across the majority of the footprint, the dredging method of either a closed or open bucket would contribute around 3% of the total volume of sediment generated under either scenario. Therefore, the method of dredging is a minor contributor to the total sediment dispersed and deposited.
- Because of lower amount of sediment released in the proposed open bucket method, compared to modelled scenario, the outcome would see shallower deposition depths, lower peak turbidity and lower peak concentration of dissolved TBT than the modelled outcome.
- The open bucket method would result in greater vertical dispersion as the bucket is lifted through the water column, and settle to a lesser depth than the modelled outcome . However, it is the overflow dredging, which introduces the greatest amount of sediment at the surface, and that causes the extent of dispersion and deposition shown in the modelling results presented the EIS .
- In the fixed berths no overflow dredging would take place. In this area the sediment would also result in greater vertical dispersion and settle to a lesser depth.
- The dissolved TBT introduced in the model was based on the volume of sediment introduced into the model. The open bucket method would generate less sediment than modelled. As such, less dissolved TBT would be produced than modelled.

The use of an open bucket method for dredging is preferred for this project for the following reasons:

- Much of the work particularly around the Wharf requires great precision that is not possible with a closed bucket method.
- Any area with a batter slope of 2:1 – 6:1, such as the perimeter of the dredge area, cannot be undertaken with a closed bucket method.
- The use of a closed bucket method would require an additional tug to move the dredger. Under bay conditions the dredger would normally paddle using the open bucket when changing positions. The

closed bucket method requires universal suspension link connected to the dipper arm of the dredge which precludes paddling. This additional vessel would increase environmental impacts as well as introduce additional safety risks.

- A closed bucket method would collect more sediment than required. An open bucket method is able to gently scrape the surface and lift a thin layer of sediment. This is not achievable with a closed bucket that works by penetrating to a significant depth and 'grabbing' the sediments from the seabed. The result would be the closed bucket method 'over dredging' a considerable area of the footprint, which in turn results in greater surface disturbance than would otherwise occur.
- If a combined open/closed bucket program was adopted this would increase the cost of dredging by approximately $5.4 million and lengthen the dredge program by up to 9 weeks.

In conclusion whilst an open bucket method would generate more sediment than a closed bucket method, the open bucket method would generate less sediment than was modelled in the EIS. Also, and as noted above, it is the process of overflow dredging that is the dominant determinant of sediment release into the environment.

The change in bucket type does not materially change the dispersion and deposition plot outcomes provided in the EIS. The assessment of impacts is based on these plot outcomes.

To ensure that the effects of dredging are mitigated, Caltex has committed to using a silt boom around the dredger. This will ensure the sediment dispersion throughout the water column is reduced. Caltex has also committed to additional water quality monitoring as described in response to **Comment A17** to validate the modelled predictions.

Modify the Dredging Method: Caltex confirms its commitment to limiting the spill rate and use of overflow dredging in the instance of any exceedance of the turbidity monitoring criteria as described under the revised mitigation measure set out in response to **Comment A10**.

Use of a Silt Curtain: Notwithstanding the results of the assessment, the EIS considered the following mitigation options for silt curtains to limit sediment dispersal and deposition:

- silt curtains within the working area of the dredge footprint; and
- silt curtains to protect specific sensitive areas of the Bay away from the dredge footprint.

For the reasons set out in the EIS, it is not feasible or practical, to use silt curtains within the working area of the dredge footprint as the curtains would need to be moved every time the dredger was moved and/or a tanker ship needed to enter and leave the port and berthing facility. Routinely moving and redeploying the silt curtains would defeat the objective for their use, as any backed-up sediment collected in the silt curtain would have to be removed. This would present the risk of the collected sediment being dispersed into the marine environment, thus defeating the purpose of using the curtains.

The option to use silt curtains to protect specific sensitive areas of the Bay away from the dredge footprint was also considered (see Section 2.5.4 of the EIS). The use of silt curtains for this purpose was not considered possible for a number of practical reasons. Silt curtains remain most effective in still, calm, shallow waters. Within an active berthing facility the ability to curtain around the dredger, which would be routinely moving to accommodate berthing and other shipping movements, would be impractical.

The only remaining alternative would be to curtain the dredger outside of the port and berthing facility. This would require a considerable length of curtain to be effective (greater than 200 m). The practical

management of such a large curtain in a dynamic, energetic and mobile area of Botany Bay (which is exposed to heavy seas and storm surges) would be impractical. It would require that the curtain to be chained and weighted to the seabed, presenting further environmental management issues. Further, the curtain would be at risk of failure under pressure.

Once more this would this defeat the purpose of its use. In addition, lost curtains would introduce risks of fauna entrainment and shipping entanglement.

For these reasons, alternative mitigation measures have been proposed. As discussed in the previous section, limiting the use of overflow dredging and reducing the spill rate from dredging provide active control measures (managing the impact at source) as opposed to the passive control measure (managing the impact at a distance) provided through the use of a silt curtain.

Comment A14: Water and Sediment Quality (Sediment Deposition)

Section 10.6.3 (Page 10-16) [of the EIS] states that "It is predicted that only above 15 mm of deposition (largely within the dredge footprint, see Figure 10-3) would there be an exceedance of the ISQG-Iow threshold limit".

The sediment deposition scale provided in Figure 10-3 does not clearly demonstrate that above 15 mm of deposition is largely within the dredge footprint. Figure 10-3 should be revised to reflect the value provided in Table 10-3 so it is clear that the predicted deposition would not result in a sediment-bound TBT concentration of less than 5 $\mu gSn.kg^{-1}$ outside the project site; particularly near the Kurnell Wharf, aquaculture site and Kamay Botany Bay National Park.

Response: Figure 10-3 of the EIS has been included as **Figure 3-3** in this Report. This Figure shows the previously reported deposition with a further refinement of the deposition scale (and therefore depths) for clarification.

The sediment deposition plot was prepared based on the following assumptions.

- Location: The three locations used to model sediment dispersion and deposition (see Figure 10-2 in the EIS) focussed on the southern and eastern edge of the project site (dredge footprint). These were used as they facilitated the assessment of the potential worst case impact on key sensitive areas in the Bay, namely seagrass beds, the inactive aquaculture site (located 300 m to the south of the limit of the fixed berths), and Kamay Botany Bay National Park (located 800 m to the east of the limit of the fixed berths).

- Duration and Intensity: The deposition modelling was based on the assumption of generating suspended sediments in the three modelled locations shown in Figure 10-2 of the EIS for the full 23-week dredging program. Figure 10-3 of the EIS illustrated the deposition that would occur as a result. In reality, the dredging would only take place in each of these locations for a short period of time after which the dredger would relocate to the other areas of the footprint (as shown in Figure 4-2 of the EIS). As such, Figure 10-3 of the EIS provides an upper-limit benchmark of a very worst case scenario.

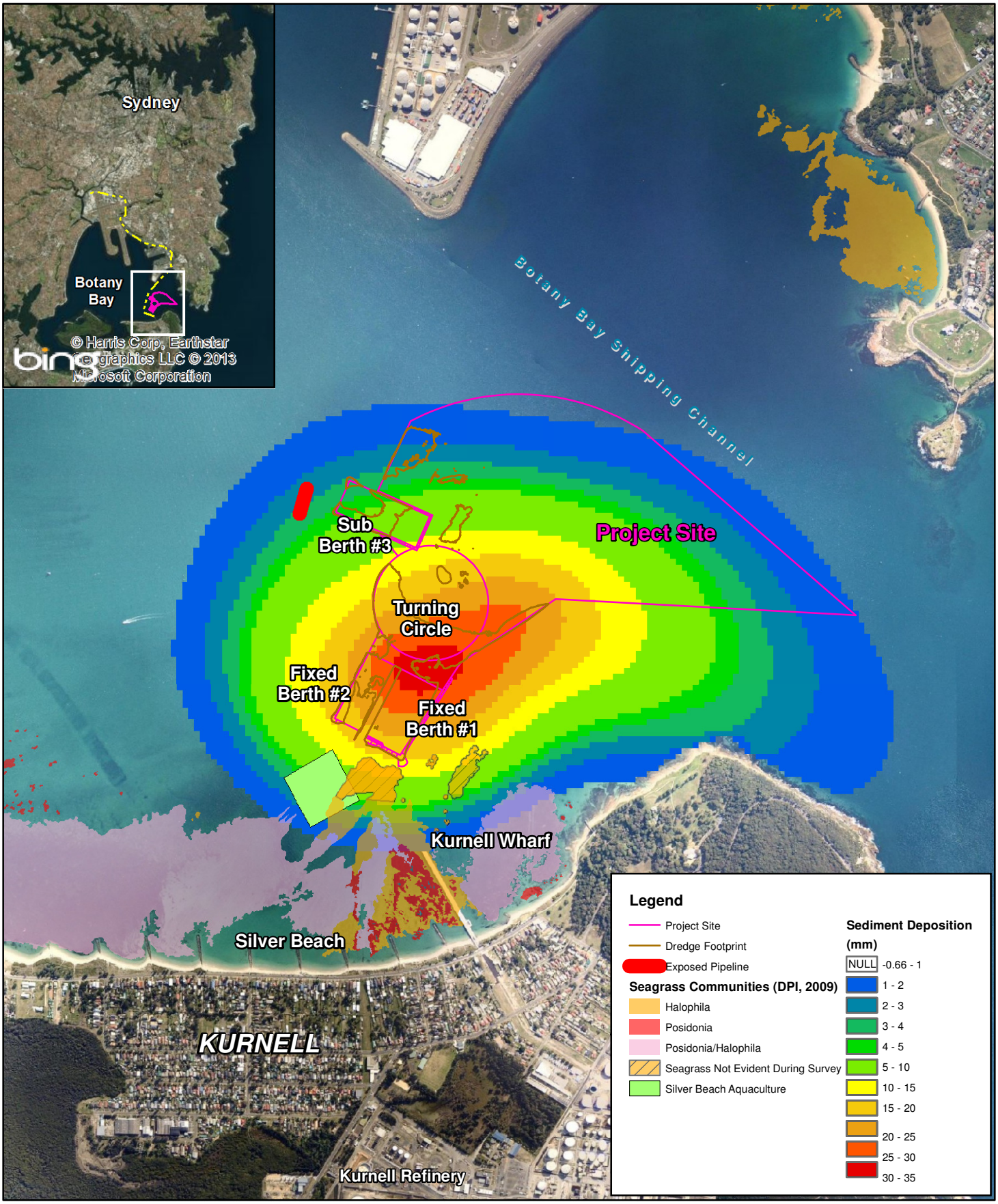
- Assessment Significance: The modelling used 95th percentile outputs, where there is only a 5% probability of there being an exceedance of the results.

Further information on the conservative inputs included in the modelling is provided in **Appendix B, Hydrodynamic Modelling Clarifications**. The Appendix states that '*Table 4-1 of the EIS shows that about 42% of the sediments would be dredged from the turning circle and approaches (Area 1) and the sub berth (Area 2). The plot included in the EIS shows the deposition that would occur as a result of dredging the approaches and turning circle in two fixed locations (as the process is influenced by overflow dredging). The result would be a peak sedimentation depth of approximately 35 mm. In reality the dredger would move out of these two locations further north to cover the footprint shown on Figure 4-1 of the EIS. It was not possible to model the effects of this due to the limitations of the method used to calculate deposition. It can be estimated however that the effect of dredging the whole footprint would create a maximum peak deposition of less than 20 mm. This is based on a volumetric calculation of the dredged sediment over the given area. The most significant change to that shown in Figure 10-2 would be to the south of the dredge footprint where the depth of deposition would decrease by 15 mm.*

It is also worth noting that the development of the 'mound' of fines through dredging would occur over a period of approximately six-months. Hence the rate of deposition would only add an imperceptible depth each day, somewhere in the region of 0.1 mm'.

The deposition plot provided in the EIS (as revised under **Figure 3-3**) is based on the above conservative criteria and it provides an upper-limit benchmark for potential deposition levels. Consequently, the results provide the maximum possible impact on the seagrass beds, aquaculture site and Kamay Botany Bay National Park. However, the likelihood of this outcome occurring at the maximum, worst case, level in all these locations would be exceptionally low.

Based on the information included in **Appendix B, Hydrodynamic Modelling Clarifications**, it would be unlikely that the depth of sedimentation would exceed the 15 mm other than within close proximity to the dredge footprint.



N
W E
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0 75 150 300 450 600
Meters

Datum: GDA94
Grid: MGA Zone 56

Source: Aerial Imagery from Nearmap HyerTiles 2012.

CALTEX
Caltex Australia

KURNELL PORT AND BERTHING PROJECT

THE EXTENT OF SEDIMENT DEPOSITION IN BOTANY BAY (REVISED FIGURE 10-3 FROM THE EIS)

URS

BOTANY BAY, NSW

Figure: 3-3

Rev. A

A4

File No: 43177815.094.mxd Drawn: STB Approved: CF Date: 08/05/2013

Comment A15: Water and Sediment Quality (Modelling Simulation Scenarios)

Section 10.4.5 [of the EIS] states that modelling the dispersion and deposition of sediment has involved the assessment of three simulation scenarios representing dredging the fixed berths, sub berth and the approaches. However modelling scenario locations provided in Figure 10-1 do not appear to cover the sub berth location. Caltex should clarify this matter.

Response: Figure 10-1 in the EIS shows the location of three modelling simulations. These three locations were selected as the closest points in the dredge footprint the sensitive receptors to the south and east.

- Scenario 1 models the potential dispersion created within the fixed berths where no overflow dredging would take place. This location is the closest point to the seagrass beds approximately 300 m to the south.
- Scenario 2 models the potential dispersion at the closest point within the combined area of the turning circle, approaches and sub berth to the seagrass beds and aquaculture site located approximately 500 m to the south.
- Scenario 3 models the potential dispersion at the point closest point to the Kurnell Headland Peninsula, approximately 800 m to the east.

The last two scenarios show the closest locations in the footprint to the above receptors where overflow dredging would take place.

No specific modelling simulation was undertaken in the sub berth. If Caltex were to commission a separate modelling simulation within the sub berth it would not affect the validity of the conclusions of the EIS in terms of sediment dispersion. This is because this location is in the centre of the Bay, further north and more remote from the sensitive areas to the south and east.

Comment A16: Water and Sediment Quality (Elutriate Tributlytin)

Figures 7.1 to 7.6 of Appendix C show the dispersion of the mean elutriate Tributyltin (TBT) concentration from each of the dredged areas using the 95 percentile. The plots assume the maximum elutriate TBT concentration being produced at the sea bed and through overflow operations. All of the Figures show no concentration of TBT despite page 10-18 of the EIS stating that '*the elutriate tests conducted on sediments confirm their potential to generate TBT at concentrations exceeding the threshold limits for water quality in Table 10-1'*. Caltex should review the Figures provided in Appendix C and provide an explanation for this discrepancy. If Caltex determine that the Figures provided are incorrect then a new set should be developed.

Response: There are two mechanisms that allow TBT to disperse in the environment. The first is the dispersion of sediment-bound TBT and the second is the dispersion of dissolved TBT in the water column (see the response to **Comment A12**).

As noted in the EIS, TBT is largely hydrophobic. This is confirmed by the fact that despite there being high concentrations of TBT adsorbed to (and associated with) the sediments in the dredge footprint, the corresponding elutriate tests show comparatively low concentrations of TBT. Nevertheless, the elutriate TBT concentrations are still sufficient to exceed the water quality species protection levels of the ANZECC/ARMCANZ guidelines.

The plots provided in Figures 7-1 to 7-6 of Technical Appendix C of the EIS illustrate the dispersion of dissolved TBT assuming it to be generated both at the point of dredging and at the same concentration as the recorded in the elutriate sampling conducted on the most contaminated sediments within the dredge footprint (see the response to **Comment A12**).

The plots (and modelling on which they are based) confirm that beyond the near-field mixing zone, the mixing and dispersion of TBT in the environment is sufficient to ensure that any dispersed, dissolved TBT, would be diluted many times over to a point that it would not affect the water quality of the Bay either at the surface or at any depth beyond the immediate vicinity of the overflow dredging operation.

Comment A17: Water and Sediment Quality Monitoring

Sections 10.7.3 and 10.7.4 of the EIS describes the water quality monitoring that will be undertaken to verify the results of the modelling and that will form part of a Sediment and Water Quality Monitoring Program. Caltex has proposed to undertake pH and dissolved oxygen (DO) monitoring in parallel to turbidity monitoring at the limit of the project site. It has been proposed that turbidity monitoring will also be conducted within the aquaculture lease area and at a number of locations within the limits and extent of the seagrass beds close to the project site. The EIS does not mention whether pH and DO will also be monitored at these locations. EPA recommends that pH and DO monitoring be undertaken at the same locations as turbidity.

Additional Comment Raised by EPA: EPA will require Caltex to undertake additional water quality monitoring (mobile monitoring for TBT relative to the overflow dredging) as part of its [Environment Protection] Licence to assist in assessing any potential water quality impacts.

Response: There was no proposal in the EIS to monitor for pH and DO at all locations where turbidity monitoring would take place. These were not viewed as necessary given the conclusions of the EIS, which predicted there to be no significant physicochemical impact at the aquaculture site and over the seagrass beds.

However, to validate the conclusions of the EIS, and as an additional contingency measure, Caltex would undertake turbidity and physicochemical monitoring at the edge of the seagrass beds and at the aquaculture site during the dredging works, if required to do so as a condition of consent. The changes are shown below in italics within the proposed Mitigation Revision [M5].

Caltex would also undertake monitoring of TBT concentrations as part of the water quality monitoring program, before and during the dredging works subject to approval with SPC. The monitoring specification and sampling schedule would be defined within the EPL.

Mitigation Revision [M5]: As a revision of Mitigation D3 in Chapter 19 of the EIS, the Sediment and Water Quality Management Plan (SWQMP), forming part of the DSDMP, would include a monitoring program for pH and dissolved oxygen at the limit of the project site, *within the aquaculture site and at a number of locations at the edge of the seagrass beds*. If the physicochemical limits set in the SWQMP are exceeded then additional mitigation measures would be implemented. These would be:

- *Limits on the spill rate or restrictions on the use of overflow dredging would be implemented (depending on the nature of the exceedance) in instances where the pH was found to be 1.5 units either side of the ambient pH concentration recorded in the Bay.*
- *Limits on the spill rate or restrictions on the use of overflow dredging would be implemented*

(depending on the nature of the exceedance) in instances where the dissolved oxygen concentration falls below 80%.

- *Persistent exceedances in either of the above threshold criteria (as measured over a 24-hour period) would require the dredger to be relocated out of the affected area until the threshold criteria are satisfied.*

Additional Mitigation [M6]: The SWQMP would include a monitoring program for TBT. The monitoring specification and sampling scheduled would be defined within the EPL. Caltex would collect baseline water quality data in accordance with the SWQMP. These data would be used for comparison purposes when assessing TBT monitoring results obtained during the works.

If there is a recorded exceedance of the *ANZECC/ARMCANZ Water Quality Guidelines 2000* further controls on the dredging program would be implemented in line with Mitigation and Management Measure D4 (see **Chapter 4, Revised Mitigation and Management Measures**).

Comment A18: Noise (Noise Modelling Scenarios)

Construction Noise Scenarios 5, 7 and 8 listed in Table 13-1 of the EIS include additional activities (rock pile (Scenario 5 & 7) and use of a mobile crane (Scenario 8)). These are additional to what was modelled in Table 7-3 of Appendix G. The additional activities have the potential to increase the predicted noise levels from the each of these scenarios. Caltex should clarify whether the additional activities will significantly increase the predicted noise levels when these works are being carried out and whether the construction activities still comply with the project specific noise criteria.

Response: The equipment list in Table 13-1 of the EIS is inconsistent with the list Table 7-3 in Technical Appendix G.

The following equipment should be included in Table 13-1 in the EIS, with each piece of equipment discussed in turn below:

- Scenario 5: ‘Rock Pile’ (x1);
- Scenario 7: ‘Rock Pile’ (x1); and
- Scenario 8: ‘Mobile Crane’ (x1).

Rock (Hammer) Piling: Table 13-1 of the EIS and associated information, specifically notes that there would be two types of piling taking place during the proposed works; general ‘piling’ and ‘rock piling’. Technical Appendix G of the EIS has consolidated the two types of piling into a single activity, modelling its impact using a sound power level of 117 dB(A).

The two types of piling are described in Section 4.5.1 of the EIS.

- Type 1 (‘piling’): Each pile would be advanced using vibration methods until ‘refusal’ or until the pile reaches depths of 1-2 m above the final embedment depth. The piling would then be completed by driving the piles with a drop hammer.
- Type 2 (‘rock pile’): Geotechnical conditions may require further action for installing the piles. This would require the use of ‘rock piling’ techniques.

Under no circumstance would both types of piling occur simultaneously.

Initially, the sheet piles would be installed in Q3 2013 followed by the mooring, dolphin and catwalk piles, which would be installed between Q3 2014 – Q2 2015.

As the modelling scenarios in Technical Appendix G of the EIS have used the highest possible sound power level for piling (regardless of the type of piling), the modelling output provides a conservative assessment of potential impacts. Therefore the relevance of the modelling and its outputs remain valid.

Mobile Crane: In each instance where piling takes place there would be a requirement for a mobile crane to be used to first position the pile and to then stabilise it whilst it is being piled. Table 7-3 in Technical Appendix G of the EIS does not include a mobile crane in the equipment list under Scenario 8. This is an omission from the table.

The modelling output for Scenario 8 shows that the dominant source of noise is the piling (sound power level 117 dB(A)). Conversely, the mobile crane is the least dominant noise source (sound power level 95 dB(A)). Even if the mobile crane were included in the modelling scenario it would have no influence on the results of the noise modelling. Therefore the modelling output and conclusions of the assessment remain valid.

Comment A19: Noise (Construction Noise)

Table 7-2 of Appendix G of the EIS does not include noise levels for all the identified noise sources/activities identified in the eight construction noise scenarios. The activities that are missing include rig power pack, water jet pump, rock pile and auxiliary boats. It is unclear from the information provided whether the noise levels of these activities have been included in the noise model predictions. It is also unclear whether the predicted noise levels for each noise scenario include all the activities listed. Should it be determined that the predicted noise levels for each scenario do not include the missing activities then the predicted noise levels may have been under estimated. Caltex should clarify this issue to demonstrate that the noise model has included all specified activities and their associated noise levels and that the predicted noise levels for each scenario are correct.

Response: The following sound power levels were used for the modelling input, however were not included in Table 7-2 of Technical Appendix G of the EIS:

- rig power pack: 97 dB(A);
- water jet pump: 91 dB(A);
- rock pile: 117 dB(A); and
- auxiliary boats: 100 dB(A).

The above data were omitted from the Table. However they were included in the modelling scenarios. Therefore the modelling output and conclusions of the assessment remain valid.

Comment A20: Noise (Noise Management Criteria)

Table 13-4 [of the EIS] identifies the noise management criteria applicable to each sensitive receptor.

Kamay Botany Bay National Park has been classed as an Active Recreation Area which is subject to higher noise criteria than a Passive Recreation Area. Based on the definitions of Active and Passive Recreation Areas provided in Table 13-3 [of the EIS], Kamay Botany Bay National Park should be classified as a Passive Recreation Area and be subject to the lower noise criteria. Based on the predicted construction noise levels provided in Tables 13-5 and 13-6, the lower noise criteria is still complied with.

Response: Caltex acknowledges that the national park is a 'passive recreational area'. However, the park contains a sports oval, which is an 'active recreational area' and this was used as the sensitive receptor for the purposes of assessment. This justifies the selection of a 65 dB(A) noise limit. Even if the 60 dB(A) limit was selected and the area was classified as a 'passive recreational area' it would not affect the validity of the assessment or the conclusions (as the maximum predicted noise level at the National Park would be 53 dB(A) during the ICNG standard working hours and 42 dB(A) outside of the ICNG standard working hours .

Comment A21: Noise (Noise Monitoring and Verification)

Section 13.7.1 [of the EIS] outlines the noise mitigation measures proposed for the works. On Page 13-22 [of the EIS], under General Noise Management, it states that for works taking place outside standard working hours, monthly attended noise monitoring would be undertaken to verify levels along Prince Charles Parade. Draft EIS made reference to monitoring at Rangers House. There is no reference to Rangers House in the final EIS. Notwithstanding this, EPA recommends that Caltex undertake attended noise monitoring at both Prince Charles Parade and Rangers House to verify noise levels at these locations.

Response: The maximum predicted noise levels generated at the Rangers House (also known as Alpha Farm) would be 49 dB(A) during the standard working hours defined in the Interim Construction Noise Guidelines 2009 (ICNG) and 39 dB(A) outside of standard working hours (as defined in the ICNG). This is below the respective noise management criteria levels defined in the EIS of 51 dB(A) and 46 dB(A).

Whilst the proposed works are unlikely to result in an exceedance of the guidelines at the Rangers House, Caltex has further committed to monthly noise monitoring at this location to validate the results of the model.

Mitigation Revision [M7]: Following a revision of G5 in Chapter 19 of the EIS, the measures below have been determined. The changes are shown in italics. When the works are to take place outside of the standard working hours defined by the ICNG, there would be a requirement to undertake monthly-attended monitoring to verify the noise levels along Prince Charles Parade *and at the Rangers House in Kamay Botany Bay National Park*. Any persistent exceedance would require Caltex to include additional noise management controls in line with the ICNG.

Comment A22: Noise (Noise Management Program)

Noise Mitigation Measure 4 on Page 13-24 [of the EIS] (and G4 in Chapter 19) includes a Noise Monitoring Program that can be used to demonstrate exceedances are limited to 3dB(A). It also states that contingency actions would be taken if noise emissions were found to be approaching or exceeding 3dB(A). EPA does not agree with this mitigation measure as it is not acceptable to implement contingency actions after noise criteria have been exceeded. Any identified mitigation measures and contingency

actions should be implemented at all times to minimise the generation of noise to the maximum extent practicable. Noise levels approaching the project specific noise criteria should be used as a guide to determine when additional mitigation measures may need to be implemented. Caltex should review this mitigation and management measure to reflect these comments.

Response: Caltex would commit to complying with project-specific noise levels conditioned on the works. This would be achieved by restricting noise-generating activities to the standard working hours defined by the ICNG and it would be confirmed by the additional monitoring at the start of key noise-generating activities (i.e. piling and rock revetment construction). In addition, Caltex would routinely consult with the community, and provide a transparent and clear method by which complaints can be received and the actions taken to address any complaint recorded (see response to **Comment A25**).

Additional Mitigation [M8]: In addition to routine monthly noise monitoring, Caltex would conduct additional noise monitoring at the start of key noise-generating activities (i.e. piling and rock revetment construction) to ensure that actual noise levels are within predicted levels. This monitoring would take place along Prince Charles Parade and at the Rangers House. If the recorded levels exceed those predicted in the EIS, adjustments to the working practices would be implemented in accordance with mitigation measures G3 and G4 in Chapter 19 of the EIS thereby achieving the limits specified in mitigation measure G2 in Chapter 19 of the EIS.

Comment A23: Noise (Noise Approval Conditions)

The following requirements for hours of construction should be considered when developing conditions of approval.

- All construction works (excluding dredging and sub berth upgrade works) must be undertaken between the hours of 7:00 am to 6:00 pm Monday to Friday and Saturday 8:00 am to 1:00 pm, with no construction activity on Sundays and Public Holidays unless inaudible at any residential premises. The sub berth upgrade works may be undertaken between the additional hours of 1:00 pm and 6:00pm on Saturday afternoons and 8:00am and 6:00pm Sundays.

- Dredging works (including the emplacement of spoil and associated activities) may be undertaken continuously for approximately 23 weeks.

- Appropriate respite periods should be implemented to address any noise complaint(s) associated with any construction noise (including piling and rock revetment activities) and any loud construction works.

- The above construction hours would not apply to the delivery of material outside the hours of operation, if that delivery is required by police or other authorities for safety reasons; and/or the operation or personnel or equipment are endangered. In such circumstances, prior notification must be provided to the Department of Planning and Infrastructure and affected residents as soon as possible or within a reasonable period in the case of emergency.

Response: Caltex acknowledges that the above conditions are likely to form a condition of consent. The mitigation commitments in the EIS (as supplemented by the amendments and additions above) are consistent with the above measures.

Comment A24: Environmental Management Plans (CEMPs and DSDMP)

Chapter 19 of the EIS outlines the preparation and development of CEMPs and a DSDMP to manage the proposed works. A number of sub management plans have also been identified including but not limited to:

- Spill Control Plan;
- Sediment and Water Quality Monitoring Program;
- Noise Management Plan;
- Port Operating Procedure and Marine Works Management Plan; and
- Waste and Resource Management Plan.

All Management Plans should be completed prior to the commencement of construction activities. Appropriate procedures should also be developed for reviewing and improving the requirements of each plan where considered necessary over the life of the proposed works.

Response: Draft copies of the relevant Management Plans are included with this Submissions report in **Appendix D, Management Plans**. As noted in response to **Comment A1** the plans will be updated prior to their submission for formal approval. Certain sub management plans, namely the spill control plan and the port operating procedure and marine works management plan, are being prepared by the works contractor. They are not included in the preliminary draft versions provided with this Submissions Report.

Comment A25: Environmental Management Plans (Community Consultation Plan)

NSW EPA recommends that the proponent also develop a Community Consultation Plan (CCP) as a sub management plan to the CEMP. The CCP shall include, but not necessarily be limited to:

- procedures for consulting and notifying nearby residents of the commencement of the construction activities. This should include procedures for providing written notification to residents and include notification to the Kurnell Progress and Precinct Committee;
- procedures for consulting and notifying nearby residents at appropriate stages throughout the construction activities of any specific works that may result in potential noise impacts;
- details of a telephone complaints line (including a daytime and an after-hours contact phone number) for the purposes of receiving any complaints or enquiries from members of the public in relation to the construction activities;
- contact details of relevant site persons responsible for following up complaints;
- procedures for handling and monitoring all complaints received by the proponent; and
- details of proposed contingency measures to be implemented where complaints are received.

The CCP should be developed in line with EPA's Interim Construction Noise Guidelines and ensure that appropriate noise management tools including community engagement have been duly considered.

Response: As noted under Section 6.8.4 of the EIS, follow-on consultation activities would continue throughout the proposed works if consent is granted. This would be consistent with Caltex's usual approach to undertaking works and would involve regular meetings, written correspondence, and a process for community members to raise concerns. These activities will be included in a Community Consultation Plan (CCP).

Additional Mitigation [M9]: Caltex would produce a CCP as a sub management plan as a revision to both preliminary draft CEMPs included in **Appendix D, Management Plans**. The CCP would include the following measures.

- Attendance by the Community Relations Manager and/or Environment Superintendent at the monthly Kurnell Progress and Precinct Resident's Association meetings.
- Quarterly community briefings on site at the Refinery led by the Refinery Manager and Engineering Projects Manager.
- A Caltex Report in the bi-monthly, community publication Kurnell Village News.
- Ad hoc letter box drops to the community, or sections of the community to inform residents of significant project events and detail any out of hours work or activities that may impact the community.
- Provision of a complaints hotline. The Refinery's 24-hour community concerns hotline forms part of an established community feedback process where comments and concerns are relayed back to the Refinery Manager, Community Relations Manager and the head of the Environmental Group, depending on their nature. All calls received to the hotline would fall under an established governance process whereby they would be logged, tracked and responded to. The process requires all calls received to the hotline are responded to within 2 hours, unless an alternative call back time is specified by the resident.

The CCP would be consistent with the requirements of the ICNG. Notice would be given prior to the commencement of the key noise-generating works (i.e. piling and the construction of the rock revetment). This would include informing potentially impacted community members of the duration and timing of the works, detailing the methods that would be employed to minimise noise (including the noise monitoring), and providing the details of the 24-hour community concerns hotline.

Comment A26: Environmental Management Plans (Sediment and Water Quality Monitoring Plan)

The SWQMP should be developed in consultation with NSW EPA and include a Monitoring Program for baseline and ongoing water quality and ecological health assessments. A key requirement of this Plan will be clearly defining the locations where overflow dredging may be permitted and how the dredging operations will be controlled and monitored to minimise the dispersal of sediments and TBT within the waters of Botany Bay. Appropriate management controls should be detailed in the program including limiting or temporarily suspending overflow dredging and controlling the spill rate. Overflow dredging must

not occur in areas where the sediment has been shown to contain highly elevated concentrations of TBT.

Response: As per the response to **Comments A1** and **A17** Caltex has prepared a draft of the SQWMP as included in **Appendix D, Management Plans**. The SWQMP includes a program of baseline and continuous water quality monitoring in Botany Bay. The monitoring would be undertaken against the threshold criteria defined in the response to **Comment A10**.

In terms of management controls in the monitoring program, these would include responses to any exceedance whereby Caltex would require that the contractor limit the spill rate, stop overflow dredging, and temporarily stop/relocate the dredger. All of these actions would minimise sediment generation and dispersion (see the response to **Comment A10**). The effectiveness of these actions would complemented by the use of the silt boom.

As noted above, overflow dredging would not take place in the locations of the footprint where the sampling confirmed there to be elevated concentrations of TBT.

A further management commitment (see response to **Comment B5**) would include monitoring the presence, habitat boundaries, extent and general condition of the seagrass during and after dredging works.

Comment A27: Environmental Management Plans (Noise Management Plan)

The Noise Management Plan should be developed in consultation with EPA to address potential noise impacts associated with the construction activity. The Plan should include the recommended feasible and reasonable noise mitigation measures listed in the Noise Impact Assessment and detail the proposed performance evaluation procedures (including noise monitoring) to assess the effectiveness of these measures and any potential impacts on sensitive receptors.

Response: Caltex has noted the requirement to develop the Noise Management Plan in consultation with the EPA, and confirm that this is its intent. Further, Caltex has included noise management measures within the main body of both the Sheet Pile Wall and Rock Revetment Construction Environmental Management Plan and the Kurnell Wharf Infrastructure Upgrade Construction Environmental Management Plan (see **Appendix D, Management Plans**). These measures include the range of reasonable and feasible controls consistent with the ICNG to manage and mitigate adverse noise impacts. The Plans includes the proposed performance evaluation procedure (including noise monitoring) that would be implemented prior to, and during, the works to validate the modelling. The Plan also includes measures to manage the potential impacts on the sensitive receptors along Prince Charles Parade and at the Rangers House (see the response to **Comment A21** and **Comment A22**).

3.2.2 NSW DPI

Introduction

A submission was received from NSW DPI on 24 April 2013. The submission included the following clarifications from NSW DPI (Fisheries):

- the impacts on water and sediment quality;
- the impacts on spoil and contamination;
- the impacts on marine ecology (and notably the impacts on seagrass communities);
- the content of the proposed management plans; and
- impacts on the recreational fishing community.

The submission also contained a single statement from NSW Office of Water (NOW) that clarified *'that the comment that the proposed works should give greater consideration to the reuse of dredged material (Table 6-5 of the EIS (Under 'Water and Sediment Quality'), Page 6-10) was raised by Crown Lands and not DPI NOW'*.

Caltex confirms that this was a referencing error in the EIS and that the above statement from DPI NOW is accurate.

The following comments were included in Attachment A of the NSW DPI submission as having been raised by NSW DPI (Fisheries).

Comment B1: Sediment and Water Quality (Sediment Dispersion)

The proposal is likely to result in elevated turbidity levels around the project site for a period of 23 weeks. While the resulting increased sedimentation on the habitats within Botany Bay has been assessed in the EIS, there is little consideration of the impact of reduced light penetration on key aquatic habitats, such as seagrass, and fish communities Fisheries NSW notes that the timing of the proposed works are likely to coincide with the main season for seagrass growth and juvenile fish recruitment within Botany Bay (i.e. the spring-summer period) As the growth rate of part of the Endangered Population of *Posidonia australis* seagrass in Botany Bay is likely to be adversely impacted by reduced light levels and there is likely to be potential localised, but unknown, impacts on fish populations. It is recommended:

- options to further minimise turbidity from "overflow dredging" be investigated This could include measures to release the overflow from the spill hopper barges lower into the water column (i.e. approximately 10 m below the surface) so that sediment can settle more rapidly It is not known if this is possible, but perhaps measures to achieve this are to discharge overflow via a pipe or installing sediment curtains around the split hopper barges, either fully or partially through the water depth;
- the Endangered Population of *Posidonia australis* seagrass that has been identified in the EIS as falling under the extended footprint of impact of the proposed works is monitored for signs of decline during the dredging event. Should this become evident then this should trigger a reduction or avoidance of overflow dredging. Posidonia sea grass is suited to such monitoring as it is a slow-growing relatively stable species that does not naturally fluctuate in extent; and

- the management measure not to undertake "overflow dredging" within fixed berthing areas (p.4-9 of the EIS) be supported However, to further avoid impacts to nearby seagrasses, dredging works within the fixed berthing areas should also, if at all possible, be staged to avoid the spring-summer seagrass growth season.

Response: Caltex acknowledges that the proposed dredging would generate sediment for a period of 23 weeks. The maximum concentration of suspended sediment that would disperse over the northern limit of the seagrass beds would be 0.5 mgL^{-1} (as shown in **Figure 3-4**). This figure is a revision to Figure 10-2 of the EIS). This would only occur when overflow dredging takes place at the base of the turning circle. Once the dredger and hopper barge move outside of this area there would be no suspended sediments dispersed over the seagrass beds. Dredging at the base of the turning circle (i.e. the location shown in green in **Figure 3-4**) would only last approximately 1-2 weeks. As no overflow dredging would take place in the fixed berths, little suspended sediment would be generated in that area (as shown on **Figure 3-4**).

A suspended sediment concentration of 0.5 mgL^{-1} is low in comparison to the ambient concentrations of suspended sediment that naturally occur in Botany Bay and which typically range between 5 to 25 mgL^{-1}.

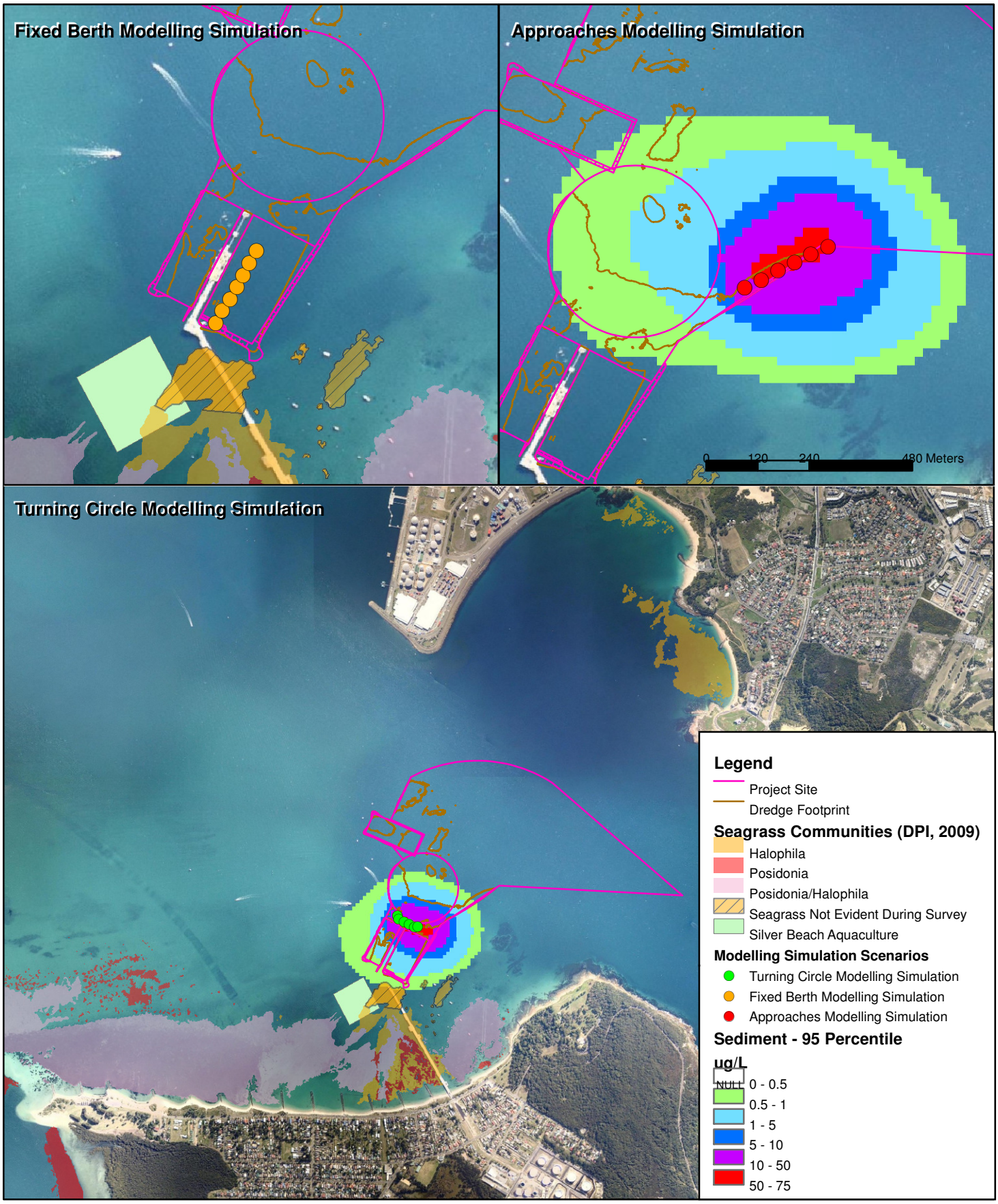
No sediment generated through the proposed dredging would disperse over the sensitive fish habitat located in Botany Bay, including Towra Point Aquatic Reserve and the artificial reefs associated with Yarra Bay, Bare Island and in Congwong Bay. These sites are located too far from the dredge footprint and the spatial impact of sediment dispersion, for such an impact to occur (as confirmed through the deposition plot shown in **Figure 3-3** of this Report).

Whilst the dredge footprint and immediate environs would be subject to suspended sediment concentrations in excess of those that naturally occur in the Bay (an effect that would extend up to approximately 270 m from any location where overflow dredging would be undertaken (as reported in the EIS)), the affected areas only contain a low density of marine plants that provide little habitat value for fish species.

Finally, although the proposal is to continuously dredge, there would be breaks in the dredge program. There would be periods when the dredger has to move to another part of the footprint to allow tanker ships to berth. Also, there would be routine breaks in the dredging to allow for refuelling, crew change-overs, maintenance, and to reposition the dredger. Whilst the latter elements have been accounted for in the modelling, the need to routinely relocate the dredge to other areas to facilitate the continued operation of the facility has not been reflected in the modelling. The stop-start nature of the dredging and the breaks in dredging activity (which include a minimum stop-period of two hours each day plus one day each week) would allow some sediment settlement to take place.

Taken together, the above factors ensure there would be a **negligible** impact on light reduction in the Bay.

Caltex is, however, proposing to implement additional contingency measures to address risks associated with potential variance of outcomes from those predicted from modelling, the risk of proposed mitigation measures failing, and/or the occurrence of an emergency or accident. These are set out above (see the response to **Comment A10**) and include placing limits on the spill rate and further restrictions on the use of overflow dredging beyond the controls described in the EIS. They also include the use of a silt boom around the dredging equipment to limit dispersion whilst lifting and slewing (loading) the sediments into the hopper barges (see the response to **Comment A13**).



N
W E
S

0 185 370 740 1,110 1,480 Meters

Datum: GDA94
Grid: MGA Zone 56

Note:
** Background Limits (<5mg/l) ** Protection of Aquaculture Species (<10mg/l).*
**** Dredging limits for previous dredging works in Botany Bay (<50mg/l).*

Source: Aerial Imagery from Nearmap Hyptertiles 2012.

CALTEX
Caltex Australia

KURNELL PORT AND BERTHING PROJECT

EXTENT OF (SEDIMENT) DISPERSION NEAR-SURFACE (REVISED FIGURE 10-2 FROM THE EIS)

URS

BOTANY BAY, NSW.

Figure: **3-4**

Rev. **A** A4

File No: 43177815.096.mxd Drawn: STB Approved: KT Date: 08/05/2013

Comment B2: Sediment and Water Quality (Sediment Dispersion)

Fisheries NSW acknowledges that the whole of Botany Bay can frequently experience considerable increased turbidity levels during extended periods of rainfall for some time and that the existing aquatic ecosystem responds and adjusts accordingly. However, if it is possible to further reduce additional turbidity related impacts from this relatively long-term human-Induced pulse event. Fisheries NSW recommends that such measures be employed. The preference of Fisheries NSW is that turbidity from this dredging does not impact nearby seagrass beds.

Response: As noted in response to **Comment B1** there would only be 0.5 mgL^{-1} of suspended sediment dispersed over the northern limit of the seagrass beds for 1-2 weeks whilst dredging at the base of the turning circle (i.e. the location shown in green in **Figure 3-4**). At all other times there would be no dispersion of sediment over the seagrass beds or any other of the sensitive areas located in the Bay.

As discussed in the EIS, the works would have a limited spatial impact on the Botany Bay environment. However, as noted above in response to **Comment B1**, Caltex has committed to implementing additional contingency measures in the implementation of the proposed works to ensure that there would be no significant impact on the receiving environment.

Comment B3: Sediment and Water Quality (Tributyltin Dispersion)

Fisheries NSW is aware that the proposed works are occurring within an area that is considerably contaminated with Tributyltin (TBT). Fisheries NSW is particularly concerned about potential impacts on adult and juvenile fish and other aquatic species from resuspended TBT; particularly within and in the immediate vicinity of the project site. It appears from the EIS that such impacts are not likely to significantly affect aquatic life within this area. However, advice and appropriate recommendations from the Government agency with relevant expertise and jurisdiction over this matter should be sought.

Response: The EIS concludes that there is negligible predicted impact resulting from the dispersion of TBT into the marine environment. The following points are relevant to this.

<u>TBT Dispersion</u>

As discussed in response to **Comment A12,** the dredging operation would create a solution of TBT that is significantly less than the water quality species protection levels included in the Commonwealth Guidelines for Fresh and Marine Water Quality 2000 (ANZECC/ ARMCANZ). Therefore, there would be negligible impact on the marine environment from TBT via this pathway.

Any dispersed sediment-bound TBT adsorbed to the small percentage of sediment dispersed over the Bay (see response to **Comment A13**) would fall out of suspension in approximately 12 hours and would be unlikely to be remobilised other than under severe storm events (see **Appendix B, Hydrodynamic Modelling Clarifications**). The dispersion would also occur over an area that contains a low density of marine plants that provide little habitat value for fish species. It would also occur in an area away from the notable sensitive fish habitats located in the Bay (as discussed in response to **Comment B1** and confirmed through the deposition plot shown in **Figure 3-3**).

As discussed in response to **Comment A14**, the deposition assessment undertaken in the EIS was particularly conservative in its approach and assumptions. A more realistic estimate of the maximum sediment deposition across the footprint is approximately 20 mm centred further north than the location of the maximum (35 mm) deposition shown in Figure 10-3 of the EIS (as revised under **Figure 3-3**).

As noted in Section 10.6.2 of the EIS, when TBT is mobilised in its sediment-bound form through

dredging, very little is released in a soluble form, limiting its bioavailability. This would also be true of any deposited sediments containing sediment-bound TBT. Whilst the modelling undertaken to support the EIS did not account for the potential pathway for soluble (dissolved) TBT to be generated post dredging through sediment dispersion and resuspension (post deposition), the fact that the TBT dilution modelling shows there to be no likely impact on water quality (see the response to **Comment A12**) confirms that there would be a low likelihood of impact through either of these two mechanisms. This would be despite the potential for the deposited (fines fraction of) dispersed sediments to accumulate to a depth of 15 mm thereby exceeding the Interim Sediment Quality Guidelines (ISQG) low trigger value for ecological protection.

Finally, toxicity tests undertaken in line with the National Assessment Guidelines for Dredging 2009 (NAGD) confirmed the TBT of the dredge footprint sediments to be non-toxic in either a sediment-bound form or dissolved form. This was further confirmed through undertaking tests on two representative indicator species.

Independent Assessment

Caltex is of the view that the work undertaken to assess the potential impacts arising from TBT contamination have been assessed thoroughly by qualified technical specialists. Further, the results of this work have been reviewed by the NSW EPA Water Quality team and will be reviewed as part of the SDP application by SEWPaC. Consequently, whilst acknowledging the capacity of the NSW EPA and NSW DP&I to engage additional experts to review the results of the EIS, Caltex is of the view that this review would not contradict or add to the outcomes of the assessment already provided in the EIS.

Comment B4: Amenity and Recreation (Generation of Habitat)

The EIS [Section 17.4.3] suggests that the hard rock armoured revetment around Fixed Berth would create additional artificial reef habitat. It would be more accurate to state that this would create additional hard rock substrate habitat within Botany Bay that with time would support species assemblages that are adapted to this environment. The artificial reef structures installed on the northern side of Botany Bay by recreational fishers are composed of purpose-designed reef ball units with structural complexity (i.e. cavities) to specifically promote fish assemblages and create quality recreational fishing opportunities.

Response: Caltex acknowledges that the construction of the rock revetment does not specifically create reef habitat. Rather it would provide additional hard rock substrate that is capable of supporting a diversity of species assemblages (including fish) that are associated with such habitat. Therefore, the rock revetment would provide a new habitat feature in the Bay.

Comment B5: Mitigation and Management Measures (Revisions)

Fisheries NSW supports the proposed mitigation and management measures detailed in Chapter 19 of the EIS if they are implemented as proposed with the following amendments and additions. These measures would assist in minimising impacts to the aquatic environment.

- When considering the proposed adaptive mitigation measures in response to monitoring it is important that the environmental manager responsible for these measures is independent and/or that there is some level of independent auditing of this process.

Response: The works would be carried out in accordance with a non-scheduled activity licence obtained from NSW EPA under the POEO Act (see response to **Comment A1**). The conditions of such a licence would manage the risk of water pollution on undertaking the proposed works. The conditions of the licence would reflect the information provided in the Sediment and Water Quality Management Plan (SQWMP) (a draft copy of which is included in **Appendix D, Management Plans**). NSW EPA would independently audit the works against the terms of the licence.

- The live monitoring of turbidity levels needs to occur at several locations along the northern portion of the nearby seagrass bed. These sites need to include areas of the Endangered Population of *Posidonia australis* seagrass.

  Response: The draft SWQMP (see **Appendix D, Management Plans**) contains the proposed locations where continuous live turbidity monitoring would take place. The SQWMP will be subject to revision pending any further comments in response to this Submissions Report, as well as accounting for any refinement to the revised mitigation and management measures (see **Chapter 4**). The SWQMP would also be updated to account for any conditions of consent placed on the proposed works should development consent be granted.

- In regard to the monitoring of turbidity levels In Item D2, an accompanying mitigation measure needs to be included which states that at any time the stated turbidity levels are triggered, the overflow dredging works are to cease immediately and mitigated accordingly. As it is written, Item D4 seems to relate more to the monitoring of pH and Dissolved Oxygen (DO) rather than turbidity. Further, mitigation responses to turbidity should be triggered for any exceedance of the stated triggered levels, rather than the 'persistent exceedance' (i.e. 3 or more exceedances within a 24 hour period) as stated in Item D4.

  Response: Measures consistent with the above comment are included in the response to **Comment A10**. These are taken from the draft SWQMP.

- The Endangered Population of *Posidonia australis* seagrass that has been identified as falling under the extended footprint of impact of the proposed works is to be monitored for signs of decline during the dredging event Should this become evident then this should trigger a reduction or avoidance of overflow dredging.

  Response: Following discussions with NSW DPI (Fisheries), Caltex proposes the following additional mitigation measure.

  Additional Mitigation [M10]: Mapping of the major benthic estuarine habitats in Botany Bay has been previously undertaken by NSW DPI Fisheries (Cresse et al, 2009); as noted in the EIS. The generated mapping provides the most current indication of the extent, diversity and condition of the seagrass beds in Botany Bay. The field surveys undertaken to support the EIS used this mapping as a basis for assessment.

  The method of survey undertaken in the EIS would be repeated during and after the works. This would involve undertaking a boat-based differential GPS seagrass survey to verify the presence, habitat boundaries, extent and general condition of the seagrass communities adjacent to the project site (dredge footprint). The survey would target those communities located on the eastern edge of Silver Beach and around Kamay Botany Bay National Park (including the endangered community of *Posidonia australis* that occurs locally).

One survey would be undertaken approximately one-third of the way through the dredging program during the peak spring-summer season. A follow-on survey would then be undertaken upon completing the dredging works.

Comment B6: Mitigation and Management Measures (Review of the Management Plans)

Fisheries NSW request the opportunity to comment on any CEMP and DSDMP prior to implementation.

Response: Preliminary draft copies of the Sheet Pile Wall and Rock Revetment CEMP, the Kurnell Wharf Infrastructure Upgrade CEMP and the DSDMP are included in the **Appendix D, Management Plans**.

Caltex would welcome preliminary feedback from NSW DPI (Fisheries) on the draft CEMP and DSDMP. NSW DPI (Fisheries) will also have the opportunity to review further iterations of the CEMP and DSDMP as the approvals process progresses.

Comment B7: Mitigation and Management Measures (Consultation)

Part of the modelled sediment deposition over seagrass areas falls in the area of seagrass habitat where active remediation research is currently occurring following the harm resulting from AusGrid's Energy Cable Laying Project. Fisheries NSW scientists have been alerted of this and have asked to be kept informed of when the dredging activity would occur. The Department of Planning and Infrastructure is hereby advised of this request, and it is also recommended that comment is also sought from AusGrid on this matter.

Response: In line with the proposed community consultation plan (see response to **Comment A25**), Caltex would consult with AusGrid before and during the works. Caltex has contacted AusGrid in defining the scope of works prior to preparing the EIS to ensure there were no conflicts with its operations relating to the recent installation of the 132 kV electricity cable located to the east of the dredge footprint.

Comment B8: Amenity and Recreation (Recreational Fishing)

As the EIS notes, Botany Bay is a Recreational Fishing Haven. This was established in 2002, when recreational fishers invested $10 million, via recreational fishing licence fees, to buy out commercial fishing effort in Botany Bay, and gain sole fishing rights within the Bay. Since then, the recreational fishing community has invested significant funds in improving recreational fishing opportunities and amenities within Botany Bay. Recreational fishing stakeholders have expressed ongoing concerns with potential impacts of the proposal on recreational fishing in the Bay, especially In relation to the size of the dredge footprint and disturbance caused by vessel movements. It is proposed that 0.1% of current recreational fishing grounds in this Recreational Fishing Haven would be lost to the Marine Security Zone to incorporate the expansion of Fixed Berth 1. The EIS states that this area is not regularly fished as it is close to the existing fixed berth. Fisheries NSW questions the validity of this assumption as no studies have been conducted to determine this. In fact, the 35 m wide x 310 m long area is in relatively safe protected waters close to the mouth of the Bay and is likely to be fished, especially when ships are not berthed at the fixed berth. The preference for Fisheries NSW is that long-term recreational fishing access is to be maintained to all fishable sites within this highly-valued Recreational Fishing Haven. As proposed within the EIS, Fisheries NSW recommends that negotiations with the recreational fishing community are progressed following this public exhibition of the EIS and that consideration be given towards possible

forms of compensation or offsets for the reduction of fishable waters within Botany Bay from these upgrades.

Response: Although this statement was included in the EIS, Caltex has since reviewed this requirement and concluded that the expansion of the fixed berth would not be accompanied by a need to expand the Marine Security Zone. Consequently, there would be no additional loss to the areas recreationally fished in the Bay.

Recreational fishing would still be permissible across the same extent of the Bay after the works as is currently permissible.

Any impact on recreational fishing would be temporary, and would relate to the need to impose a 'works exclusion zone' around the dredger and hopper barges. As the dredger and hopper would be moving over the entire footprint across the 23-week period no single area would be unduly affected for more than a few weeks. The impact is therefore considered negligible.

Comment B9: Mitigation and Management Measures (Community Consultation)

Considering the popularity of Botany Bay with the recreational fishing and wider community and the exposure of the site to the general public, Fisheries NSW recommends that an effective public communications strategy and complaint-line is maintained during the dredging event. It is important that stakeholders are kept informed of when the dredging and spoil disposal activities are occurring, the mitigation measures being employed, and what impacts this would have on conducting their activities if any Fisheries NSW also requests to be notified of such consultations, so that Fisheries NSW can ensure that recreational and commercial fisheries stakeholders and seagrass researchers are informed of the dredging event so that they can adjust their activities accordingly.

Response: The response provided to **Comment A25** notes that a community consultation plan would be put in place over the next three years. This would include measures to inform the local community, special interest groups and users of the Bay of the key works activities.

Comment B10: Spoil and Contamination (Offshore Disposal)

The proposed disposal of dredged spoil at the Sydney Offshore Dumping Ground is an activity that requires authorisation by the Federal Government. Commercial and recreational fishing stakeholders who fish in this area have expressed concern regarding the deposition of contaminated material at sea. Fisheries requests this matter be appropriately considered to ensure the deposited sediment does not have any significant impacts on marine ecosystems within and adjacent to the proposed dump site.

Response: Since the exhibition of the EIS, Caltex has embarked on a substantial and comprehensive assessment to characterise the north-west corner of the Sydney Offshore Spoil Ground (the proposed location where the dredged sediments would be disposed). This has involved collecting physical, chemical and biological data covering the proposed disposal site, as well as modelling the dispersion and deposition impacts over the Spoil Ground and its environs. This assessment has been prepared to support the SDP application being made to SEWPaC and forms part of a separate assessment of the environmental impacts resulting from the 'loading, transporting and disposing' of sediment. This

Environmental Impact Assessment (EIA) has been written in accordance with the provisions of the Commonwealth *National Assessment Guidelines for Dredging 2009* (NAGD). Caltex understands that the recreational fishing community is in direct consultation with SEWPaC regarding this matter. SEWPaC will consider and determine the SDP application including the findings of the EIA. This assessment includes a consideration of the impacts on recreational and commercial fishing interests in Botany Bay and at the Spoil Ground.

Comment B11: Management Plans (Marine Pest Species)

Regarding the various management and monitoring plans within Appendix D of the Draft Submissions Report, Fisheries NSW consider these documents to be adequate with the inclusion of the following:

- Section 8.3 of the Dredge and Spoil Disposal Management Plan – this section should refer to preventing the introduction of all marine pests (both flora and fauna). Associated performance indicators, monitoring, reporting, and corrective action measures should relate to all marine pests, not just *Caulerpa taxifolia* as currently proposed.

Response: Caltex recognises the importance of managing the risk of spread of all marine pest species. Consequently, the following revision to the Mitigation and Management Measure E5 in Chapter 19 of the EIS is proposed.

Mitigation Revision [M11]:

Proposed measures to minimise the risk of translocating marine pest species into Botany Bay, or from Botany Bay to the disposal area, would include the following:

- The works' contractor would liaise with NSW DPI (Fisheries) and review the marine pest website (http://www.marinepests.gov.au/home) to identify any reported pest specifically affecting Botany Bay immediately prior to and during the proposed works. If required, further discussion would take place with NSW DPI (Fisheries) and DAFF to agree on specific mitigation beyond the measures set out below.
- Prior to commencement of dredging in an area, a visual survey of the seafloor for all marine pest species would be undertaken to minimise the risk of spreading such pests beyond current limits. If pest species are determined to be present in the area, the works contractor would report the presence of the species to the State or Commonwealth agencies (as required). Management measures would be implemented in accordance with the requirements of the guidance documents including, NSW *Control Plan for the Noxious Marine Alga Caulerpa taxifolia 2009*.
- Any dredge equipment sourced from outside the region would be subject to inspection for marine pests and hull cleaning prior to use.
- The works would adhere to DAFF requirements restricting the transfer and discharge of ballast water. No 'high risk' ballast water or sediments from ballast tanks would be discharged into Botany Bay, in transit, or at the Spoil Ground.

3.2.3 NSW OEH

Introduction

A submission was received from NSW OEH on 28 March 2013 (ref: DOC13/7132). The NSW OEH submission notes that the majority of issues raised at the point of consistency had been addressed in the exhibited EIS, however the Office has highlighted a number of outstanding issues relating to:

- the impacts outside of Botany Bay;
- the long-term impacts to Silver Beach; and
- the content of the Management Plans.

Comment C1: Spoil and Contamination (Offshore Disposal)

The scope of the study area in the ElS has been extended to include consideration of sensitive areas on the northern and western sides of Botany Bay As a result the EIS has assessed the potential impacts of the proposal on a wider range of habitat types around the Bay. However, the study area was limited to the dredge site within Botany Bay and consequently the EIS does not fully consider the potential impacts on threatened pelagic species that use areas outside of the Bay (see below).

No additional survey work was undertaken for the EIS. Instead, a number of threatened and migratory species were assumed to be present on the basis of a desktop assessment, this included species recommended for consideration by OEH. As a result, a broader range of threatened and migratory species were considered in the ElS. However, this desktop assessment was based on a 5 km radius search around the dredge site only and did not cover the Sydney Offshore Spoil Ground sub-site or the area between the dredge site and the disposal site. There are numerous records for Humpback Whale in this area, because it is on their biannual migration route. OEH considers that additional shipping movements and sediment disposal associated with the project could potentially impact this species in various ways (e.g. ship strike and sediment plumes). Consequently, OEH recommends that specific measures to avoid or minimise these impacts be included in any Fauna Management Plan developed as part of a project approval.

Supplementary Comment: NSW OEH acknowledges that sediment disposal would occur in Commonwealth waters and accepts that the impacts on marine fauna will be assessed as part of Caltex's application to SEWPaC. However, the shipping movements between the dredge site and the disposal site would occur within NSW State [territorial] waters and therefore an assessment of the potential impacts on all marine/pelagic species listed under the NSW *Threatened Species Conservation Act 1995*, which are likely to occur in these waters, should have been included in the EIS. Measures to minimise/avoid impacts on marine fauna were included in the draft CEMPs, but they do not cover offshore sediment disposal.

Response: The upgrade of the Kurnell port and berthing facility would take place in NSW waters.

Therefore development consent is being been sought from NSW Department of Planning and Infrastructure (DP&I), and this would be granted under the provisions of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EP&A Act, the *EP&A Regulation 2000* and the associated State Environmental Planning Policy on State and Regional Development 2011 (SEEP SRD) require that an EIS be prepared to assess the impacts of the activity for which development consent is being sought (in this case the upgrade of the port and berthing facility).

The transport of the sediment would occur in Botany Bay (NSW waters), and within State territorial waters (5.5 km out to sea) as well as Commonwealth waters.

Separately, an application is being lodged to SEWPaC to dispose of the dredged sediments offshore in Commonwealth waters. This application is being made under the *Environment Protection (Sea Dumping) Act 1981*. The guidelines supporting the Act (the NAGD) require that an assessment is undertaken to assess the environmental impacts resulting from 'loading, transporting and disposing' of the dredged sediments. This assessment has been prepared by Caltex and has been be submitted to SEWPaC (as the administrators of the *Environment Protection (Sea Dumping) Act 1981*) alongside the SDP. This EIA identifies and assesses the potential impacts of the transportation to, and disposal of the sediments within, the north-west corner of the Sydney Offshore Spoil Ground. It therefore considers shipping impacts in both State Territorial and Commonwealth Waters.

For completeness the following section has been taken from the environmental assessment undertaken to support the above application. The assessment provided information on the dredging area, transport routes and Spoil Ground.

Dredging Area: The potential risk of a ship striking marine fauna occurs with any marine activity, with the greatest risk occurring where fast moving ships are operating in shallow and/or confined waters (Laist *et al.*, 2001). Slower-moving species that surface to breathe, such as Dugong, marine turtles and whales, are at the greatest risk of being struck.

The transport of the sediment would include the use of a range of ships including the barges and a number of support ships. Within Botany Bay, due to the slow-moving nature of the majority of these ships, which would generally also be operating in water depths exceeding 10 m, the risk of ship strike to marine fauna is considered to be low. Whilst moving offshore the ships would travel to the Spoil Ground at speeds consistent with any other marine vessels in the area and in water depths increasing to 120 m.

Threatened or protected marine mega-fauna are not common in Botany Bay, and suitable foraging habitat in the dredge footprint is limited, further reducing the likelihood of ship strike on any of these species.

Although any ship strike may result in serious harm to the animal, it is not considered that strikes pose a significant risk to any of these species at a population or community level. Nonetheless, there would be a residual risk that would need managing in undertaking the proposed works. This impact is therefore assessed as **minor-to-moderate** adverse.

Transport Route (State Territorial and Commonwealth Waters)/Spoil Ground: Whilst moving offshore the ships would travel to the Spoil Ground at speeds consistent with any other marine vessel in the area and in water depths increasing to 120 m.

It is recognised that the transport route outside of the Bay would occur in an area where significant whale migration occurs. The principal risk to cetaceans would be the collision with spoil barges travelling to and from the Spoil Ground. However given the low frequency of barge movements and the moderate speed at which they will be travelling, the risk to individuals is small and no risk to species or populations is foreseen.

Low level avoidance behaviour may be exhibited in the proximity of vessels and the intermittent spoil plumes. However, given the open water location of the spoil ground, impact on migrations during the dredging period will be small.

Two species of seal (Australian Fur-seal and New Zealand Fur-seal) also have the potential to be impacted. Again the presence of the spoil barges and spoil plumes may cause localised avoidance behaviour. However, given the ranges of individuals of these species such interaction is expected to be negligible.

While the north-west corner of the Spoil Ground lies at the extreme southern edge of marine turtle habitat, there would be a negligible impact on this species resulting from collision with vessels.

The movement of the spoil barges and discharge of spoil may attract birds. However this would be limited by the absence of food in the spoil. Therefore, no significant impact on birds is expected as a result of spoil dumping.

Supporting field survey of the north-west corner of the Spoil Ground and adjacent areas suggests that suitable habitat for Black Cod and Grayling does not occur and hence these species are unlikely to occur in the area. Therefore, it is unlikely these species would be affected by the proposed disposal activity.

Overall, impacts to marine fauna resulting from collision with vessel movements under the proposed transport and disposal activities would be **negligible**.

A specific Fauna Management Plan is being prepared to support the transport and disposal of the sediments. This would form part of the Dredging and Spoil Disposal Management Plan (DSDMP), a preliminary draft of which is included in **Appendix D, Management Plans**. The following additions to Mitigation Measure E3 in Chapter 19 of the EIS will be included in the revised Fauna Management Plan.

Mitigation Revision [M12]:

To minimise the risk of ship strike:

- Observations for marine turtles, dugong and cetaceans would be undertaken within 420 m [(2)] of the works in Botany Bay, whilst the sediments were transported offshore and once at the Spoil Ground.
- Where marine turtles, whales and cetaceans enter this area, the operations would be put on standby and the tugboat would reduce its speed to 4 knots.
- Where marine turtles, whales and cetaceans come within 150 m of the hopper barges, the tugboat would temporarily stop until the fauna were to move beyond this distance.

[2] This is the distance defined in the EIS over which underwater noise generated from the works could impact on marine mammals.

Comment C2: Hydrodynamics and Coastal Process (Hydrodynamic Change)

The EIS dismisses the importance of intertidal habitat along Silver Beach for shorebirds and migratory-waders. There are numerous records for Pied Oystercatcher and Little Tern, as well as some migratory waders, at this site. The potential impact of changes to the hydrodynamic processes at Silver Beach (see page 11-29 of the EIS) on this intertidal habitat should be addressed in more detail together with a description of any ameliorative measures that may be required.

Response: Caltex acknowledges the presence of Pied Oystercatcher and Little Tern in the Bay area as discussed in Chapter 11 of the EIS. Section 8.6.1 of the EIS considered the changes to the hydrodynamic processes in Botany Bay resulting from the proposed works. The conclusions of that assessment state that:

- '*there would be no change to local wind-wave conditions*';
- predicted changes in wave-height and wave-direction (resulting from the altered swell) would be minor only (in the order of mm) occurring '*on Silver Beach and within the groyne field, where changes in (significant) wave heights would be +/-0.05% compared against existing conditions*';
- there would be '*minor changes (ranging from -0.4% to +0.4%) to the significant wave height along Silver Beach [and]… no changes at the [airport] runways, in Port Botany, or at the main recreational fishing sites to the north*'; and
- less than 0.1 degree of direction change in the longshore transport processes, which would be contained within the Silver Beach groyne field.

The model used to predict these changes has been validated against data collected in Botany Bay.

The EIS concluded that '*the results of the modelling demonstrate that the effects of the proposed dredging works on the hydrodynamics and coastal processes within Botany Bay would be, at most, minor (adverse) and would not require the development of specific mitigation measures'*.

This conclusion remains valid even accounting for the long-term hydrodynamic changes in the Bay, as discussed in **Appendix B, Hydrodynamic Modelling Clarifications**.

'*Although the planned extent of dredging is significant, the volume is small when compared with the 7.5 million m^3 extracted for the Port Botany Expansion project for example. The changes in depth are relatively small and diffuse [due to only dredging in spot locations across the footprint]; hence there would be no focussed changes in wave parameters and direction changes would not be consistent within the groyne compartments. Moreover, Figures 9-2 to 9-4 [of the EIS] demonstrate that any small changes are all located in the Silver Beach groynes area, which is inherently protected*'.

Beach stability and long-shore transport or erosion would not be significantly affected along Silver Beach as a result of the proposed works. This would therefore mean that the associated intertidal habitat would remain unaffected in terms of changes to the hydrodynamics.

The other area of the Bay that would be potentially affected through TBT dispersion and deposition is the rocky intertidal zone around Kamay Botany Bay National Park. This area supports a range of plants and invertebrates. These biota may be subject to long-term exposure of low concentrations of TBT resulting from deposition occurring over this area followed by the re-suspension of deposited bottom sediments over time. Invertebrates such as cunjevoi, rock oyster and gastropods are present within the intertidal zone. These species are prey for endangered bird species (such as the Pied oystercatchers) and other migratory wading shorebirds that occur in the Bay.

As such, potential pathways for bioaccumulation of TBT from contaminated sediments currently exist in this habitat. These pathways involve TBT becoming attached and foliose algae, which is then grazed by gastropods, oysters, cunjevoi and shorebirds. Sediment deposition from dredging activities in the intertidal zone fringing the National Park foreshore are conservatively predicted to be in the order of 1 to 5 mm (see **Figure 3-3** of this Report), with predicted concentration of sediment-bound TBT ranging from 0.03 to 2.4 µg Sn kg^{-1} (see Table 10-3 of the EIS) These sediment concentrations are below those that have been associated with changes in ecological communities or reproductive inhibition (Wilson 1994, Gibson and Wilson 2003, Roach and Wilson 2009). It is considered unlikely that the deposition and resuspension of deposited sediments by tidal flow would increase the concentration of bioavailable TBT to detectable levels. The presence of low concentrations of sediment-bound TBT in foreshore areas is therefore a **negligible** risk in terms of the bioaccumulation of TBT in marine biota and shorebirds compared to the existing conditions.

Comment C3: Mitigation and Management Measures (Management Plans)

Chapters 11 and 19 of the EIS provide information on the measures proposed to mitigate and manage the impacts of the proposal, which will be detailed in various post-approval plans (e.g. Construction Environmental Management Plans, Fauna Management Plan, Dredging and Spoil Disposal Management Plan etc.). Most of the measures are fairly general and do not provide enough detail for OEH to be confident that they can effectively mitigate or manage potential direct and indirect impacts on threatened species or their habitat in Botany Bay or between Botany Bay and the Sydney Offshore Spoil Ground.

Consequently, OEH recommends that any approval conditions specifically stipulate what must be addressed in each of these plans to ensure that they comprehensively cover all of the impacts of the proposal.

Response: In response to a consistency review comment, Caltex included additional information in Section 19.4 of the EIS that provided more detail on the content of the above two Plans. In addition, Caltex has chosen to prepare and submit preliminary draft versions of both the CEMPs (the Sheet Pile Wall and Rock Revetment CEMP and the Kurnell Wharf Infrastructure Upgrade CEMP) and the DSDMP in **Appendix D, Management Plans**, of this Submissions Report.

Caltex would welcome preliminary feedback from NSW OEH on the draft CEMPs and DSDMP. NSW OEH will also have the opportunity to review further iterations of the CEMPs and DSDMP as the approvals process progresses.

3.2.4 Randwick City Council

Introduction

A submission was received from Randwick City Council on 28 March 2013 (ref: F203/00157). The submission included comments on:

- the impacts to Botany Bay;
- impacts to the seagrass in Botany Bay;
- the management and spread of marine pest species;
- the distribution and dispersion of contaminated sediment;
- impacts on marine protected species; and
- community consultation (public interest).

Comment D1: Ecology (Impacts on Botany Bay)

The key issue that Council wishes to raise is the concern of the potential impact on the marine ecology of Botany Bay; specifically in relation to cumulative impacts with other major developments and impact on sensitive marine environments resulting from disturbance to sediment.

Response: Caltex recognises the potential for the works to impact on the hydrodynamic processes of the Bay as discussed above in response to **Comment C2**.

The model used to predict the hydrodynamic changes that would occur as a result of the proposed works considered the influence of a number of recent major projects that have taken place in Botany Bay. These include the Port Botany Expansion work and the extension of the Airport runway. As such, the hydrodynamic changes that have occurred over the period since these projects were developed have been included in the modelling.

As noted in **Appendix B, Hydrodynamic Modelling Clarifications** '*previous modelling (Lawson and Treloar (2003)), and the work undertaken for the proposed works, has shown small changes in wave conditions; with no changes in open water currents. Changes in wave heights were in the order of millimetres and current speeds changed only near major structures such as the parallel runway. The dredging proposed by Caltex only requires the need to 'spot dredge' certain location across an established footprint. Locally there would be changes in bathymetry, however across the entire project site there would be unidentifiable macro-scale changes (even accounting for the slight increase in the depth and size of the established berths). In effect, the hydrodynamics of the Bay are not substantially influenced by such a small scale change (demonstrated by the fact that the Caltex proposal is to dredge 153,000 m^3 compared to the 7,500,000 m^3 dredged at Port Botany)*'.

The works would be undertaken using a dredging method that produces suspended sediments at a much lower rate than alternatives that have been used in Botany Bay, such as trailing suction hopper dredging (TSHD). The result is a low level of sediment concentration and deposition rate (as discussed in response to **Comment B1**). Suspended sediment is predominantly generated through overflow dredging, the impacts of which are also discussed in response to **Comment B1.**

Caltex however realises Council's concerns and the request to include additional contingency (mitigation) measures on undertaking the works. For this reason Caltex has proposed further restrictions on the

limiting the spill rate and use of overflow dredging (see response to **Comment A10**), supported by the implementation of a silt boom around the dredger (see response to **Comment A13**).

Comment D2: Ecology (Damage to Seagrass)

This proposal appears to have the potential to cause further loss of seagrass areas which are notoriously vulnerable to sea floor dredging and disturbance. From an environmental perspective a great amount of seagrass habitat has already been lost in Botany Bay and the conservation of remaining areas of sea grasses is critical to the ecological health of Botany Bay.

The impacts of the current proposal need to be considered in conjunction with other works in the Bay including the Port Botany Terminal 3 Expansion and ongoing maintenance dredging of shipping channels, to adequately address cumulative impacts of the combined works on the remaining seagrass beds and their dependent ecological communities within Botany Bay.

Botany Bay has a complex pattern of currents and sand movement. Dredging to allow for the reconfiguration of the Kurnell berthing facility has the potential to have a significant impact on endangered Posidonia australis seagrass communities.

As the predicted impact zone is 250-270 m distance from the dredging zone and the NSW Department of Primary Industries have identified Posidonia beds less than 250 m from the site. The Council recommends that monitoring strategies be required to be undertaken before, during and after dredging is completed to accurately assess any actual impact on the sensitive marine environment.

To ensure the accuracy of and a precautionary approach in relation to the predictive modelling and to ensure any impacts on nearby Posidonia beds are minimised, Council recommends Caltex be required undertake monthly monitoring of sediment transport and deposition during dredging works, as has been completed under the Port Botany expansion Terminal 3 construction project.

In addition pre and post seagrass bed distribution mapping should also be completed to ascertain actual impact on seagrass. Council also suggests that due to the unpredictable nature of modelling impacts on seagrass that compensatory strategies for damage to seagrass should to be developed prior to commencement of works in the instance that seagrass are damaged as part of these works.

Response: There is no predicted direct impact (loss) of seagrass resulting from the proposed works. The established seagrass communities all occur outside of the dredge footprint. It is theoretically possible for seagrass to colonise the dredge footprint (noting their absence during the field surveys). However it is doubtful that this would occur given the depth of the footprint is at the limit of tolerance at which the species that occur in Botany Bay can survive. However, post the works the footprint would quickly re-establish, thus providing a residual potential for seagrass colonisation.

As discussed in response to **Comment B1**, sediment dispersion would only occur over the northern limit of ephemeral extent of the seagrass beds when dredging the base of the turning circle (i.e. the location shown in green in **Figure 3-4**). This would occur for 1-2 weeks. For all other dredging locations there would be no sediment dispersion over the seagrass beds.

The predicted suspended sediment concentration over the seagrass beds whilst dredging the base of the turning circle would 0.5 mgL^{-1}. This is far less than the natural levels of turbidity that occur in the Bay. The dispersion would also occur in the summer months when there is likely to be more stable conditions in the Bay.

The resultant deposition that would occur over the seagrass beds has been modelled based on conservative assumptions, and calculated to provide an upper-limit benchmark (as discussed in response to **Comment A14**). Even if this benchmark was reached, the species of seagrass in the area would be able to tolerate this depth of deposition for the reasons discussed in Chapter 11 of the EIS; a point that was acknowledged by NSW DPI (Fisheries) in discussions held with the Department in April 2013 during the preparation of the submissions report.

As noted above in response to **Comment D1**, the modelling used to predict the sediment dispersion and deposition has accounted for the other hydrodynamic changes that have taken place in the Bay.

As a precaution, Caltex has revised its proposed mitigation measures to strengthen its proposed turbidity monitoring program (as discussed in response to **Comment A10**). In addition, Caltex would undertake seagrass monitoring both during and following the dredging works (see response to **Comment B5**).

The proposal to continually monitor turbidity at five locations provides an active method of mitigation. This is considered far more effective than the passive methods of monitoring sediment deposition or implementing silt curtains (see response to **Comment A13**).

Caltex would consider compensatory measures should it be demonstrated through the turbidity and seagrass monitoring that there had been a material impact on the seagrass community due to undertaking the proposed works.

Comment D3: Water and Sediment Quality (Distribution and Dispersal of Contaminated Sediment)

The disturbance of the seabed during the course of dredging will disturb and potentially cause the dispersal of contaminated sediment. This sedimentation will not only significantly affect the fragile seagrass beds in the Bay but also the suspended material may impact upon aquatic fauna species.

Council has noted that although most identified sediment contaminants are below waste classification levels there are a number which exceed ANZECC environmental protection levels as indicated in Appendix D2 and these include Arsenic, Lead, Zinc and Mercury.

These proposed works may cause dispersal of this contaminated sediment into other uncontaminated areas of Botany Bay. This proposal needs to identify appropriate management regimes to minimise sediments dispersal during the dredging works. Further consideration of a floating or fixed silt curtains should be made as these have been extensively used in Botany Bay for a number of other infrastructure projects. These could be installed around the dredging barge encompassing its operations to assist in containing any plume which will occur as a result of the dredging operations.

Response:

<u>Impacts on Seagrass</u>

The dredging would remove the majority of the sediment, placing it into the hopper barge with the exception of 1-2%, comprising fine sediment, which would be dispersed into Botany Bay through dredging, and a maximum of 8% of the total volume of sediment would be dispersed through overflow dredging. Any disturbed or lost coarse material would settle out of suspension within a few seconds immediately around the dredger.

The sediment dispersion would have negligible impact on the seagrass beds for the reasons discussed in response to **Comment B1**. The resultant sediment deposition could also be tolerated by the species that exist close to the project site (as discussed above in response to **Comment D2**).

Marine organisms are able to tolerate naturally occurring high concentrations of suspended sediments (generally above 100 mgL^{-1}) (Nicholls et al, 2003). However acute effects on marine and estuarine organisms can occur where the suspended sediment concentrations exceed ~500 mgL^{-1} (Schubel, 1977). At such high concentrations the filter and breathing mechanisms in filter feeders can become clogged or damaged (Brehmer, 1965; Parr et al., 1998). Young fish can also be affected, with sediments becoming trapped in their gills (Wilbur, 1971). Adult fish and other motile (mobile) species are likely to move away from areas of high suspended sediments (such as dredging sites) unless food supplies increase as a result of the disposal of organic material (ABP Research R701, 1997). For these reasons, the sediment generated by the proposed works is unlikely to impact on sensitive marine species.

Occurrence and Dispersion of Trace Metals

Whilst the metals concentration in individual samples exceeded the NAGD Screening Level and ISQG-low level, the 95% Upper Confidence Limit (UCL) of the mean for all metals was determined to be below these threshold Screening Levels.

The NAGD Screening Level and ANZECC ISQG-Low Level are the best available guidelines to determine the biological-effects of contaminants, and the calculation of the 95% UCL is the accepted statistical parameter to use in the comparison. This is because individual sample locations may have spikes or low levels in certain contaminants that are not representative of the overall area being dredged. Under the NAGD guidelines (used as the basis on which the sampling and analysis was undertaken), elutriate testing and comparison against the water quality species protection levels included in the Commonwealth Guidelines for Fresh and Marine Water Quality 2000 (ANZECC/ ARMCANZ) is only required when the 95% UCL of the mean exceeds the NAGD Screening Level; as sediments with 95% UCL of the mean below the NAGD Screening Level are not considered to adversely affect water quality or marine life.

The Guidelines are generally based on the impact of these sediments on the local environment during disposal. Given that comparison to the Guidelines shows there is expected to be no significant impact from trace metals during the disposal of the sediments, the impact during dredging would be expected to be negligible, provided suitable environmental management procedures are adopted during the dredging, as detailed in Chapter 19 of the EIS and supplemented here in **Chapter 4, Revised Mitigation and Management Measures**.

Dispersion of TBT

The issue of TBT dispersion is discussed above in **Comment A12.** The dredging works would not generate a solution of dissolved TBT that would exceed the Commonwealth Fresh and Marine Water Quality Guidelines 2000. The concentration of residual sediment-bound TBT would be much less than is currently present in the dredge footprint. In the long-term, the small percentage of dispersed and deposited fine sediment, which is likely to fall out of suspension within approximately 12 hours (see the response to **Comment A13**) and cover an area centred of the footprint (see the response to **Comment A14**), are unlikely to be remobilised other than under severe storm events (see **Appendix B, Hydrodynamic Modelling Clarifications**). This would limit the further redistribution of TBT. Therefore impacts would be localised to an area that currently contains highly elevated concentrations of sediment-bound TBT, most of which would be removed through the dredging. This would therefore have a residual positive effect in the dredge footprint, with a limited effect on the central areas of the Bay immediately outside of the footprint.

Finally, toxicity tests undertaken in accordance with the National Assessment Guidelines for Dredging 2009 (NAGD) show the TBT of the dredge footprint sediments to be non-toxic in either a sediment-bound form or dissolved form. This was confirmed through undertaking tests on two representative indicator species.

Whilst silt curtains would not be used for the reasons set out in response to **Comment A13**, Caltex is proposing an active method of mitigation through live turbidity monitoring, with the ability to alter the dredging schedule and working method immediately upon there being an exceedance of the threshold criteria relative to ambient conditions in the Bay as listed under the response to **Comment A10**. The proposal to use a silt boom and restrict the use of overflow dredging to locations that are a minimum of approximately 500 m away from the seagrass beds provides additional contingency.

Comment D4: Ecology (Impact on Protected Marine Species)

The 'Steps' dive site, located off Kamay Botany Bay National Park to the south of the project site is reported to contain the most number of Weedy Seadragons (Phyopteryx taeniolatus) ever surveyed from one location. As Appendix E7 [of the EIS] indicates that the project is "highly likely" to have an impact on protected Weedy sea dragon, Council recommends that mitigation strategies similar to those proposed by other major infrastructure projects that have occurred within Botany Bay must be provided to minimise these impacts.

Response: The Weedy Seadragon is a Marine Listed species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and is protected under the Fisheries Management Act 1994 (FM Act), where it is an offence to '*possession, collect or harvest [the Weedy Seadragon] in NSW without a permit'*. The Weedy Seadragon is not listed under the EPBC Act as a threatened or migratory species. Therefore, no further action is required for this species (i.e. a significant impact criteria assessment).

As noted in the EIS, juveniles of the species are often associated with kelp and seagrass habitat (NSW DPI (Fisheries), 2007). The species has been historically recorded in Botany Bay, and there is a high likelihood of the Weedy Seadragon being present within the shallower areas of the dredge footprint, and areas directly adjacent to the dredge footprint. Therefore it is likely that there would be a localised limited direct mortality resulting from the dredging. The potential for widespread indirect impacts to occur is considered substantially less due to the limited extent of sediment dispersion and the very slow rate and extent of deposition (see response to **Comment A14**).

Comment D5: Consultation (Public Interest)

Due to the level of community concern regarding this project and the technical nature to the proposal documentation Council suggests that some more user-friendly information on this project be made publicly available for any approval/implementation stages.

Response: As noted in response to **Comment A25** Caltex would prepare a Community Consultation Plan (CCP) that is to be implemented leading up to, during, and if required, immediately following, the proposed works. This would include the regular publication and dissemination of user-friendly information.

3.2.5 Sutherland Shire Council

Introduction

A submission was received from the Sutherland Shire Council on 2 April 2013 (ref: 772113170). The submission outlines Council's assessment of the aspects of the proposed works relating to the impacts on:

- sensitive environmental receptors;
- tributyltin (TBT) contaminated sediments;
- hydrodynamic processes;
- turbidity 'during construction';
- the sea dumping permit process;
- monitoring and management plans;
- contingency planning; and
- the application of the precautionary principle.

Council concludes that it understands the importance of the provisions of appropriate facilities for the operation of the Kurnell Refinery and the economic benefits the facility provides to Sutherland Shire. However, it said that remains concerned about the potential impacts of the development on the receiving environment, recommending that additional information be prepared and submitted for review.

Comment E1: General Comments (Impacts of the Works)

Sutherland Shire Council expressed general concern regarding the proposed development at the Kurnell port and berthing facility. The submission noted that Council was particularly concerned that the scale and nature of the Project could give rise to adverse environmental impacts. Most notably Council expressed concern in relation to potential impacts on sensitive arising from the proposed dredging of sediments containing tributyltin (TBT). Council' submission recommended that the proposed dredging works be reviewed by an independent expert with experience the assessment and management of TBT contaminated marine sediments.

Response: Caltex acknowledges Council's concerns and notes that the purpose of the EIS was to identify and assess the proposed work's potential environmental impact on the receiving environment. In response to this, the EIS proposed measures to mitigate, manage and monitor adverse impacts. These have been revised and supplemented in this Report (see **Chapter 4, Revised Mitigation and Management Measures**). In addition, as noted in response to **Comment A1** the assessment would carried out in accordance with a non-scheduled activity licence obtained from the NSW EPA under the POEO Act. NSW EPA would independently audit the works against the terms of the licence.

The potential impacts relating to the proposed dredging of sediments containing TBT have been identified and assessed in the EIS. Mitigation and management measures to address these potential impacts are also provided. These are addressed in greater detail in the response to **Comment E3**.

Comment E2: Ecology (Impacts on Sensitive Receptors)

Council's submission notes that the proposed works are located in close proximity to a number of significant and sensitive environmental receptors. These include the Towra Point Nature and Aquatic Reserves which Council noted contain wetlands of international significance listed under the RAMSAR convention. Council's submissions states that these areas and the sub-tidal environmental immediately fronting Silver Beach contain extensive seagrass beds, in particular, large expanses of beds containing Posidonia australis listed as an Endangered Population in Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie under the NSW Fisheries Management Act 1994.

Response: The EIS identifies, acknowledges and assesses the impact of the proposed works on the above sensitive receptors found within the environs of Botany Bay. Process to avoid and mitigate predicted likely significant impacts have also been included in the EIS and supplemented in this Submissions Report.

Comment E3: Spoil and Contamination (Tributyltin contaminated sediment)

Council's submission expressed concern that the proposal has the potential for significant adverse impacts on the marine environment from TBT within the sediment proposed to be dredged. It has recommended that the key components of the proposed dredging be reviewed by an independent expert with experience in the assessment and management of TBT contaminated marine sediments.

Response: Caltex has discussed the issue of TBT dispersion and deposition with the NSW EPA Water Quality team in response to comments raised in their submission (see **Section 3.2.1**). As noted in response to **Comment A11**, the dredging would not generate a solution of dissolved TBT that exceeds the Commonwealth Guidelines on Fresh and Marine Water Quality 2000.

The dispersed suspended sediments would contain adsorbed (i.e. sediment-bound) TBT. However (as noted in Section 10.6.2 of the EIS), when TBT is mobilised in its sediment-bound form through dredging, very little is released in a soluble form, thus limiting its bioavailability.

The residual consideration therefore relates to potential impacts arising from the long-term deposition of sediments, particularly in terms of the deposition and resuspension of TBT.

The concentration of residual sediment-bound TBT would be much less than is currently present in the dredge footprint. In the long-term, the small percentage of dispersed and deposited fine sediment, which is likely to fall out of suspension within approximately 12 hours (see the response to **Comment A13**) and cover an area centred of the footprint (see the response to **Comment A14**), are unlikely to be remobilised other than under severe storm events (see **Appendix B, Hydrodynamic Modelling Clarifications**). This would limit the further redistribution of TBT. This would localise the impacts to an area that currently contains highly elevated concentrations of sediment-bound TBT, most of which would be removed through the dredging. This would, therefore, have a residual positive effect in the dredge footprint, with a limited effect on the central areas of the Bay immediately outside of the footprint.

Finally, toxicity tests undertaken in accordance with the National Assessment Guidelines for Dredging 2009 (NAGD) show the TBT of the dredge footprint sediments to be non-toxic in either a sediment-bound or dissolved form to two representative indicator species.

Caltex is of the view that the work undertaken to assess the potential impacts arising from TBT contamination have been assessed thoroughly by qualified technical specialists. Further, the results of this work have been reviewed by the NSW EPA Water Quality team and will be reviewed as part of the

SDP application by SEWPaC. Consequently, whilst acknowledging the capacity of the NSW EPA and NSW DP&I to engage additional experts to review the results of the EIS, Caltex is of the view that this review would not contradict or add to the outcomes of the assessment already provided in the EIS.

Comment E4: Hydrodynamics and Coastal Process (Altered Hydrodynamic Processes)

Council's submission expressed concern that the proposal has the potential for significant adverse impacts on altered hydrodynamic processes within Botany Bay. Council has proposed that this aspect of the EIS be reviewed in detail.

Response: As noted in the response to **Comment C2,** Section 8.6.1 of the EIS considered the changes to the hydrodynamic processes in Botany Bay resulting from the proposed works. This assessment concluded that '*the results of the modelling demonstrate that the effects of the proposed dredging works on the hydrodynamics and coastal processes within Botany Bay would be, at most, minor (adverse) and would not require the development of specific mitigation measures'*. This conclusion is supported by the information provided in **Appendix B, Hydrodynamic Modelling Clarifications**; which considered the long-term resuspension effects (again see the response to **Comment C2**).

As noted above, the EIS has been reviewed by the NSW EPA Water Quality team as well as the NSW Department of Primary Industries (DPI) (Fisheries) and NSW Office of Environment and Heritage (OEH) (see **Sections 3.2.2** and **3.3.3** above).

Comment E5: Water and Sediment Quality (Increased Turbidity)

Council's submission expressed concern that the proposal could result in increased levels of sediment in the water column and stated that there is no recommendation in the EIS for use of sedimentation controls (e.g. silt curtains). Council recommended that NSW DP&I condition the project by including turbidity controls when works are likely to disturb the seabed.

Response: The NSW EPA and NSW DPI (Fisheries) have raised a similar comment within their submissions (see **Comment A13** and **Comment B1**). Their comments relate to the direct impacts of the proposed works on the seagrass communities resulting from sediment dispersion (i.e. light reduction) and the effects resulting from sediment deposition (i.e. smothering).

As noted in response to **Comment B1** modelling indicates that there would only be 0.5 mgL^{-1} of suspended sediment dispersed over the northern limit of the seagrass beds for 1-2 weeks whilst dredging at the base of the turning circle (i.e. the location shown in green in **Figure 3-4**). At all other times there would be no dispersion of sediment over these, or any other of the sensitive areas of the Bay.

Around any overflow dredging operations there would be a concentration of suspended sediments generated that would be detectable up to approximately 270 m. This is independent of where the overflow dredging would take place across the dredge footprint. The works would therefore have a limited spatial impact on Botany Bay.

NSW DPI (Fisheries) has accepted that the seagrass species present in the vicinity of the works would be able to tolerate the predicted worst-case depth of deposition to occur as a result of the proposed dredging works, even when using the conservative upper-limit benchmark as described above in response to **Comment A14**.

Caltex is, however, proposing to implement additional contingency measures as listed in **Chapter 4, Revised Mitigation and Management Measures**. These measures would be included to account for uncertainty in the modelling predictions, whilst providing contingency in case the mitigation proposed in the EIS fails and/or there is an unanticipated emergency or accident that occurs whilst the works are being undertaken.. These are set out above and comprise placing limits on the spill rate and further restrictions on the use of overflow dredging beyond the controls described in the EIS (see the response to **Comment A10**). It also includes a decision to use a silt boom around the dredging equipment to limit dispersion whilst lifting and slewing (loading) the sediments into the hopper barges (see the response to **Comment A13**).

Comment E6: Mitigation and Management Measures (Sea Dumping Permit)

Council's submission expressed concern that the proposal is reliant on the granting of a Sea Dumping Permit by the Commonwealth. Council stated its opinion that the approval of the sea dumping permit be secured by the proponent prior to approval of the Project under the NSW EP&A Act.

Response: The SDP will probably be determined prior to receiving any Part 4 development consent under the NSW EP&A Act. If a SDP is not granted, there is no other cost-effective alternative for disposal of the spoil, i.e. while onshore treatment is feasible it is cost prohibitive. It would also result in a number of other social and environmental impacts.

It is anticipated that a decision on the approval or otherwise of the SDP will take place by late June 2013. Should the works receive approval under the NSW EP&A Act, the timeframe for this is unlikely to be before late August/early September 2013. Consequently, should the works proceed as currently proposed, the SDP would indeed be secured prior to development consent being granted.

Comment E7: Monitoring and Management (Management Plans)

The EIS outlines that a number of monitoring and management plans will be prepared prior to works commencing. Council expressed the view in its submission that given the extent of works, potential for significant adverse environmental impact and the proximity to particularly sensitive environmental receptors, these monitoring and management plans should be prepared and reviewed prior to approval of the application.

The significance of the impacts depends on the management of the key commitments and therefore the management actions should be detailed now and be subject to independent review. Any monitoring program must be designed appropriately, both temporally and spatially, to identify changes resulting from the proposed works. Management actions required to address any comments identified as part of monitoring should also be included. They must also be achievable.

Response: Preliminary draft copies of both the Construction Environmental Management Plans (CEMPs) and the Dredging and Spoil Disposal Management Plan (DSDMP) are included in **Appendix D, Management Plans**. As noted in response to **Comment A1**, the plans will be updated prior to seeking formal approval.

The DSDMP does set out the temporal and spatial parameters relating to the relevant monitoring programs consistent with the revised mitigation and management measures included in **Chapter 8** of this Report.

Caltex would welcome feedback from Council on the preliminary draft Sheet Pile Wall and Rock Revetment CEMP, the Kurnell Wharf Infrastructure Upgrade CEMP and the DSDMP. Council will also have the opportunity to review further iterations of the CEMPs and DSDMP as the approvals process progresses.

Comment E8: Mitigation and Management Measures (Contingency Planning)

Council noted its concern that the project had the potential for significant adverse impacts, and consequently recommended that contingency plans should be prepared and submitted for review. Council further recommended that the aim of the plan(s) must be to address any realised changes resulting from the proposed works. Council's submission noted its opinion that this be prepared and submitted for review prior to approval of the proposal.

Response: Caltex has ensured that its approach to the mitigation of potential impacts is capable of addressing worst case outcomes predicted from the modelling, as well as low probability but potentially significant events (e.g. accidents or emergency situations). Chapter 4 of this Report includes the revised management and mitigation measures to which Caltex is committing in response to the comments raised in the submissions to the exhibited EIS. These revisions and additions include additional contingency measures consistent with adopting a precautionary approach to the management and mitigation of potential impacts.

The detail of these provisions is included in the preliminary draft DSDMP and both the Sheet Pile Wall and Rock Revetment CEMP and the Kurnell Wharf Infrastructure Upgrade CEMP (see **Appendix D, Management Plans**). Further detail will also be developed in the more detailed sub management plans developed in support of the DSDMP and CEMPs.

Comment E9: Mitigation and Management Measures (Precautionary Principle)

Council stated in its submission that the precautionary principle must take precedence until the effects and impacts of the proposal are properly reviewed and with regard to avoiding and/or minimising the effects of such practices, recommendations of best practice are made available.

Response: Section 20.4 of the EIS discusses how the proposed works are consistent with the principles of Ecologically Sustainable Development (ESD), among them the precautionary principle.

Beyond this, Caltex is proposing refinements and additions to mitigation measures proposed in response to submissions received, and as discussed above in response to **Comment E8**.

3.3 Additional Consultation

In addition to the above submissions NSW DP&I received further consultation letters from SPC and NSW HC. NSW DP&I has asked that this consultation be considered as part of this report but not as a formal submission.

3.3.1 SPC

Introduction

A communication on the project was received from SPC on 23 April 2013 (ref: 012/3953). The consultation was restricted to comments regarding the changes to the hydrodynamic and coastal processes that would occur as a result of the proposed dredging.

Comment F1: Water and Sediment Quality (Coastal Processes)

As you may be aware, approval for the Port Botany Expansion was granted on 13 October 2005 (DA-494-11-2003-i).The assessment undertaken found that there were likely to only be minimal hydrodynamic impacts as a result of the Port Botany Expansion project. Notwithstanding this, Sydney Ports committed to monitor the hydrodynamics of Botany Bay for a period of five years from the date of completion of the reclamation (i.e. commencing January 2010). The Department of Planning further confirmed this commitment through the imposition of the following condition regarding hydrodynamics and coastal processes:

B2.40: To ensure that any impacts of the development on hydrodynamics and coastal processes over time is understood, a monitoring program, as outlined in the EIS, is to be implemented which will include:

- continuous recording of the wind and wave climate in Botany Bay and offshore;
- beach profiling or aerial photographic record/photogrammetric analysis of Silver Beach, Towra Beach, Spit Island, Lady Robinsons Beach and nearshore shoals; and
- ongoing assessment of the need for removal of accumulated sand at the groyne and any replenishment required at the new boat ramp.

It is Sydney Ports' understanding that the above condition was imposed to confirm the results of the modelling undertaken as part of the Port Botany Expansion EIS based on the potential hydrodynamic impact of the Port Botany Expansion project which had found that wave climate, currents and wave swell energy would remain relatively unchanged across the Bay as a whole. Since undertaking the Port Botany Expansion project assessment and constructing the land reclamation area, all development within Botany Bay, including the proposed seabed dredging by Caltex, has potentially attributed to changing (both individually and cumulatively) the hydrodynamics and coastal processes of the Bay. As indicated above, the proposed seabed dredging by Caltex, if approved, may change the assumptions and conclusions of the Port Botany Expansion EIS. It is therefore recommended that Caltex be required to undertake monitoring of hydrodynamic and coastal processes, for a period of time, in order to confirm the conclusions of the modelling that has been undertaken as part of the subject application.

Response: As noted above in response to **Comment C2** the scale of dredging at Port Botany was significantly greater than that which is proposed by Caltex (7,500,000 m^3 versus 153,000 m^3). In addition,

the Port Botany project served to alter the profile and depth of the seabed in Botany Bay, unlike the proposed works, which serve broadly to maintain an existing seabed profile.

As noted in **Appendix B, Hydrodynamic Modelling Clarifications** the above condition of consent (Clause B2.40) was imposed by the NSW DP&I to *'confirm the results of modelling undertaken for that project. SPC seem to contend that, in the event that some identifiable changes occur following the completion of works proposed by Caltex, it may not be possible to assign levels of responsibility between themselves and Caltex; or indeed other previous works or natural processes. Any changes that might occur in areas other than Foreshore Beach (dot-point 3 [above]) would be difficult to assign to any particular cause because they would be very small'. This can be concluded through the results of the modelling, the conservatism included in the modelling and the fact that the model already accounts for the changes that have occurred elsewhere in the Bay (including those generated through the Port Botany Expansion).*

The tasks required of SPC under Clause B2.40 are being undertaken now. The work undertaken by Cardno for Caltex has shown that some minor shoreline changes would occur on Silver Beach (contained within groyne compartments) and Bonna Point, but would be ***negligible/not identifiable*** *on Towra Beach. The monitoring work undertaken by SPC in these areas should continue, and because of their long-term involvement, is best undertaken by them'.*

As the footprint, extent and corresponding impact of the proposed works is negligible relative to the impacts and resultant effects caused by the Port Botany Expansion project, no additional monitoring beyond that currently undertaken by SPC is proposed.

3.3.2 NSW HC

Introduction

On 21 May 2013 NSW HC issued a consultation letter commenting on the EIS and the draft Submissions Report (ref: 13/08495). The consultation included two heritage-related comments.

Comment G1: Issuing of Photographic Archival Records

Recommendation 3 [of the Heritage Impact Assessment included in the EIS] requires that '*Consideration should be given to preparing a photographic record of the existing fabric and operation of the Kurnell Wharf prior to the upgrade works, including in particular the existing infrastructure at Fixed Berth #1, which would be replaced as part of the proposed works. This record would become part of the history of the place and should be maintained for the appreciation of the present and future generations'.*

However, although it was recommended that the structures to be removed from Fixed Berth #1 on Kurnell Wharf were to be to be photographically recorded as an historical record, no storage repository for these records has been specified.

Response: Caltex will revise Mitigation and Management Measure F1 in Chapter 19 of the EIS as follows.

Mitigation Revision [M13]:

A photographic record of the existing fabric and operation of Kurnell Wharf would be prepared prior to the proposed works. This would focus, in particular, on the existing infrastructure at fixed berth #1. The record would be submitted to NSW Heritage Council's photographic archival record prior to removal/demolition.

Comment G2: Side Scan Surveys

Recommendation 5 of the Heritage Impact Assessment was not included as a Mitigation and Management Measures to the EIS, which states that in order '*to mitigate against the potential for the unexpected discovery of relics delaying the works program, existing side scan sonar data of the north-west section of the dredge footprint [turning circle and the approaches] should be reviewed by a maritime archaeologist prior to the works. If these data are not available, a remote sensing survey should be undertaken by a maritime archaeologist prior to works. In addition, the fixed berths and sub berth should be monitored for maritime cultural heritage to ensure that any relics exposed would be assessed by a maritime archaeologist, and an appropriate strategy put in place".*

There are numerous examples where small, often fragile, shipwrecks are regularly found in exposed areas where dredging and diving has previously been undertaken (e.g. the recently round wrecks of the *Herald* and *Colonist* in Sydney Harbour). Again this demonstrates the need for Caltex to undertake side a scan sonar survey of the seabed. The results of this survey need to be analysed by a suitably qualified and experienced maritime archaeologist. This information should be included in an amended EIS, which is sent to the Heritage Branch for review.

Given the issues raised above, Caltex's Mitigation and Management Measures Sections in the EIS do not sufficiently mitigate the potential heritage impacts this project will have…

Response: The proposed dredge footprint was dredged 40 years ago. Since then, the majority of that footprint, except the approaches, has been either inspected or surveyed. Diver inspections have taken place in the fixed berths, turning circle and sub berth. No heritage items have been identified. These areas were last inspected and surveyed in 2013. In addition, divers are required to work in the berths 2-3 times each week as they connect mooring lines and hoses to berthing ships.

As concluded in the EIS, there is a low-to-moderate residual risk of associated heritage relics being located within the dredge footprint. This risk will be managed through the following proposed Mitigation and Management Measure.

Additional Mitigation [M14]: Caltex would undertake a magnetic survey of the seabed before starting work. It would be used to identify any subsea utilities. Should this survey identify any unknown or unidentifiable object Caltex would engage a maritime heritage specialist to review the results of the survey prior to starting work. The review findings would be reported to the NSW Heritage Council. Caltex would also make the survey data available to NSW Heritage Council on request regardless of the findings.

Any identified heritage relics would be managed in accordance with Mitigation and Monitoring Measure F2 included in Chapter 19 of the EIS.

4 Revised Mitigation and Management Measures

The following Chapter includes Caltex's proposed revisions, amendments and additions to the mitigation and management measures described in Chapter 19 of the EIS.

4.1 Introduction

The majority of the mitigation and management measures detailed with Section 19.1 of the EIS remain unchanged. As noted in **Chapter 3, Submissions and Responses**, certain measures have been revised to provide more clarity and/or definition, whilst certain measures have been added in response to agency feedback and to provide enhanced risk management as a reflection of adopting the precautionary principle.

4.2 Revised Measures

Table 4-1 provides the original wording of the mitigation and management measures included in Chapter 19 of the EIS, and revisions to these measures that are proposed in response to comments on the received submissions. Certain additional revisions are also proposed to reflect discussions with SEWPaC in relation to the Sea Dumping Permit (SDP) application. The proposed additions to the original proposed mitigation measures are *italicised* in the right hand column.

Table 4-1 Original Measures and Corresponding Revisions

Item	Original Mitigation and Management Measures	Revised Mitigation and Management Measure
D2	The SWQMP would require turbidity monitoring to be undertaken for the duration of the dredging works. This monitoring would be undertaken at the limit of the project site, within the aquaculture site and at a number of locations within the limit of the seagrass beds. The sampling would include: • obtaining background concentrations during dry weather conditions prior to dredging to confirm the limit of 5 mgL^{-1} as being representative of the baseline; and • live monitoring during the dredging works to ensure limits of 50 mgL^{-1} were achieved at the outer limit of the project site and 10 mgL^{-1} at the aquaculture lease site and seagrass bed locations.	The SWQMP would include that turbidity monitoring be undertaken for the duration of the dredging works. This would be undertaken at the limit of the project site, within the aquaculture site and at a number of locations within the limit of the seagrass beds. The sampling would include: • obtaining background concentrations during dry weather conditions prior to dredging to confirm the limit of 5 *Nephelometric Turbidity Units* (NTU) (equivalent to 5 mgL^{-1}) (under normal dry weather conditions) as being representative of the baseline; • a limit of *50 Nephelometric Turbidity Units (NTU)* (equivalent to 50 mgL^{-1}) (under normal dry weather conditions) at the outer limit of the dredge footprint; and • a limit of *10 NTU* (equivalent to 10 mgL^{-1}) (under normal dry weather) at the closest point between the dredge footprint and the seagrass beds. *The above limits would be as measured relative to the prevailing ambient concentration of suspended sediment at the time.*

Item	Original Mitigation and Management Measures	Revised Mitigation and Management Measure
D3	The SWQMP would include a monitoring program for pH and dissolved oxygen at the limit of the project site, to be undertaken for the duration of the dredging works. These parameters would be compared against the limits set by the *ANZECC/ARMCANZ Water Quality Guidelines 2000*. The sampling would include: • obtaining background concentrations prior to dredging; and • live monitoring during the dredging works to ensure the above limits were achieved.	The SWQMP would include a monitoring program for pH and dissolved oxygen at the limit of the project site, *within the aquaculture site and at a number of locations at the edge of the limit of the seagrass beds. If the physicochemical limits set in the SWQMP are exceeded then additional mitigation measures would be implemented.* • *Limits on the spill rate or restrictions on the use of overflow dredging would be implemented (depending on the nature of the exceedance) in instances where the pH was found to be 1.5 units either side of the ambient pH concentration recorded in the Bay.* • *Limits on the spill rate or restrictions on the use of overflow dredging would be implemented (depending on the nature of the exceedance) in instances where the dissolved oxygen concentration fell below 80%.* *Persistent exceedances in either of the above threshold criteria (as measured over a 24-hour period) would require the dredger to be relocated out of the affected area until the threshold criteria are satisfied.*
D4	Should any of the monitored parameters persistently exceed the threshold limits within the *ANZECC/ARMCANZ Water Quality Guidelines 2000,* works would temporarily stop and either the spill rate would be reduced, or in extreme cases (i.e. where more than three exceedances were detected in a 24-hour period), overflow dredging would be halted temporarily in favour of removing excess water to the Sydney Offshore Spoil Ground.	The EIS currently states that the measures listed below would be employed if there was a <u>persistent</u> exceedance of the monitored threshold criteria. Caltex has reviewed this mitigation and will now commit the works' contractor to: • *ceasing overflow dredging should there be any recorded exceedance of the monitored threshold criteria, relative to ambient background concentrations, at the limit of the dredge footprint;* • *ceasing dredging where there are three exceedances of the monitored threshold criteria, relative to ambient background concentrations, within a 24-hour period at the limit of the dredge footprint;* • *reducing the rate of overflow dredging where there are two exceedances of the monitored threshold criteria, relative to ambient background concentrations, within a 24-hour period at any of the three monitoring locations covering the aquaculture site and seagrass beds;* • *ceasing overflow dredging where there are three exceedances of the monitored threshold criteria, relative to ambient background concentrations, within a 24-hour period at any of the three monitoring locations covering the aquaculture site and seagrass beds; and/or* • *relocating the dredging activity where there is a continued exceedance of the monitored threshold criteria, relative to ambient background concentrations, over more than 24 hours at any of the three monitoring locations covering the aquaculture site and seagrass beds until the ambient concentration falls below <10mgL^{-1}.*

Item	Original Mitigation and Management Measures	Revised Mitigation and Management Measure
D7	A *Spill Control Plan* (SCP) would form part of the DSDMP and CEMP. It would include controls currently in place at the port and berthing facility to manage spill risks. The SCP would include: • the requirement for staff to understand the limitations, controls, and methods to manage and prevent spills; • the protocol for reporting spills and the consequential actions to cease works immediately; • the need for regular inspections by the works' contractor to ensure the adoption of the relevant spill-management controls; • the need to plan for regular equipment maintenance; and • the requirement for spill containment provisions to be available to support the proposed works.	*All contractors working on the port and berthing facility upgrade would be required to implement necessary clean up and/or containment measures in the event of a spill.* A works-specific *Spill Control Plan (SCP)* would be prepared to control and manage spill risk*.* The SCP would include the following provisions to handle an accident or emergency situation: • requirement for staff to understand the limitations, controls and methods to manage and prevent spills; • protocol for reporting spills and the consequential actions to cease works immediately; • need for regular inspections by the works' contractor to ensure the adoption of the relevant spill-management controls; • need to plan for regular equipment maintenance; and • requirement for spill containment provisions to be available to support the proposed works.
E3	To minimise the risk of ship strike: • all project operations personnel would be fully trained in the use of the equipment and would undergo training in accordance with the CEMP, DSDMP and environmental measures agreed as part of the proposed works' approval; • observations for marine turtles, Dugong and cetaceans would be undertaken during the dredging, piling and rock revetment works and, where marine fauna approach within the precautionary exclusion zones designated in the DSDMP, dredging operations would temporarily cease until the animal has left the exclusion zone; and • ship speeds would be restricted to not more than 4 knots within the project site.	To minimise the risk of ship strike: • All project operations personnel would be fully trained in the use of the equipment and would undergo training in accordance with the CEMP, DSDMP and environmental measures agreed as part of the proposed works' approval. • *Observations for marine turtles, Dugong and cetaceans would be undertaken within 420 m of the works in Botany Bay, whilst the sediments were transported offshore and once at the Spoil Ground.* • *Where marine turtles, whales and cetaceans enter this area, the operations would be put on standby and the tugboat would reduce its speed to 4 knots.* • *Where marine turtles, whales and cetaceans come within 150 m of the hopper barges, the tugboat would temporarily stop until the fauna were to move beyond this distance.*

Item	Original Mitigation and Management Measures	Revised Mitigation and Management Measure
E5	To minimise the risk of marine pest species being introduced: • Regular inspections of the active working areas and of equipment during maintenance for the presence of *C. taxifolia* and treatment of any *C. taxifolia* in accordance with the NSW Control Plan for the Noxious Marine Alga *Caulerpa taxifolia* 2009. • Regular inspections by the Department of Agriculture, Fisheries and Forestry (DAFF) at the port and berthing facility. • Any dredge equipment sources from outside the region would be subject to hull cleaning and/or inspection for marine pests prior to the commencement of works. • Adherence to DAFF requirements for the transfer of ballast water, with no 'high risk' ballast water or sediments from ballast tanks being discharged in to Botany Bay.	To minimise the risk of marine pest species being introduced: • *The works' contractor would liaise with NSW DPI and review the marine pest website (http://www.marinepests.gov.au/home) to identify any reported pest specific affecting Botany Bay immediately prior to and during the proposed works. If required, further discussion would take place with NSW DPI and DAFF to agree on specific mitigation beyond the measures set out below.* • *Prior to commencement of dredging in an area, a visual survey of the seafloor for all marine pest species would be undertaken to minimise the risk of spreading such pests beyond current limits. If pest species are determined to be present in the area, the works contractor would report the presence of the species to the State or Commonwealth agencies (as required). Management measures would be implemented in accordance with the requirements of the guidance documents including, NSW Control Plan for the Noxious Marine Alga Caulerpa taxifolia 2009* • *Any dredge equipment sourced from outside the region would be subject to inspection for marine pests and hull cleaning if required prior to use.* • *The works would adhere to DAFF requirements restricting the transfer and discharge of ballast water. No 'high risk' ballast water or sediments from ballast tanks would be discharged into Botany Bay, in transit, or at the Spoil Ground*.
F1	A photographic record of the existing fabric and operation of Kurnell Wharf would be prepared prior to the proposed works. This would focus in particular on the existing infrastructure at fixed berth #1. This record would become part of the history of the place and would be maintained for the appreciation of present and future generations.	A photographic record of the existing fabric and operation of Kurnell Wharf would be prepared prior to the proposed works. This would focus in particular on the existing infrastructure at fixed berth #1. This record would become part of the history of the place and would be maintained for the appreciation of present and future generations. *The record would be submitted to NSW Heritage Council's photographic archival record prior to the removal/demolition.*
G5	When works were to take place outside of standard working hours defined by the ICNG, there would be a requirement to undertake monthly-attended monitoring to verify noise levels along Prince Charles Parade where exceedances were predicted. Any persistent exceedances would require Caltex to include additional noise management controls in line with the ICNG.	When the works are to take place outside of the standard working hours defined by the ICNG, there would be a requirement to undertake monthly-attended monitoring to verify the noise levels along Prince Charles Parade *and at the Rangers House in Kamay Botany Bay National Park.* Any persistent exceedance would require Caltex to include additional noise management controls in line with the ICNG.
I7	Ballast water would be controlled in accordance with the management provision included in the International Convention for the Control and Management of Ships' Ballast Water and Sediments (of which Australia is a signatory), the IMO Guidelines for the Control and Management of Ships' Ballast Water (2004) and the Australian	Ballast water would be controlled in accordance with the management provision included in the International Convention for the Control and Management of Ships' Ballast Water and Sediments (of which Australia is a signatory), the IMO Guidelines for the Control and Management of Ships' Ballast Water (2004) and the Australian

Item	Original Mitigation and Management Measures	Revised Mitigation and Management Measure
	Ballast Water Management Requirements (Version 5) (DAFF, 2011).	Ballast Water Management Requirements (Version 5) (DAFF, 2011). *In accordance with the Commonwealth Department of Agriculture, Fisheries and Forestry's (DAFF) recommendation, no ballast water discharge would be permitted within 12 nautical miles of the coast. Prior to discharge, the works' contractor would be required to ensure the ballast waters contained no marine pest species.*
I8	Bilge water discharge would not be permitted.	Bilge water discharge would not be permitted. *All bilge waters generated during the works would be stored on board the relevant ship and disposed of onshore at an approved facility.*

Note: All mitigation measures would be adopted during project implementation stage.

4.3 Additional Measures

Four additional measures are proposed following receipt of the submissions. These are presented below in **Table 4-2**.

Table 4-2 Additional Measures

Item	Mitigation and Management Measures	Implementation of mitigation measures		
		Pre-Works	Implementation	Post works
A8	Caltex will produce a Community Consultation Plan (CCP) as a sub management plan to the CEMP. It will include the following measures. • Attendance by the Community Relations Manager and/or Environment Superintendent at the monthly Kurnell Progress and Precinct Resident's Association meetings. • Quarterly community briefings at the Refinery led by the Refinery Manager and Engineering Projects Manager. • A Caltex Report in the bi-monthly, community publication Kurnell Village News. • Ad hoc letter box drops to the community, or sections of the community to inform residents of significant project events and detail any out of hours work or activities that may impact the community. • Provision of a complaints hotline. The Refinery's 24-hour community concerns hotline forms part of an established community feedback process where comments and concerns are relayed back to the Refinery Manager, Community Relations Manager and the head of the Environmental Group, depending on their nature. All calls received to the hotline would fall under an established governance process whereby they would be logged, tracked and responded to. The process requires all calls received to the hotline are responded to within 2 hours, unless an alternative call back time is specified by the resident. The focus of such consultation would notify the community in advance of the works (and specific activities) starting. The Plan would also include measures to maintain regular consultation, whilst providing specific notification of key activities such as piling, the construction of the rock revetment wall, and concrete pouring that would likely give rise to specific community concern. The CCP is consistent with the ICNG. Prior notice will be given prior to starting the key noise-impacting works (as noted above). This would include informing the affected community of the duration and timing of the works, detailing the methods that would be employed to minimise noise (including the noise monitoring), and providing the details of the 24-hour community concerns hotline.		✓	✓
D8	A silt boom will be placed around the backhoe dredger at all times to limit sediment dispersion whilst lifting and slewing (transferring) the sediment to the hopper barge.		✓	

Item	Mitigation and Management Measures	Implementation of mitigation measures		
		Pre-Works	Implementation	Post works
D9	The SWQMP would include a monitoring program for TBT. The monitoring specification and sampling scheduled will be defined within the EPL. Caltex would collect baseline water quality data in accordance with the SWQMP. These data would be used for comparison purposes when assessing TBT monitoring results obtained during the works. If there is a recorded exceedance of the *ANZECC/ARMCANZ Water Quality Guidelines 2000* further controls on the dredging program would be implemented in line with Mitigation and Management Measure D4.	✓	✓	
E7	Mapping of the major benthic estuarine habitats in Botany Bay has been previously undertaken by NSW DPI (West *et al*, 2009); as noted in the EIS. The generated mapping provides the most current indication of the extent, diversity and condition of the seagrass beds in Botany Bay. The field surveys undertaken to support the EIS used this mapping as a basis for assessment. The method of survey undertaken in the EIS would be repeated during and post the works. This would involve undertaking a boat-based differential GPS seagrass survey to verify the presence, habitat boundaries, extent and general condition of the seagrass communities adjacent to the project site (dredge footprint). The survey would target those communities located on the eastern edge of Silver Beach and around Kamay Botany Bay National Park (including the endangered community of *Posidonia australis* that occurs locally). One survey would be undertaken approximately one-third of the way through the dredging program during the peak spring-summer season. A follow-on survey would then be undertaken upon completing the dredging works.		✓	✓
F3	A magnetic survey of the seabed would be undertaken before starting work. It would be used to identify any subsea utilities. Should this survey identify any unknown or unidentifiable object Caltex would engage a maritime heritage specialist to review the results of the survey prior to starting work. The review findings would be reported to the NSW Heritage Council. Caltex would also make the survey data available to the NSW Heritage Council on request regardless of the findings.	✓		
G10	In addition to routine monthly noise monitoring, Caltex would conduct preventive noise monitoring at the start of key noise-generating activities (i.e. piling and rock revetment construction) to ensure that actual noise levels are within predicted levels. This monitoring would take place along Prince Charles Parade and at the Rangers House.		✓	

5 References

ANZECC/ARMCANZ 2000 *National Water Quality Management Strategy: Paper No 4 -Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Volume 1 - The Guidelines (Chapters 3 – Aquatic Ecosystems). Australian and New Zealand Environment and Conservation Council / Agriculture and Resource Management Council of Australia and New Zealand, October 2000.

Associated British Ports (ABP) Research 1997 *Environmental Assessment of the Deepening of Swansea Channel*. ABP Research Report No. R701

Brehmer, M.L. 1965 *Turbidity and Siltation as Forms of Pollution*. Journal of Soil Water Conservation, Vol. 20, No 4, pp. 132-133.

Brehmer, M.L. 1965 *Turbidity and siltation as Forms of Pollution*. Journal of Soil and Water Conservation, 20, pp.132-133.

Cardno 2013: Metocean Study for the Caltex Wharf, Kurnell. Report NA49913035/R001_v4) Prepared for Caltex Australia.

Creese RG, Glasby TM, West G, Gallen C 2009 *Mapping the habitats of NSW Estuaries*. NSW I&I – Fisheries Final Report Series No. 113.

Department of Environment & Climate Change NSW 2009 *Interim Construction Noise Guidelines*. ISBN 978 1 74232 217 9

Department of Environment & Climate Change NSW 2009 *Waste Classification Guidelines*.

Gibson, CP. and Wilson, S.P (2003). Imposex still evident in eastern Australia 10 years after tributyltin restrictions. *Marine Environmental Research* 55 (2003) 101-112.

Lawson and Treloar Pty Ltd 2003 (a) *Proposed Expansion of Container Port facilities in Botany Bay, NSW: Coastal Process and Water Resources Issues*. Report to Sydney Ports Corporation, Report Number J2076/R1999, 3 Volumes. Lawson and Treloar Pty Ltd, Gordon, NSW.

Lawson and Treloar Pty Ltd 2003 (b) *Proposed Expansion of Container Port Facilities in Botany Bay, NSW. Coastal Process and Water Resources Issues*. Volume 2: Water Quality Investigations, Report (J2076/R1999). Prepared for Sydney Ports Corporation.

Lawson and Treloar Pty Ltd 2003 (c) *Proposed Expansion of Container Port Facilities in Botany Bay, NSW. Coastal Process and Water Resources Issues*. Volume 3: Waves, Currents and Coastal Process Investigations, Report (J2076/R1999). Prepared for Sydney Ports Corporation.

National Environmental Protection Council 2010 *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM)* as varied 2010.

Nicholls, P.; Hewitt, J.; Halliday, J. 2003 *Effects of suspended sediment concentrations on suspension and deposit feeding marine macrofauna*. NIWA Client Report HAM2003-077 prepared for Auckland Regional Council. August (NIWA Project ARC03267).

Parr, W., Clarke, S.J., Van Dijk, P. and Morgan, N. 1998. *Turbidity in English and Welsh tidal waters*. WRc Report No. CO 4301. Report for English Nature. WRc Medmenham, Bucks

Roach, A.C. and Wilson, S.P (2009). Ecological impacts of tributyltin on estuarine communities in the Hastings River, NSW Australia. *Marine Pollution Bulletin* 58 (2009) 1780–1786.

Schubel, J. R. 1977. Sediment and the quality of the estuarine environment: Some observations. Pg 399-424. In: I. H. Suffet (ed.). Fate of pollutants in the air and water environments. Part 1. Mechanism of interaction between environments and the mathematical modelling and the physical fate of pollutants. John Wiley and Sons, New York, NY.

URS 2012, *Caltex Kurnell Dredging Project – Ecological Assessment*. URS Pty Ltd, Sydney Office.

URS 2013, *Kurnell Ports and Berthing Facility –Environmental Impact Statement*, URS Pty Ltd, Sydney Office, February 2013

URS 2013b *Evaluation of Alternatives to Ocean Disposal*. Prepared for Caltex (Refineries) Pty Ltd,

West R.J., Thorogood CA, Walford TR, Williams RJ 1985, *Estuarine inventory for New South Wales, Australia.* NSW Department of Agriculture and Fisheries Bulletin No. 2. Sydney, Australia.

Wilber, C.G. 1971. Turbidity – Animals. In: Marine Ecology Vol 2 (Ed. O'Kinne). Wiley Interscience, London, pp 1181-1194.

Wilson, S.P. (1994). Tributlytin induced imposex in two species of intertidal gastropods. PhD Thesis, University of Technology, Sydney.

WorleyParsons 2013, Caltex Dredging. *Sediment Sampling and Analysis Plan Implementation Report (Final).* Report (301015-02448/07) Prepared for Caltex Refineries NSW.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