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Office of the Environmental Monitor

Channel Deepening Independent Audit

Activity No.2 Audit No.1

Targeted audit of dredging in the Entrance of Port Phillip Bay

February 2009



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Executive Summary

The Channel Deepening Project is being implemented by the Port of Melbourne Corporation (PoMC). Its aim is to deepen shipping channels in Port Phillip Bay and the lower reaches of the Yarra River by dredging to enable ships up to 14 m draught to access the Port of Melbourne.

Victorian and Commonwealth Government environmental approvals for the Project set conditions that the PoMC must adhere to. These include arrangements set out in an Environmental Management Plan (EMP). The EMP sets out 58 "Project Delivery Standards", which are rules about where, when and how the Project must be delivered.

The Office of the Environmental Monitor (Office) has appointed Peter Nadebaum of GHD Pty Ltd (the Auditor) to undertake a series of independent audits of the implementation of the Environmental Management Plan for the Channel Deepening Project (Project). The audits are to meet the requirements of the Office and the Commonwealth for the audit of the Port of Melbourne's annual report on performance.

This report outlines the findings of one of these audits, comprising *a focussed audit of selected EMP requirements to target specific Project features or processes. This audit includes a detailed analysis of those Project Delivery Standards and monitoring programs relevant to the Entrance of Port Phillip Bay and, in particular:*

- » *The width and depth of dredging; and*
- » *Work methods to reduce rock spill.*

The audit commenced on 23 September 2008, and considered information available to 22 December 2008.

The Project Delivery Standards

PDSs have been identified for the CDP to address key environmental risks, effects and legal requirements. The PDSs are a collation of the management and mitigation measures, environmental performance monitoring and contingency plans for the project. The CDP PDSs are:

- » Construction management (all activities);
- » Marine-based works (all areas);
- » Land-based works;
- » Dredging and plume;
- » Dredging schedule;
- » Dredged material management;
- » Entrance dredging;
- » Hydrohammer use and marine-based pile driving.

It should be noted that the EMP formally defines 8 PDSs, listed above. Within those 8 standards are 58 environmental rules. However, the general convention through the



delivery of the CDP has been to refer to the environmental rules individually as PDSs. This convention is continued in these audits and any reference to the 58 PDSs will by definition include the 58 environmental rules.

Methodology for the Audit

The audit methodology was consistent with ISO 19011 and was implemented to meet the specific requirements of the Office and the Commonwealth.

The audit adopted a graded assessment of compliance, involving Full Compliance, “Critical”, “Major” and “Minor” Non-Compliance, Not Applicable and Undetermined.

In carrying out the audit, the auditor was supported by a team of specialist staff from GHD.

Findings

PoMC has a well-developed system for documenting information relating to the CDP that is relevant to confirming compliance with the EMP and the PDSs. PoMC responded to the many requests by the audit team for information and evidence, and a large body of information was made available to the audit team.

Table 1 presents an overview of the findings for the 21 PDSs identified as being relevant to the Entrance of Port Phillip Bay.

Table 1 Overview of compliance with the Entrance of Port Phillip Bay PDSs

Project Delivery Standard	Full Compliance	Minor Non-Compliance	Undetermined	Not Applicable
23 Sands and adjacent coast and beaches monitoring	Yes (parts)			Yes (parts)
24 Dredging	Yes (parts)			Yes (parts)
31 Dredging schedule	Yes (parts)			Yes (parts)
33 Consideration of seasonal sensitivities	Yes (parts)			Yes (parts)
34 Dredged material placement	Yes (parts)			Yes (parts)
40 Draghead design	Yes			
41 Dredging in the Entrance	Yes			
42 Clean up in the Entrance	Yes (parts)	Yes (part)		
43 North-west side of Nepean Bank	Yes			
45 Pre-construction plateau inspection	Yes			
46 Construction plateau inspection	Yes			
47 Post-construction plateau				Yes



Project Delivery Standard	Full Compliance	Minor Non-Compliance	Undetermined	Not Applicable
inspection				
48 Pre and post-construction bathymetric survey	Yes (part)			Yes (part)
49 Post-construction deep reef habitat – impact and recovery assessment				Yes
50 Post-construction tide monitoring report				Yes
51 Minimise use of hydrohammer				Yes
52 Hours of operation				Yes
53 Start procedure				Yes
54 Hydrohammer – noise assessment				Yes
55 Hydrohammer – cetaceans				Yes
56 Hydrohammer – no dive zone				Yes

Overall, the audit concluded that there was a high level of compliance with the PDS requirements, and the non-compliance identified was of a minor nature and not likely to give rise to a serious adverse environmental effect.

The issue relating to the minor non-compliance related to PDS 42. PDS 42 contains requirements for the equipment used, provision of weather forecasts, and frequency, duration and spatial extent of clean up. PDS 42 also contains requirements for additional clean up events: prior to removal of the ridge along the north-west side of Nepean Bank; once design profile has been achieved; and in any other areas identified at Management Review meetings. The available information indicates that clean up in the Entrance complied with the PDS requirements with one exception:

- » On 20 July 2008, PoMC recorded and reported a non-conformance for clean-up event 15 in the Rip Bank. This was detected through a routine quality check of the data, which indicated that approximately 94 cubic metres of dredged material had not been cleaned up following dredging. Clean up of the residual material was carried out some 2 weeks later to correct this. Because the volume involved is small, it would not be expected that the non-compliance represents a serious risk to the environment, even if some scour from the residual material were to occur. The auditor has included consideration of the potential for scour of residual material to occur and has assigned a minor non-compliance to this requirement.

There were some PDS requirements that were assessed as not applicable as they either had not yet fallen due, were not applicable to dredging in the Entrance, or



related to the hydrohammer, which has not been deployed. These will be assessed in subsequent Activity 1 audits.

No recommendations were made relating to the item of non-compliance.



1. Introduction

The Office of the Environmental Monitor (Office) has appointed Peter Nadebaum from GHD (auditor) to undertake a series of independent audits of the implementation of the Environmental Management Plan for the Channel Deepening Project (CDP).

This report outlines the findings of one of these audits:

Activity 2: a focussed audit of selected EMP requirements to target specific Project features or processes. This audit includes a detailed analysis of those Project Delivery Standards and monitoring programs relevant to the Entrance of Port Phillip Bay and, in particular:

- » **The width and depth of dredging; and**
- » **Work methods to reduce rock spill.**

1.1 Background

The Office was established by the Victorian Government in December 2007 as a requirement for the Project.

The Office's objectives are to:

- » Be accessible to all stakeholders and the community;
- » Scrutinise, report and advise on the Project's environmental performance in an independent and transparent way; and
- » Communicate all available information on the Project's environmental performance in a meaningful and timely way to stakeholders and the community.

The Channel Deepening Project (CDP) is being implemented by the Port of Melbourne Corporation (PoMC). Its aim is to deepen shipping channels in Port Phillip Bay and the lower reaches of the Yarra River by dredging to enable ships up to 14 m draught to access the Port of Melbourne. Dredging operations commenced in February 2008. The operational stage of the project, which includes dredging and ancillary works, is scheduled for completion in late 2009. Some of the monitoring programs will continue for a further two years.

Victorian and Commonwealth Government environmental approvals for the Project set conditions that the PoMC must adhere to, including arrangements set out in an Environmental Management Plan (EMP), approved ancillary documents covering Turbidity, Underwater Noise and Airborne Noise detailed designs, approved EMP Work Method Statements, and EMP and Environment Protection and Biodiversity Conservation (EPBC) Act approval requirements for independent and external audits. The principal environmental approvals are approvals under Victoria's Coastal Management Act and the Commonwealth's EPBC Act.

The EMP sets out 58 "Project Delivery Standards", which are rules about where, when and how the Project must be delivered. It established four monitoring mechanisms to



inform compliance and performance against these standards. It also sets out quarterly, annual and other reporting obligations for the four-year period 2008 to 2012.

This audit is one of a series of independent audits of the implementation of the Environmental Management Plan and includes a detailed analysis of those Project Delivery Standards and monitoring programs relevant to the Entrance of Port Phillip Bay.

1.2 Scope of the Independent Audits

1.2.1 Overview

The independent audits form an element of the Project's governance, in terms of environmental assurance mechanisms and provide an independent and transparent assessment for use by the Office. The audit reports will also form part of the public documentation on PoMC's compliance with the EMP and the environmental performance of the Project. Should the need for an investigation emerge from an audit, the Office will consider the audit findings and determine the need, scope and means by which such an investigation would be conducted.

The purposes of the independent audits are:

- » To undertake an audit(s) that meets the provision for the external audit contained in the EMP and which:
 - Independently assesses the implementation of the EMP; and
 - Independently gathers such information necessary to verify the veracity of information arising from the monitoring program commissioned by PoMC – this may include field verification, sampling and measurement.
- » To advise the Office of any non-conformances with the EMP; and
- » To provide regular reports to the Office.

The audit program is divided into two stages, with audit activities as follows:

1.2.2 Stage 1: Operational Stage – early 2008 to early 2010

Activity 1: Undertake four (4) independent audits to assess the implementation of the EMP and compliance with each of the 58 Project Delivery Standards (PDSs). It is anticipated that such audits will occur twice annually, with a final audit occurring at completion of the operational stage of the project.

Timing of the audits is to be as follows:

- 1st audit to commence immediately on signing of the contract.
- 2nd audit to be completed by 31 January 2009 (this is to comply with Commonwealth reporting requirements), and will focus on an audit of the PoMC annual report.
- 3rd audit to commence around April/May 2009, but could be subject to change. Timing of this audit to occur within three (3) weeks of the



commencement in 2009 of dredging in the South Channel and Port Melbourne Channel.

- 4th audit to commence in late 2009 or early in 2010 based on completion of operational stage of the project. This audit will include auditing of the 58 PDSs and the PoMC annual report.

Activity 2 : Undertake focussed audits of selected EMP requirements to target significant Project features or processes. Timing of these audits is independent of the audits undertaken in Activity 1, but their results should feed into the analysis and assessment of compliance done for Activity 1 audits.

These audits are to include a detailed analysis of those Project Delivery Standards and monitoring programs relevant to:

1. The Entrance of Port Phillip Bay:
 - The width and depth of dredging
 - Work methods to reduce rock spill
2. The management of contaminated sediment:
 - Bund and stub wall construction
 - Methods to remove and place contaminated sediment
 - Placement of sand capping
3. South Channel:
 - Mechanisms to protect seagrass
4. Mechanisms to monitor environmental performance:
 - Environmental monitoring
 - Process monitoring and inspections
 - Management performance monitoring
 - Bay wide monitoring

It is recognised that work carried out for the Activity 2 audits may overlap work carried out for the Activity 1 audits.

1.2.3 Stage 2: Post Operational Phase – early 2010 to early 2012

A series of independent audits are to be taken in the post operational phase. These are a separately commissioned activity, and will be reported on separately from this series of audits.

1.3 Deliverables

As part of the project the auditor is required to provide:

- » Immediate reports (within 24 h) of any non-conformances that may be identified by the audit.



- » Reports of independent audits of the implementation of the EMP and the 58 Project Delivery Standards.
- » Report on the audit of PoMC's annual report against EMP requirements and Commonwealth project approval conditions.
- » Reports of focussed audits on selected EMP requirements.

1.4 Reference Documents

In addition to Victorian and Commonwealth approvals, the following documents are key reference documents for the project:

- » **Environmental Management Plan**
<http://www.channelproject.com/environment/management.asp>
- » **EMP Dredging Schedule**
http://www.channelproject.com/global/docs/Dredging_Schedules/SCHD_Rev1_Update4_EMP_Dredging_Schedule_100708.pdf
- » **Approved ancillary documents covering Turbidity, Underwater Noise and Airborne Noise detailed designs**
http://www.channelproject.com/global/docs/EMON_080205_Turbidity.pdf
http://www.channelproject.com/global/docs/EMON_080205_Monitoring_Underwater_Noise.pdf
http://www.channelproject.com/global/docs/EMON_080205_Monitoring_Airborne_Noise.pdf
- » **Approved EMP Work Method Statements**
http://www.channelproject.com/global/docs/WMS_080205_Material_Placement_PMDMG.pdf
http://www.channelproject.com/global/docs/WMS_080205_Method_Statement_EMP_Contaminated.pdf
http://www.channelproject.com/global/docs/WMS_080205_Method_Statement_EMP_Entrance.pdf

Note that these documents are subject to periodic review and revisions may be issued during the course of the project.



2. The Channel Deepening Project

2.1 Project description

2.1.1 Overview

The Channel Deepening Project (CDP) includes:

- » Capital dredging works associated with the channels, swing basins and berth pockets;
- » Management of dredged material; and
- » Modifications to existing infrastructure, including the protection of services, berth upgrades and upgrading and installation of new navigation aids.

The dredging and associated works are expected to take between 18 months to two years to complete.

The CDP components are as follows.

2.1.2 Capital dredging works

The dredging works will be undertaken largely within the existing channels in the north and south of the bay. The exceptions are the turning area at Hovell Pile, which will be enlarged to accommodate larger vessels and the entrances to the Port Melbourne and Great Ship Channels. The middle of the bay (north of Hovell Pile to south of Fawkner Beacon) is naturally deeper and does not require dredging.

2.1.3 Management of dredged material

Dredged material is to be placed within the Port of Melbourne dredged material ground (PoM DMG) located near the middle of the bay, both within the existing area and in a southern extension to it, as well as in a new DMG in the south east of the bay.

All of the dredged material sourced from the Port Melbourne, Williamstown and Yarra River Channels and associated berth pockets will be placed in the PoM DMG. The PoM DMG will be extended to the south to provide capacity for material from future maintenance dredging. Part of the PoM DMG will be bunded and capped with uncontaminated sediments to contain contaminated sediments from the Yarra River and Williamstown and Port Melbourne Channels and berth pockets.

Most of the material dredged from the south of the bay is to be stored in the new south east DMG (SE DMG). Sand dredged from the south of the bay will be used as capping material for the PoM DMG.

2.1.4 Berth works

As a consequence of deepening the shipping channels, a program of structural upgrades to berths is planned at Appleton Dock, Swanson Dock (East and West), Holden Dock and Gellibrand Pier to stabilise the docks beside the deepened channels.



This will ensure the berths will accommodate larger vessels and the lowered riverbed. The swing basins at Swanson Dock and Gellibrand Pier are being enlarged to accommodate turning movements of larger vessels.

2.1.5 Services

Several utility services crossing the Yarra River and Port Phillip Bay are to be protected from shipping movements. The following services are being protected in their current location:

- » The Melbourne Water Hobsons Bay Main Sewer, the Westernport-Altona-Geelong (WAG) oil pipeline, and the GasNet high pressure gas pipeline which all cross the Yarra River downstream of the West Gate Bridge; and
- » The Esso ethane pipeline that crosses Port Phillip Bay south of Fawkner Beacon.

The Telstra telecommunications cables and the CitiPower electrical power cables that currently cross the Yarra River downstream of the West Gate Bridge are being decommissioned and the services rerouted by the respective utility service providers.

2.1.6 Navigation Aids

To ensure ongoing safe navigation of vessels some existing navigation aids and in some locations new navigation aids are being installed. The navigation aids include:

- » New marine-based piled structures for lateral and lead lights adjacent to the northern channels and South Channel; and
- » New land-based lead lights and sector lights at Queenscliff, Port Melbourne and alongside docks within the port.

2.2 Environmental Management

A comprehensive program determines PoMC's management of the environmental aspects of the project. Important elements of this include:

- » An Environmental Policy;
- » An Environmental Management System (EMS), consistent with the requirements of *ISO 14001:2004 Environmental management systems – Requirements with guidance for use* developed for the CDP. The EMS consists of the policies, plans, procedures and activities that together form a systematic method of managing the environmental aspects of the project.
- » An Environmental Management Plan (EMP). The EMP is a key component of the EMS and describes the main elements of the EMS and provides direction to detailed procedures and inter-relationships between different processes. The EMP is the focus of this audit.



2.3 The Environmental Management Plan

2.3.1 Scope

The EMP details the environmental management requirements to be followed for the CDP. The EMP includes:

- » Arrangements to integrate the EMP with PoMC's environmental policy and EMS;
- » The requirements for environmental management during the planning, implementation, evaluation and review of CDP construction activities;
- » The responsibilities for implementing the EMP;
- » The Project Delivery Standards (PDS) including environmental controls and limits to ensure that project objectives and targets are achieved;
- » An overview of the environmental monitoring programs and contingency plans and associated management action;
- » Post construction requirements including monitoring and inspections; and
- » The transition arrangements from construction phase to operations.

The EMP generally applies to the capital works described in Section 2.1.2 and environmental monitoring programs. PoMC has overall responsibility for the implementation of the CDP in accordance with the requirements of the EMP.

This audit was conducted against the approved EMP. For the period covered by this audit to 22 December 2008, the approved EMPs were as follows:

- » 30 January 2008 EMP (CDP_IMS_PL_004 Revision 1)
- » 11 April 2008 EMP (CDP_IMS_PL_004 Revision 2)
- » 22 July 2008 EMP (CDP_IMS_PL_004 Revision 3)
- » 2 September 2008 EMP (CDP_IMS_PL_004 Revision 4)
- » 3 November 2008 EMP (CDP_IMS_PL_004 Revision 5).

2.4 Project Delivery Standards

PDSs have been identified for the CDP to address key environmental risks, effects and legal requirements. The PDSs are a collation of the management and mitigation measures, environmental performance monitoring and contingency plans for the project. The CDP PDSs are:

- » Construction management (all activities);
- » Marine-based works (all areas);
- » Land-based works;
- » Dredging and plume;
- » Dredging schedule;
- » Dredged material management;



- » Entrance of Port Phillip Bay dredging;
- » Hydrohammer use and marine-based pile driving.

PDSs generally include the following:

- » An objective – the performance goal;
- » A target – performance level at which the objective is demonstrated as being achieved;
- » Application – the project activities and project areas to which the PDS applies (refer to drawing CDP-Env-50228 in Annexure 7 of the EMP for the location of the project areas);
- » Environmental controls – management and mitigation measures required to support achievement of the objective during the implementation of the project. These include process controls and associated monitoring;
- » Environmental limits – numerical performance standards, which the project must comply with;
- » Reference to environmental monitoring programs – the environmental monitoring programs applicable to the PDS; and
- » Reference to contingencies – the relevant contingency plans containing management actions, which may be taken in the event of potential exceedence of the environmental limit or response level.

It should be noted that the EMP formally defines 8 PDSs, listed above. Within those 8 standards are 58 environmental rules. However, the general convention through the delivery of the CDP has been to refer to the environmental rules individually as PDSs. This convention is continued in these audits and any reference to the 58 PDSs will by definition include the 58 environmental rules.



3. Audit Methodology

3.1 Standards

This audit was undertaken adopting a methodology consistent with ISO 19011 to meet the specific requirements of the Office for the audit of PoMC's implementation of the EMP requirements for the Entrance of Port Phillip Bay.

ISO 19011 "*Guidelines for Environmental Auditing*" provides a systematic approach to defining the requirements of the audit, planning, interpreting the elements of the EMP, collecting audit evidence, objectively assessing the evidence, and reporting in a clear and accurate manner. It also ensures that the audit has been conducted in accordance with an established and recognised audit methodology.

3.2 Audit Preparation

3.2.1 Overview

The audit methodology used in the preparation of this audit is presented schematically in Figure 1. Brief descriptions and dates for key activities are described in greater detail below.

Prior to the audit the Office had identified those elements that it considered were particularly significant, and specified these in the tender brief as requiring focused audits. These are the subjects of what are described as Activity 2 audits. This audit report is pertinent to the audit of the requirements of the EMP that are relevant to the Entrance of Port Phillip Bay; subsequent audits focus on the implementation of the EMP as set by the 58 PDSs.

3.2.2 Audit Plan and Scope

The requirements of the audit were outlined in a brief that the Office issued for this work (<http://www.oem.vic.gov.au/Independentaudits>), and a draft audit plan and a preliminary methodology for the audit were outlined in the tender submission. To ensure that the audit requirements and the brief were addressed, the scope of the audit was confirmed with the Office and the audit plan and methodology was further refined in subsequent meetings with the Office, Victorian regulators and the Commonwealth.

The audit plan extended to the series of audits that are required under this commission; the methodology outlined in this report is common to all of the audits, but the details of meetings and interviews outlined in the following sections of this report is pertinent to the focused audit of the requirements of the EMP and the PDSs that are relevant to the Entrance of Port Phillip Bay.

This audit was one of the series of audits.



The scope of this audit was to undertake a detailed analysis of compliance with the Project Delivery Standards and monitoring programs relevant to the Entrance of Port Phillip Bay:

- » The width and depth of dredging; and
- » Work methods to reduce rock spill

This audit has been prepared on the basis of information available to 22 December 2008.

This audit was focused on aspects of the EMP that relate to environmental management and protection of the environment; this audit did not seek to review and confirm compliance with aspects of the PDSs that relate to non-environmental aspects such as on-ship or on-shore occupational health and safety, or structural or geotechnical considerations.

In assessing compliance of CDP activities and procedures with requirements of the EMP and the PDSs, check sheets were prepared by GHD and used to assist in identifying and obtaining evidence relevant to assessing compliance. The audit team met with PoMC nominated environmental representatives and sought relevant evidence; if requested evidence was deemed by PoMC to be not available or not relevant to the audit at that stage, the auditor sought evidence from PoMC to support that claim.

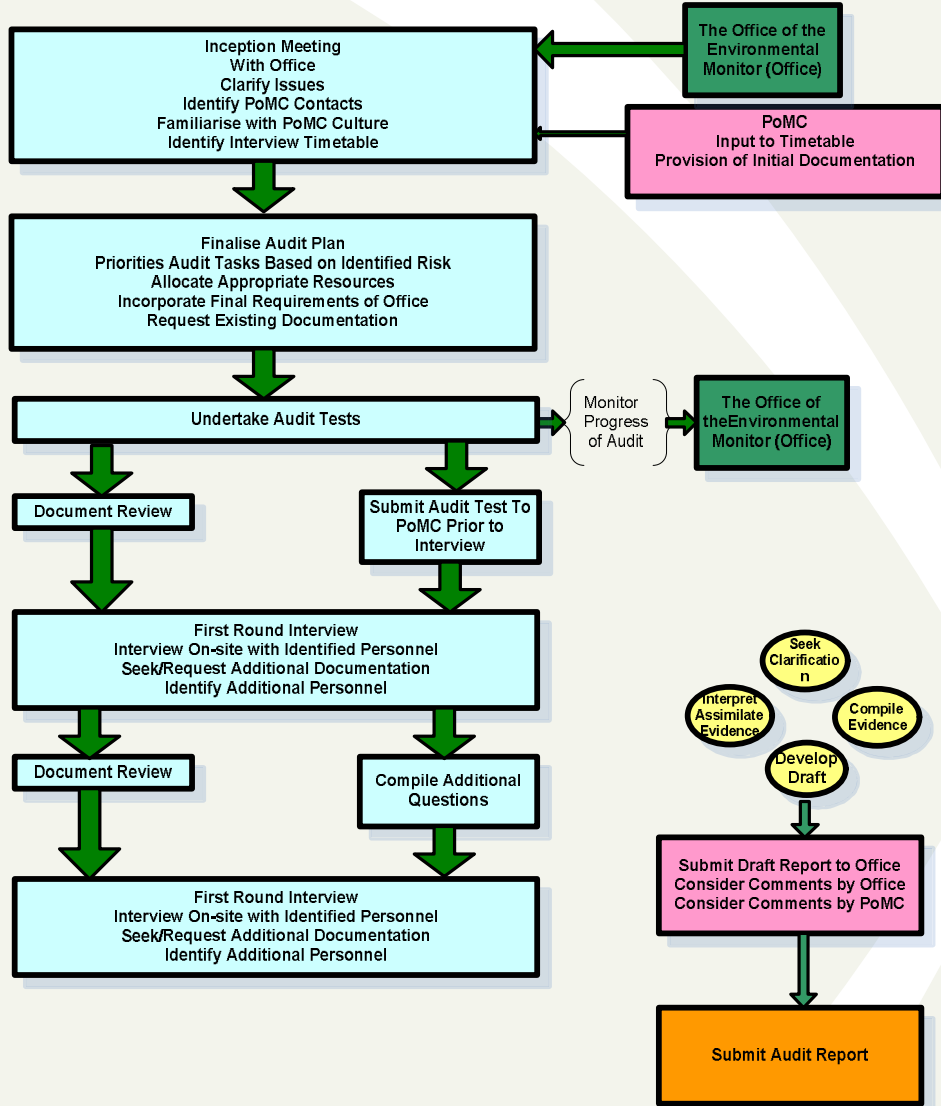
PDSs relevant to this audit were identified and are listed in Table 3. Together they form the basis for the findings described in Section 4.1.2 to 4.1.12.

In general the audit comprised a desk review of documentation provided by PoMC and other information available from the Office, the Commonwealth and media reports. This review was supported by an inspection by the audit team of the main dredge vessels.

In particular, this audit considered the available information in more detail than the Stage 1 Activity 1 audit, and carried out additional crosschecks of information to confirm that the data and reporting is consistent and supports the conclusions that the requirements of the PDSs are being complied with. In particular, the following additional more detailed analysis of data has been carried out:

- » Review of bathymetric survey data for the Entrance of Port Phillip Bay to further assess compliance with the depths, widths and volumes dredged.
- » Review of vessel tracking data to further assess compliance with location of dredging and disposal of dredged material.
- » Review of clean up reports and supporting maps of dredge and clean up passes as well as weather reports to further assess compliance with clean up requirements.

Figure 1 : Summary of Audit Methodology





3.2.3 Inception Meetings

As part of the preparation of the audit plan, the requirements of the brief were reviewed and discussed in a meeting with the Office, DSE and the Commonwealth on 9 September 2008. Two further meetings were held with the Office on 23 September 2008 and 21 October 2008 to discuss in detail the expectations relating to the focused audit of the Entrance of Port Phillip Bay.

A comprehensive listing of all elements of the EMP, audit questions and a preliminary set of requirements for evidence were prepared and submitted to the Office and PoMC, and a meeting was held with the Office and PoMC on 9 September 2008 to consider each of the requirements and to allow PoMC to provide background on each element of the EMP and the evidence that was available, and to agree on the evidence that would be provided to the auditor. This meeting was focused on the first Activity 1 audit of the EMP, however, the knowledge and information gathered at this meeting has also informed the focused Activity 2 audits.

A primary objective of these meetings was for the auditor and audit team to develop working relationships, mutual understandings and expectations relating to the requirements and process of the audit and to provide an opportunity for the PoMC to present an overview of the dredging works, the organisational background, overview of compliance, and to arrange inductions for inspecting the dredge vessels.

3.2.4 Audit Tests and Ranking of Compliance

The requirements for determining compliance were discussed with the Office, DSE and the Commonwealth, and it was agreed that compliance would be graded in terms of full compliance, critical non-compliance, major non-compliance, minor non-compliance, not applicable and undetermined. The definition of these terms is outlined in Table 2. This grading was drawn from the method of grading compliance outlined in guidelines to auditors¹ under the Victorian Government *Safe Drinking Water Act 2003*.

Table 2 Summary Compliance Grades

Compliance Grade	Description
Full compliance	There is sufficient evidence to confirm that actions have been undertaken, prepared and/or implemented in full compliance with the requirements of the auditable element.
Critical non-compliance	The evidence shows that actions are not in full compliance with the requirements of the auditable element and this gives rise to a serious or imminent risk to the environment.
Major non-compliance	The evidence shows that actions are not in full compliance with the requirements of the auditable element and this gives rise to a high potential that the environment will be seriously affected if the non-

¹ Victorian Government Department of Human Services, Water Regulatory Audit Guidance Note November 2007



Compliance Grade	Description
	compliance is not rectified.
Minor non-compliance	The evidence shows that actions are not in full compliance with the requirements of the auditable element but it is unlikely that this will cause the environment to be seriously affected.
Not applicable	The auditable element falls outside the scope of the audit, eg work relevant to the project delivery standard has not yet commenced.
Undetermined	There is insufficient evidence to make a judgement on compliance.

Audit tests were developed for all requirements within the scope of the audit. These tests were designed to establish compliance with each element of the EMP. Evidence was sought from PoMC to establish whether the element has been complied with.

In order to maximise the efficiency with which the audit was carried out and to ensure the audit effort was directed to the most important issues, an assessment of the risk to the environment associated with each element of the EMP was determined and used to target issues and the level of effort put into each element.

3.2.5 Inspection of sites and vessels

PoMC provided an induction to the auditor and his team on 23 September 2008. The auditor and his team held a land-based inspection of the berthing sites and the Queen of the Netherlands and Cornelis Zanen on 25 and 26 September 2008.

3.3 Report on findings

The findings of the audit are presented in Section 4 of this report. Section 4.1 presents a discussion of the findings as they relate to each of the activities conducted in the Entrance of Port Phillip Bay. Section 4.2 contains the detailed findings of the report in tabular form for each of the PDSs relevant to the Entrance, as they are listed in the EMP Revision 4. The listing and findings are not presented in a "prioritised order" or "order of significance".



4. Audit Findings

4.1 Findings

4.1.1 Overview

PoMC has a well-developed system for documenting information relating to the CDP that is relevant to confirming compliance with the EMP and the PDSs. PoMC responded to the many requests by the audit team for information and evidence, and a large body of information was made available to the audit team.

Table 3 presents an overview of the findings for the 21 PDSs identified as being relevant to the Entrance of Port Phillip Bay.

Table 3 Overview of compliance with the Entrance of Port Phillip Bay PDSs

Project Delivery Standard	Full Compliance	Minor Non-Compliance	Undetermined	Not Applicable
23 Sands and adjacent coast and beaches monitoring	Yes (parts)			Yes (parts)
24 Dredging	Yes (parts)			Yes (parts)
31 Dredging schedule	Yes (parts)			Yes (parts)
33 Consideration of seasonal sensitivities	Yes (parts)			Yes (parts)
34 Dredged material placement	Yes (parts)			Yes (parts)
40 Draghead design	Yes			
41 Dredging in the Entrance	Yes			
42 Clean up in the Entrance	Yes (parts)	Yes (part)		
43 North-west side of Nepean Bank	Yes			
45 Pre-construction plateau inspection	Yes			
46 Construction plateau inspection	Yes			
47 Post-construction plateau inspection				Yes
48 Pre and post-construction bathymetric survey	Yes (part)			Yes (part)
49 Post-construction deep reef habitat – impact and recovery assessment				Yes
50 Post-construction tide				Yes



Project Delivery Standard	Full Compliance	Minor Non-Compliance	Undetermined	Not Applicable
monitoring report				
51 Minimise use of hydrohammer				Yes
52 Hours of operation				Yes
53 Start procedure				Yes
54 Hydrohammer – noise assessment				Yes
55 Hydrohammer – cetaceans				Yes
56 Hydrohammer – no dive zone				Yes

Overall, the audit concluded that there was a high level of compliance with the PDS requirements, and the non-compliance identified was of a minor nature and not likely to give rise to a serious adverse environmental effect. An overview of the findings of the audit is discussed below. Detailed findings of the audit relating to compliance with the requirements of each of the PDSs are summarised in Table 4.

4.1.2 Use of specialised equipment (drag head and hydrohammer)

PDS 40, 41 and 51 to 56 address the need to use specialised equipment for dredging in the Entrance of Port Phillip Bay.

PDS 40 requires the ripper draghead to be designed and constructed to minimise rockfalls as recommended by Delft Hydraulics (October 2006) report no. Z4117, *Physical Model Experiments with Ripper Dragheads in Rock: Experimental research program on reduction of spill*. PDS 41 requires that all dredging in the Entrance of Port Phillip Bay be conducted with the ripper draghead. The auditor concludes that compliance has been achieved with this requirement.

PDS 51 to 56 contain requirements for use of the hydrohammer, if required. The hydrohammer has not been deployed in the dredging program and as works in the Entrance of Port Phillip Bay have reached design depth, will not be required. It is concluded that the requirements of these PDSs are not applicable.

The auditor concludes that compliance has been achieved with the requirement for use of specifically designated specialised equipment.

4.1.3 Limits on area dredged

PDS 24 sets limits on the lateral extent of dredging in each project area, including the Entrance of Port Phillip Bay.

The PDS requires the final channel width to be no greater than 15 metres outside the Entrance of Port Phillip Bay design toe line, with 50 percent of the delivered toe line to



be within nine metres of the Entrance design toe line. PDS 24 also requires that no dredging is to take place within 65 metres of the outside edge of the construction zone, except to the extent necessary to achieve a design depth of 17.3 metres along the north-west side of Nepean Bank. The auditor concludes that compliance has been achieved with these requirements.

4.1.4 Limits on the depth dredged

PDS 24 sets limits on the depth dredged in each project area, including the Entrance of Port Phillip Bay.

The design depth in the Entrance of Port Phillip Bay is 17.3 metres for the Great Shipping Channel and 14.3 metres in the layby area. The PDS requires that design depths be achieved as a minimum in all areas. The PDS further requires that the depth of a minimum of 50 percent of the area dredged and within toe lines is within 1.3 metres of the Entrance design depth and that the depth of a minimum of 90 percent of the area dredged and within toe lines is within 1.8 metres of the Entrance design depth.

The auditor concludes that compliance has been achieved with these requirements.

4.1.5 Limits on the volume of rock that can be dredged

PDS 24 sets a maximum limit on the volume of rock that can be dredged in the Entrance of Port Phillip Bay.

PDS 24 requires that the maximum total in-situ volume dredged in the Entrance of Port Phillip Bay is 0.55 million cubic metres \pm 15 percent. Dredging in the Entrance reached design depth on 15 September 2008. PoMC reported that 0.461 million cubic metres were dredged in the Entrance and the audit confirmed this figure.

The auditor concludes that compliance has been achieved with this requirement.

4.1.6 Limits on the time that dredging can occur

PDS 33 recognises seasonal sensitivities in the Bay and restricts dredging activities accordingly. The PDS states that no dredging is permitted between 18 December and 31 January in the south of the Bay to mitigate impacts on the recreation and tourism activities during the holiday season.

The audit has found that dredging in the Entrance of Port Phillip Bay commenced in April 2008 and reached design depth in September 2008. The auditor concludes that compliance has been achieved with this requirement.

4.1.7 Dredging requirements in relation to the Canyon edge

PDS 41 and 43 contain requirements for dredging near and on the edge of the geological feature located within the Entrance of Port Phillip Bay that is referred to as the Canyon.



PDS 41 requires that when dredging towards the canyon, the draghead is lifted so that no rock will be removed within five metres of the canyon edge and that dredging of the canyon edge be conducted from the canyon towards the plateau. This requirement was undetermined in the Activity 1 Audit 1. Additional information was provided by PoMC relating to this requirement. The auditor concludes that compliance has been achieved with this requirement.

PDS 43 required a ridge to be maintained along the north-west side of Nepean Bank until the remaining area had been dredged to the design depth. The auditor concludes that compliance has been achieved with this requirement.

4.1.8 Clean up requirement

PDS 42 and the EMP Work Method Statement (EMP WMS) for Dredging Works South - Entrance (CDP_ALL_MS_409) specify the requirements for clean up dredging in the Entrance of Port Phillip Bay.

The PDS and EMP WMS contain requirements for the equipment used, provision of weather forecasts, and frequency, duration and spatial extent of clean up. PDS 42 also contains requirements for additional clean up events: prior to removal of the ridge along the north-west side of Nepean Bank; once design profile has been achieved; and in any other areas identified at Management Review meetings.

The available information indicates that clean up in the Entrance complied with the PDS requirements with one exception:

- » On 20 July 2008, PoMC recorded and reported a non-conformance for clean-up event 15 in the Rip Bank. This was detected through a routine quality check of the data, which indicated that approximately 94 cubic metres of dredged material had not been cleaned up within 18 hours following dredging. Clean up of the residual material was carried out some 2 weeks later to correct this. Because the volume involved is small, it would not be expected that the non-compliance represents a serious risk to the environment, even if some scour from the residual material were to occur. The auditor has included consideration of the potential for scour of residual material to occur and has assigned a minor non-compliance to this requirement.

4.1.9 Pre-construction inspections, surveys and reporting

PDS 45 and 48 require pre-construction bathymetric survey of the Entrance of Port Phillip Bay and visual monitoring of scour holes in the trial dredge area and immediately adjacent areas of the Great Ship Channel until the commencement of dredging.

PDS 45 is specific to the monitoring of scour holes to assess the rate of scour and accretion and the mobility of material, the maximum potential depth of scour and the potential extent of lateral erosion in the scour holes. PDS 48 is specific to the completion of bathymetric surveys to identify bathymetric changes at set intervals in time. The auditor concludes that compliance has been achieved with these requirements.



4.1.10 Construction inspections, surveys and reporting

PDS 46 relates to the completion of construction plateau inspections and requires a towed video survey to be completed four to six weeks following commencement of dredging and again as soon as practicable once the design profile has been achieved and the final clean-up completed. The auditor concludes that compliance has been achieved with these requirements.

4.1.11 Post-construction inspections and surveys

PDS 47, 48 and 49 relate to post-construction inspections and surveys of the Entrance of Port Phillip Bay. PDS 47 requires a towed video survey to be completed, PDS 48 requires bathymetric surveys to be completed and PDS 49 requires a post-construction deep reef habitat assessment survey. Completion of these PDSs does not fall within the time period of this audit and will be assessed in future audits.

4.1.12 Requirements to provide notifications

The EMP Table 6: *Notification and reporting requirements* outlines the subject matter that needs to be reported, the relevant government authority, and the required timeframe for notification or reporting.

Three of these subjects are specific to the Entrance of Port Phillip Bay:

1. Underwater noise assessment of hydrohammer;
2. Entrance clean up; and
3. Deep reef and Entrance plateau post-construction inspection programs, Entrance bathymetry survey, post-construction towed video survey.

As discussed in Section 4.1.2, the hydrohammer has not been used and hence the first of these notifications has not been required.

The DSE, the Minister for Environment and Climate Change or delegate, and the independent environmental monitor must be notified within 12 hours (any time of day) of determining that final Entrance clean up is complete (once design profile is achieved). The auditor concludes that compliance has been achieved with this requirement.

In this audit period the following notification had not yet been required:

- » Post-construction inspection and survey reports listed in item 3 are to be forwarded to the DSE, EPA, DEWHA and independent environmental monitor within 90 days following completion of the post construction inspection or survey.

As previously noted in Section 4.1.11, completion of the post-construction inspections and surveys required by the PDSs 47, 48 and 49 do not fall within the time period of this audit.



4.2 Details of Compliance

Details pertaining to the requirements, evidence and compliance for each of the 23 PDSs are provided in Table 4.

4.3 Recommendations

No recommendations were made relating to the item of non-compliance.

Table 4 Details of compliance with the Entrance of Port Phillip Bay PDSs

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
23 Sands and adjacent coast and beaches monitoring			
<p>Undertake a baseline bathymetric survey of the Sands flood tidal delta system, with continuous cover of the area within the Entrance from Point Lonsdale to St Leonards (including Swan Bay), across to Hovell Pile to Martha Point to Point Nepean, and including all the adjacent coast and beaches within that area, at a resolution of better than or equal to five metre horizontal spacing and vertical accuracy of better than or equal to 0.5 m. To be completed prior to commencement of dredging in the south, and two and four years after dredging commences.</p>	<p>A review of the PoMC Request for Quotation and the Tenix Report of Survey showed that the baseline bathymetric survey was undertaken between 6 December and 14 December 2007, prior to the commencement of dredging in the south (8 February 2008).</p> <p>The survey geographic extent covered the entirety of the designated area outlined in Section 3.2: Proposed Survey Area of the Request for Quotation.</p> <p>Section 1.6 in the Tenix report indicates that small areas of limited coverage were encountered despite the fact that <i>“the entire survey area was flown”</i>. Areas of limited coverage were re-flown in an attempt to improve coverage, however conditions such as shallowness, seagrasses, continual white water and tidal variation hampered this.</p> <p>The Tenix report indicates that the survey resolution was better than or equal to the required five metre horizontal spacing, and <i>“IHO Order-1 depth accuracy was achieved”</i> which corresponds to the required vertical accuracy of better than or equal to 0.5 m.</p> <p>The auditor deemed the above to be fully compliant with the requirement to undertake a baseline bathymetric survey.</p> <p>Future surveys will be reviewed in subsequent audits.</p>	<p>Full compliance</p>	<p>PoMC Request for Quotation – Great Sands Airborne LIDAR Bathymetry Survey, Port Phillip Bay</p> <p>Tenix Report of Survey - Great Sands Airborne LIDAR Bathymetry Survey, Port Phillip Bay</p> <p>IHO Order 1 Specification</p> <p>Dredge Schedule Revision 7</p>
<p>Multibeam surveys of the Entrance shipping channels and South Channel to be undertaken prior to commencement of dredging in respective areas in the south, and two and four years after dredging commences.</p>	<p>Multibeam surveys of the Entrance of Port Phillip Bay shipping channels were carried out. Two plots of bathymetric insurvey data were provided by PoMC as evidence that the Entrance has been surveyed. An overview drawing shows how these plots fit together and confirms that the entire Entrance was surveyed. The plots do not indicate the date that the surveys were undertaken but a database list of</p>	<p>Full compliance</p>	<p>insurvey dates.xls</p> <p>CDP-ALL-DWG-210001 Entrance – Rip bank.pdf</p> <p>CDP-ALL-DWG-210002 Entrance – Nepean bank.pdf</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence				
	<p>insurveys shows that the insurvey of the Entrance was completed on 4 March 2008, which is prior to commencement of dredging in the Entrance on 5 April 2008.</p> <p>The auditor concludes that compliance has been achieved with this requirement for the Entrance. Survey requirements for the South Channel are not applicable to this audit.</p> <p>Future surveys will be reviewed in subsequent audits.</p>		<p>CDP-ALL-DWG-210000 Overview charts Entrance and South Channel.pdf</p> <p>Dredge Schedule Revision 7</p>				
Current measurements to be undertaken in South Channel and inside the Entrance after completion of dredging. Measurements to be compared against SEES predictions.	To be assessed in a future audit following completion of dredging.	Not applicable					
Sediment size analyses to be undertaken in conjunction with refined sediment transport numerical modelling post-construction.	To be assessed in a future audit following completion of dredging.	Not applicable					
24 Dredging							
<p>Design depths are to be achieved as a minimum in all areas. Due to dredging tolerance, actual construction depth will exceed design depths. Design depths are as follows:</p> <table border="1"> <thead> <tr> <th></th> <th>Great Ship Channel / layby</th> </tr> </thead> <tbody> <tr> <td>Design depth (m)</td> <td>17.3 / 14.3</td> </tr> </tbody> </table>		Great Ship Channel / layby	Design depth (m)	17.3 / 14.3	<p>Dredging in the Entrance of Port Phillip Bay reached design depth on 15 September 2008, implying that the design depths of 17.3 metres in the Great Ship Channel and 14.3 metres in the layby area have been achieved in all areas.</p> <p>PoMC conducted a bathymetric survey "outsurvey" of the Entrance area on 17 September 2008. The audit team independently analysed the data from this survey and independently calculated and plotted the depth profile. It was concluded that the design depths have been achieved as a minimum within the Great Ship Channel and layby area. (Refer Appendix A)</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>	Full compliance	<p>Alliance Monthly Report September 2008 CDP_ALL_REP_303-08-09 Rev 00</p> <p>Bathymetric survey data (insurvey)</p> <p>Bathymetric survey data (outsurvey)</p>
	Great Ship Channel / layby						
Design depth (m)	17.3 / 14.3						
Dredging must remain within the maximum total insitu volume, width constraints and construction depth constraints identified below:	This requirement is not specific to the Entrance as it relates to the total CDP dredge volume. Dredging for the CDP is currently on-going and hence this requirement has been	Not applicable					

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
<p>» Maximum total insitu volume to be dredged is 22.92 million m³ ± 15%, and</p>	<p>assessed as not applicable as of 22 December 2008.</p>		
<p>» Maximum insitu volume to be dredged in the Entrance is 0.55 million m³ ± 15%, and</p>	<p>The Alliance Monthly Report (CDP_ALL_REP_303-08-09 Rev 00 (September 2008)) indicates the total in-situ volume dredged in the Entrance of Port Phillip Bay was 0.461 million m³. This volume was calculated by the Alliance based on bathymetric survey data. This is less than the specified maximum insitu volume of 0.55 million m³ ± 15%.</p> <p>The Revised Clean-up summary INTERNAL.pdf for the Entrance dated 6 October 2008 states that 438 287 m³ have been removed from the Entrance. This volume comprised 422 874 cubic metres removed during dredging and 15 413 cubic metres removed during clean-up. This reported volume is based on the dredge hopper volumes and the auditor notes that this number is 22 713 m³ less than the volume reported in the Alliance Monthly Report. However, both reported volumes are less than the maximum volume allowed to be dredged in the Entrance. The auditor concludes that compliance has been achieved with this requirement. The Entrance Management Review minutes state that this difference in dredged volume measurements is within the expected variation (~5%).</p> <p>The audit team independently analysed the bathymetric survey data for the Entrance and confirmed that the dredged volume complies with the requirement for a maximum dredged volume of 0.55 million m³ ± 15% (refer Appendix A).</p> <p>In assessing the dredged volumes reported, the auditor notes: (a) review of post-completion hydrographic surveys confirmed that the design depth had been achieved in the Entrance of Port Phillip Bay, and (b) the lower volume dredged indicates that more of the Entrance bathymetry will be preserved than had been allowed for in terms of volume of material allowed to be removed.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>	<p>Full compliance</p>	<p>Alliance Monthly Report September 2008 CDP_ALL_REP_303-08-09 Rev 00</p> <p>Alliance Monthly Report October 2008 CDP_ALL_REP_303-08-10 Rev 00</p> <p>Revised Clean-up summary INTERNAL.pdf</p> <p>Bathymetric survey data (insurvey)</p> <p>Bathymetric survey data (outsurvey)</p> <p>Entrance Management Review Minutes 6 November 2008</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
<p>» Maximum insitu volume of contaminated sediments (soft silts) to be dredged is 1.72 million m³ ± 15% (dredging volume to be finalised following pre-construction bathymetry survey), and</p>	<p>Not applicable to the Entrance.</p>	<p>Not applicable</p>	
<p>» A minimum of 50% of the area to be dredged and within toe lines is to be within 0.9 m of the design depth (sands and clays) and within 1.3 m of the design depth (Entrance). This does not apply to the sand waves within South Channel, and</p>	<p>Dredge requirements for the South Channel, Williamstown Channel and Port Melbourne Channel are not applicable to this audit. Compliance has only been assessed for requirements relating to the Entrance.</p> <p>Review of the September 2008 Alliance Monthly Report (CDP_ALL_REP_303-08-09 Rev 00) has indicated that more than 50% of the area to be dredged and within toe lines is within 1.3 m of the design depth in the Entrance of Port Phillip Bay.</p> <p>Maunsell conducted an independent calculation of the depth distribution of the dredged area in the Entrance to Port Phillip and confirmed that over 50% of the area to be dredged and within toe lines is within 1.3 m of design depth. SKM have certified that the insurvey and outsurvey data accurately represents the seabed depths in the Entrance.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>	<p>Full compliance</p>	<p>Alliance Monthly Report September 2008 CDP_ALL_REP_303-08-09 Rev 00</p> <p>Bathymetric survey data (insurvey)</p> <p>Bathymetric survey data (outsurvey)</p> <p>Maunsell 2008, letter to PoMC re: 'Proportion of Entrance Dredged Area at or above -19.1m CD', dated 24 November 2008</p> <p>SKM 2008, letter to PoMC re 'Port Phillip Entrance – Certification of Acceptance Survey', dated 13 October 2008</p>
<p>» A minimum of 90% of the area to be dredged and within toe lines is to be within 1.8m of the design depth (19.1 m total depth) as determined following completion of dredging (Entrance only), and</p>	<p>Review of the September 2008 Alliance Monthly Report (CDP_ALL_REP_303-08-09 Rev 00) has indicated that more than 90% of the area to be dredged and within toe lines is within 1.8 m of the design depth (19.1 m total depth) in the Entrance.</p> <p>Maunsell conducted an independent calculation of the depth distribution of the dredged area in the Entrance to Port Phillip and confirmed that over 90% of the area to be dredged and within toe lines is within 1.8 m of the design depth. SKM have certified that the insurvey and outsurvey data accurately represents the seabed depths in the Entrance. As a further check, the audit team conducted an</p>	<p>Full compliance</p>	<p>Alliance Monthly Report September 2008 CDP_ALL_REP_303-08-09 Rev 00</p> <p>Bathymetric survey data (insurvey)</p> <p>Bathymetric survey data (outsurvey)</p> <p>Maunsell 2008, letter to PoMC re: 'Proportion of Entrance Dredged Area at or above -19.1m CD', dated 24 November 2008</p> <p>SKM 2008, letter to PoMC re 'Port Phillip Entrance – Certification of</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p>independent analysis of the depths dredged using the SKM certified bathymetric data. This confirmed the findings for both Rip Bank and Nepean Bank (refer Appendix A).</p> <p>Based on the Alliance Monthly Reports, Maunsell's independent calculation, the auditor's independent analysis and the supporting observation that the actual dredged volume in the Entrance of Port Phillip Bay is less than the estimated volume to be dredged, the auditor concludes that compliance has been achieved with depth constraint requirements.</p>		<p>Acceptance Survey', dated 13 October 2008</p>
<p>» For areas to be dredged, final channel width to be no greater than 25 m outside of the Williamstown Channel, Port Melbourne Channel, and South Channel design toe lines and 15 m of the Entrance design toe line. 50% of the delivered toe line is to be within 15 m of the Williamstown Channel, Port Melbourne Channel, and South Channel design toe lines and 9 m of the Entrance design toe line. This does not apply to the sand waves within South Channel, and the north-west side of Nepean Bank (where the minimum amount to achieve a design depth of 17.3 m is to be dredged).</p>	<p>Dredge requirements for the South Channel, Williamstown Channel and Port Melbourne Channel are not applicable to this audit. Compliance has only been assessed for requirements relating to the Entrance.</p> <p>Review of the September 2008 Alliance Monthly Report (CDP_ALL_REP_303-08-09 Rev 00) has indicated that:</p> <ul style="list-style-type: none"> » The final channel width is no greater than 15 m outside of the Entrance design toe line. » More than 50% of the dredging is within the 9 m design toe lines at the Entrance. <p>SKM have certified that the insurvey and outsurvey data accurately represents the seabed depths in the Entrance. As a further check, the audit team conducted an independent analysis of the widths dredged using the SKM certified bathymetric data. This confirmed the findings for both Rip Bank and Nepean Bank (refer Appendix A).</p> <p>Based on the Alliance Monthly Reports and the auditor's independent analysis and the supporting observation that the actual dredged volume in the Entrance of Port Phillip Bay is less than the estimated volume to be dredged, the auditor concludes that compliance has been achieved with width constraint requirements.</p>	<p>Full compliance</p>	<p>Alliance Monthly Report September 2008 CDP_ALL_REP_303-08-09 Rev 00</p> <p>Bathymetric survey data (insurvey)</p> <p>Bathymetric survey data (outsurvey)</p> <p>SKM 2008, letter to PoMC re 'Port Phillip Entrance – Certification of Acceptance Survey', dated 13 October 2008</p>
<p>Construction zone – construction zones have been identified to limit the footprint of dredging activities.</p>	<p>The EMP Annexure 7 drawings CDP-Env050439 Nepean Bank ridge, 35331 and 35332 outline the construction zones</p>	<p>Not applicable</p>	<p>Environment Management Plan Rev 5 Annexure 7 drawings CDP-Env050439</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
Construction areas are identified in drawings listed below.	to limit the footprint of dredging activities in the Entrance of Port Phillip Bay.	(for information)	Nepean Bank Ridge, 35331 and 35332
All dredging activities to take place within the construction zones. No dredging (as a subset of dredging activities) is to take place within 65 m of the outside edge of the construction zone (Port Melbourne Channel, South Channel and the Entrance only, except to the extent necessary to achieve a design depth of 17.3 m along the north-west side of Nepean Bank). This is to be confirmed through draghead tracking (in dredging mode only) and validated by bathymetry survey (where draghead tracking indicates that dredging in this area has potentially occurred).	<p>Dredge requirements for the South Channel and Port Melbourne Channel are not applicable to this audit. Compliance has only been assessed for requirements relating to the Entrance.</p> <p>Alliance reporting has not identified cases where dredging took place outside the construction zones.</p> <p>In seeking to confirm that the requirement has been met, the auditor undertook a review of vessel tracking data and bathymetry.</p> <p>As part of this review, the Alliance provided the audit team with an onsite demonstration of the vessel and equipment tracking data as displayed on their EnviroSys Database (8 October 2008 at the Alliance office Fishermans Wharf). Here, examples of vessel tracking were explained and illustrated including the nature of the dredge activities and its location within the construction zones. Detailed vessel tracking data are recorded by the Alliance, with data logged every thirty seconds. In assessing the tracking data, PoMC advised that there are instances where the draghead may remain lowered or engaged while the vessel is manoeuvring or allowing other vessels to pass in the channels, but dredging is not taking place. As tracking of the dragheads continues irrespective of whether dredging is taking place, the resulting information can infer that dredging is taking place in an area outside of the construction zone when this is not the case.</p> <p>A detailed review of the logged data was undertaken by the auditor for three sequences of six days (16 to 21 April 2008, 15 to 20 June 2008 and 21 to 26 August 2008) of vessel tracking data for the Queen of the Netherlands whilst dredging in the Entrance of Port Phillip Bay. Review of the draghead tracking records while in dredge mode confirmed that there were no instances of the vessel dredging (as a subset of dredging activities) within 65 m of the outside edge</p>	Full compliance	<p>Vessel tracking data for the Queen of the Netherlands (16 to 21 April 2008, 1 June 2008, 10 June 2008, 15 to 20 June 2008, 4 July 2008, 21 to 26 August 2008)</p> <p>EnviroSys screen plots of vessel tracking data for the Queen of the Netherlands (1 June 2008, 10 June 2008, 19 June 2008, 4 July 2008 and 26 August 2008)</p> <p>Alliance demonstration of the tracking data on EnviroSys Database (8 October 2008 at Alliance office Fishermans Wharf)</p> <p>Bathymetric survey data (insurvey)</p> <p>Bathymetric survey data (outsurvey)</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p>of the construction zone in the Entrance. This supported the conclusion that the dredging complied with the requirement.</p> <p>The auditor notes that the outsurvey for the Entrance of Port Phillip Bay only covered the dredging zone and did not extend to include the area within 65 metres of the outside edge of the construction zone. As such, this data could not be used to validate that no dredging occurred in this area. However, it is noted that there is no requirement to conduct a bathymetric survey of the entire construction zone unless draghead tracking indicates that dredging in this area has potentially occurred</p> <p>In summary, based on the reporting by PoMC and a review of the available vessel tracking data, the auditor concludes that dredging has not occurred within 65 metres of the outside edge of the construction zone and that compliance has been achieved with this requirement.</p>		
<p>Dredging equipment and associated support vessels will be required to manoeuvre outside construction areas, including transit between construction areas.</p>	<p>Dredge requirements for the South Channel, Williamstown Channel and Port Melbourne Channel are not applicable to this audit. Compliance has only been assessed for works in the Entrance.</p> <p>Demonstration of vessel tracking by the Alliance indicated movement outside of construction zones, including sailing to and from DMGs, bunkering, anchoring or moving out of shipping channels to allow other vessels to pass.</p> <p>Review of tracking data provided for the Queen of the Netherlands for the dates in the previous point confirms that dredging equipment and associated support vessels were manoeuvred outside construction areas, as was anticipated in this PDS.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>	<p>Full compliance</p>	<p>Alliance demonstration of the tracking data on EnviroSys Database (8 October 2008 at Alliance office Fishermans Wharf)</p> <p>Vessel tracking data for the Queen of the Netherlands (16 to 21 April 2008, 1 June 2008, 10 June 2008, 15 to 20 June 2008, 4 July 2008, 21 to 26 August 2008)</p> <p>EnviroSys screen plots of vessel tracking data for the Queen of the Netherlands (1 June 2008, 10 June 2008, 19 June 2008, 4 July 2008 and 26 August 2008)</p>
<p>Toe lines and construction zones are identified on: Drawing 35328 – Channel Deepening Project – Port of Melbourne – Coastal Management Consent</p>	<p>Requirements for the South Channel, Williamstown Channel and Port Melbourne Channel are not applicable to this audit. Compliance has only been assessed for requirements</p>	<p>Not applicable (for information)</p>	<p>Environment Management Plan Rev 5 Annexure 7 drawings 35331 and 35332</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence										
<p>Scope of Works</p> <p>Drawing 35329 – Channel Deepening Project – Port of Melbourne – South – Coastal Management Consent Scope of Works</p> <p>Drawing 35330 – Channel Deepening Project – Port of Melbourne – North – Coastal Management Consent Scope of Works</p> <p>Drawing 35331 – Channel Deepening Project – Port Phillip Entrance – South Channel – Coastal Management Consent Scope of Works</p> <p>Drawing 35332 – Channel Deepening Project – Port Phillip Entrance – South Channel – Coastal Management Consent Scope of Works</p> <p>Drawing 35333 – Channel Deepening Project – South Channel – West - Coastal Management Consent Scope of Works</p> <p>Drawing 35334 – Channel Deepening Project – South Channel – East - Coastal Management Consent Scope of Works</p> <p>Drawing CDP-ENV-50254 – Construction Areas – Heritage significance</p> <p>(Drawings are included in Annexure 7)</p>	<p>relating to the Entrance.</p> <p>The EMP Annexure 7 drawings 35331 and 35332 outline the construction zones to limit the footprint of dredging activities in the Entrance of Port Phillip Bay.</p>												
<p>Dredging to be undertaken in accordance with EMP Method Statement for Dredging works North – Contaminated (CDP_ALL_MS_408)</p>	<p>CDP_ALL_MS_408 does not apply to the Entrance of Port Phillip Bay.</p>	<p>Not applicable</p>											
<p>Tracking of equipment activity as follows:</p> <table border="1" data-bbox="215 1139 696 1294"> <thead> <tr> <th data-bbox="215 1139 322 1182">Equipment</th> <th data-bbox="322 1139 383 1182">Time</th> <th data-bbox="383 1139 443 1182">Date</th> <th data-bbox="443 1139 600 1182">Co-ordinates</th> <th data-bbox="600 1139 696 1182">Other</th> </tr> </thead> <tbody> <tr> <td data-bbox="215 1182 322 1294">TSHD</td> <td data-bbox="322 1182 383 1294">P</td> <td data-bbox="383 1182 443 1294">P</td> <td data-bbox="443 1182 600 1294">Dredging - x,y,z (northing, easting, depth to Chart Datum)</td> <td data-bbox="600 1182 696 1294">Status of cycle (i.e. dredging, sailing,</td> </tr> </tbody> </table>	Equipment	Time	Date	Co-ordinates	Other	TSHD	P	P	Dredging - x,y,z (northing, easting, depth to Chart Datum)	Status of cycle (i.e. dredging, sailing,	<p>Review of tracking data provided by the Alliance, from a selection of dates chosen by the auditor, indicates the TSHD is tracked. This review confirmed that an automated data collection system is in place whereby the equipment activity is tracked and recorded every thirty seconds. Equipment is indicated by the name of the vessel.</p> <p>Evidence of the tracking extent was also confirmed during</p>	<p>Full compliance</p>	<p>Alliance demonstration of the tracking data on EnviroSys Database (8 October 2008 at Alliance office Fishermans Wharf)</p> <p>Onboard inspection of the Queen on 25 September 2008</p>
Equipment	Time	Date	Co-ordinates	Other									
TSHD	P	P	Dredging - x,y,z (northing, easting, depth to Chart Datum)	Status of cycle (i.e. dredging, sailing,									

Project Delivery Standard				Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
			Sailing & placement of dredged material – x,y,z (northing, easting)	placement of dredged material)	<p>the Alliance's EnviroSys demonstration to GHD on 8 October 2008 where all equipment was tracked.</p> <p>Onboard inspection of the Queen of the Netherlands on 25 September 2008, under instruction of Vessel Master (Alliance), included an overview of tracking instruments and details. All tracking of equipment activity for the TSHD was indicated.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>	<p>Vessel tracking data for the Queen of the Netherlands (16 to 21 April 2008, 1 June 2008, 10 June 2008, 15 to 20 June 2008, 4 July 2008, 21 to 26 August 2008)</p> <p>EnviroSys screen plots of vessel tracking data for the Queen of the Netherlands (1 June 2008, 10 June 2008, 19 June 2008, 4 July 2008 and 26 August 2008)</p>
Use of green valve at all times when using overflow.				<p>The Vessel Master confirmed, during an onboard inspection of the Queen of the Netherlands on 25 September 2008 and Cornelis Zanen on 26 September 2008, that the green valve is automated for use when the overflow is used.</p> <p>Review of the Queen of the Netherlands' and the Cornelis Zanen's daily trip reports for dates of 1 June 2008, 10 June 2008, 19 June 2008, 4 July 2008, and 26 August 2008 indicates that the green valve was operational.</p>	Full compliance	<p>Daily trip reports for Queen of the Netherlands and Cornelis Zanen (1 June 2008, 10 June 2008, 19 June 2008, 4 July 2008 and 26 August 2008)</p> <p>Notes taken during vessel inspection on 25 September 08 (Queen of the Netherlands) and 26 September 08 (Cornelis Zanen)</p>
The overflow valve of the TSHD will be closed when sailing.				<p>PoMC has advised that the overflow valve of the TSHD is always closed while sailing. Review of a selection of Daily Trip Reports from the Queen of the Netherlands and Cornelis Zanen indicated that the overflow valve was closed during sailing. This is evidenced by a row on each report under the miscellaneous heading: "Turbidity during sailing (O/C)". In all cases this corresponded with "C" in each trip column, thus indicating that the valve was closed. The Vessel Master also confirmed that the overflow valve is closed while sailing during interview and inspection by GHD (Queen of the Netherlands on 25 September 2008 and Cornelis Zanen on 26 September 2008).</p>	Full compliance	<p>Daily Trip Reports for the Queen of the Netherlands and Cornelis Zanen (1 June 2008, 10 June 2008, 19 June 2008, 4 July 2008 and 26 August 2008)</p> <p>Notes taken during vessel inspection on 25 September 08 (Queen of the Netherlands) and 26 September 08 (Cornelis Zanen)</p>
31 Dredging schedule						
The initial dredging schedule to be submitted to DSE before implementation.				<p>The initial EMP Dredging Schedule FINAL Rev 0 was dated 23 January 2008 and the first PoMC Matter for Decision signed on 29 January 2008 confirms that the schedule was</p>	Full compliance	<p>Table 16 of EMP Dredging Summary Notification to Agencies Letter (To</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p>submitted to and viewed by DSE prior to 8 February 2008 dredging start date.</p> <p>Notification to Agencies letter dated 29 January 2008 confirms submission of <i>"Dredge Schedule for the Channel Deepening Project"</i> was submitted to the DSE before implementation of the schedule.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>		<p>Secretary DSE on 29 January 2008)</p> <p>EMP Dredging Schedules (All revisions and updates to 8 October 2008)</p> <p>Daily Trip Reports for the Queen of the Netherlands and Cornelis Zanen (1 June 2008, 10 June 2008, 19 June 2008, 4 July 2008 and 26 August 2008)</p> <p>Matter for Decision Revision 1 Update 7 (8 October 2008)</p> <p>Matter for Decision documents (All documents from January to 8 October 2008)</p>
<p>Subsequent revisions of the dredging schedule and monthly updates will be submitted to DSE within 2 working days of approval by CDP management.</p>	<p>Review of the Dredge Schedules, PoMC Matter for Decision documents, as well as Notification to Agencies letters and email records, indicate that subsequent revisions of the dredging schedule and monthly updates were submitted to DSE within 2 days of approval by CDP management. Approval by CDP management can be seen in the form of signatures on the Matter for Decision documents and as a name in the "approved" column on revisions of the EMP Dredge Schedules. All dates in Notification to Agency letters and emails correspondence are within 2 working days of approval dates by CDP management.</p>	<p>Full compliance</p>	<p>Notification to Agencies letters and email records (to various DSE contacts dated from 7 February to 3 September 2008)</p> <p>Notification to agencies email with subject matter: EMP Dredging Schedule, Rev1 Update7 (8 October 2008)</p> <p>EMP Dredging Schedules (All revisions and updates to 8 October 2008)</p> <p>Matter for Decision Revision 1 Update 7 (8 October 2008)</p> <p>Matter for Decision documents (All documents from January to 8 October 2008)</p>
<p>Dredging to take place as summarised in Table 16 'Dredging Summary'.</p>	<p>Table 16 provides an overall 'dredging summary', for each 'project area' and 'dredging location'. This Table lists 'indicative dredging technology', 'indicative dredging volumes', 'material description', 'dredge material ground', 'management requirements' and 'disposal methods'. This audit assesses compliance with the components of Table 16</p>	<p>Full compliance</p>	<p>Refer to data for PDS 41</p> <p>Refer to data for PDS 24</p> <p>Refer to data for PDS 34</p> <p>Dredging Schedule Rev 1 Update 7,</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p>that are relevant to the Entrance of Port Phillip Bay.</p> <p><u>Indicative dredging technology</u></p> <p>Table 16 indicates that the Jumbo TSHD with hydrohammer and stonefisher (if required) would be used in the Entrance. The Dredging Schedule (Rev 1 Update 7, dated 08 October 2008) indicates that the only vessel used for dredging (excavation) in the Entrance was the Queen of the Netherlands. This requirement is further addressed by PDS 41, which requires all dredging to occur with the ripper draghead. Evidence supporting this includes a statement from PoMC declaring that the ripper draghead was the only draghead used in the Entrance, and vessel tracking records for the Queen of the Netherlands, which show her dredging in the Entrance. Email advice from PoMC to the Office of the Environmental Monitor indicates that the Cornelis Zanen assisted with clean up of Nepean Bank.</p> <p>The hydrohammer has not been deployed in the dredging program. PoMC advises that the hydrohammer is specialised equipment and the Cetus is the only vessel equipped with the hydrohammer. The Cetus has not visited Melbourne as part of the current program of the CDP. This was confirmed by a review of PoMC records that indicated the Cetus was not found to be in Melbourne during this time.</p> <p><u>Indicative dredging volumes</u></p> <p>As addressed in PDS 24, Table 16 indicates that a maximum of 0.55 million m³±15% could be dredged in the Entrance. Dredged volumes are addressed in detail in PDS 24. A review found that the total volume dredged in the Entrance was 0.461 million m³.</p> <p>In evaluating this, as per PDS 24, the auditor notes: (a) review of post- completion hydrographic surveys confirmed that the design depth has been achieved in the Entrance and hence the functionality of the Entrance has been achieved. (b) The lower volume dredged indicates that more of the Entrance bathymetry will be preserved than anticipated.</p>		<p>dated 08 October 2008</p> <p>Email from PoMC to the Office, dated 29 August 2008 with subject: The Entrance</p> <p>Daily trip reports, vessel tracking data, and Envirosys screen prints for Queen of 1 June 2008, 10 June 2008, 19 June 2008, 4 July 2008, and 26 August 2008</p> <p>Vessel tracking data for 16 to 21 April 2008, 15 to 20 June 2008 and 21 to 26 August 2008</p> <p>Dredging Schedule Rev 1 Update 7, dated 08 October 2008</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p><u>Material description</u></p> <p>Table 16 indicates that the material to be dredged in the Entrance of Port Phillip Bay is very weak rock. Daily trip reports for the Queen of the Netherlands were reviewed for a set of selected days (1 June, 10 June, 19 June, 4 July, and 26 August). These detail stone as the only material type involved. The auditor concludes that compliance has been achieved with this requirement.</p> <p><u>Dredged material ground (DMG)</u></p> <p>Table 16 indicates that material dredged from the Entrance is to be disposed to the SE DMG. This requirement is addressed in detail in PDS 34. Vessel tracking data for the Queen of the Netherlands were reviewed and confirmed placement at the SE DMG. The tracking data and daily trip reports indicates that placement was made directly from the hopper.</p> <p><u>Management requirements</u></p> <p>Table 16 requires that material from the Entrance of Port Phillip Bay be covered with South Channel sand. The Dredging Schedule (Rev 1, Update 7) indicates that Entrance dredging was completed in September. Dredging in the South Channel occurred sporadically from the commencement of dredging in February 2008. Dredging in South Channel occurred continuously from 16th of September 2008 until the 15th of October 2008.</p> <p><u>Disposal method</u></p> <p>Table 16 requires that material be disposed directly from the hopper. This was confirmed with a review of the Queen of the Netherlands' tracking data.</p>		
<p>Dredging schedule to include:</p> <ul style="list-style-type: none"> » dredging technology » dredging configuration (i.e. number and location) 	<p>Review of EMP Dredging Schedule revisions indicate that they include dredging technology, dredging configuration, timing, duration and sequence of dredging in the project areas.</p>	<p>Full compliance</p>	<p>EMP Dredging Schedules (All revisions and updates to 3 December 2008)</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
of dredges, use of interval dredging) » timing, duration and sequence of dredging in Project Areas.			
Capping layer to be placed around 140 days after completion of the hydraulic placement of contaminated sediment to allow the sediment sufficient time to gain enough strength to support the capping layer.	Not applicable to the Entrance of Port Phillip Bay	Not applicable	
Capping will be completed before 31 December 2009.	Not applicable to the Entrance of Port Phillip Bay	Not applicable	
33 Consideration of seasonal sensitivities			
No dredging permitted between 18 December and 31 January in the South of bay to mitigate impacts on the recreation and tourism activities during the holiday season.	Dredging (excavation) in the Entrance commenced on 5 April 2008 and was completed on 15 September 2008. The auditor concludes that compliance has been achieved with this requirement.	Full compliance	Dredging Schedule Rev 1 Update 7
Restrict dredging in Williamstown Channel (within Hobsons Bay) to less than 50% of key anchovy spawning period from 1 December to 28 February. A two weeks on/two week off sequence will be applied to this period.	Not applicable to the Entrance of Port Phillip Bay.	Not applicable	
No dredging using the TSHD in the Yarra River or Williamstown Channels between 15 October to 30 November to protect migration of the endangered Australian grayling species (relates to EPBC Act / NES matters – refer to Annexure 8).	Not applicable to the Entrance of Port Phillip Bay.	Not applicable	
Dredging using the TSHD in Yarra River between 1 April and 31 July restricted to no more than two calendar months, or equivalent in days to protect Australian grayling larval drift.	Not applicable to the Entrance of Port Phillip Bay.	Not applicable	
In preparing the dredging schedule, consideration will be given to seasonal sensitivities and preferred	The revisions and updates of the EMP Dredging Schedule and PoMC Matter for Decision documents were reviewed up	Full compliance	EMP Dredging Schedules (All revisions

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
<p>seasons identified in Table 17 'Key Seasonal Sensitivities and Preferred Seasons'. The decision process, including how seasonal sensitivities were considered, will be documented.</p>	<p>to 8 October 2008. Dredging (excavation) in the Entrance was completed on 15 September 2008 and hence revisions to the dredging schedule after this date are not applicable to the Entrance. These documents provide information that indicates that in preparing the dredge schedule, consideration was given to seasonal sensitivities and preferred seasons as identified in EMP Table 17 'Key Seasonal Sensitivities and Preferred Seasons'</p> <p>The EMP Dredge Schedule includes information on "Dredging Constraints" in the section dealing with the time schedule. A Table and legend entitled "Environmental and Social Preferences" is also presented, indicating preferred dredging periods in each area and any non dredging or dredging restricted periods (as indicated in the first 4 dot points of this PDS). The Schedule also notes that "Environmental limits and seasonal sensitivities have been considered during the development of the EMP Dredging Schedule".</p> <p>The information provided indicates that consideration was also given to seasonal activities for changes in the dredging schedule. Documentation is included in the document series of <i>Matter for Decision</i>. Matter for Decision documents include a Table indicating the "Status of EMP Dredging Schedule" against the "EMP Requirements" as well as continually updated schedule changes to reflect EMP Table 17 requirements.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>		<p>and updates to 8 October 2008)</p> <p>EMP Dredging Schedule Rev 1 Update 7 (8 October 2008)</p> <p>Matter for Decision Revision 1 Update 7 (8 October 2008)</p> <p>Matter for Decision documents (All documents from January to 8 October 2008)</p>

34 Dredged material placement			
<p>DMGs – all dredged material placement activities to take place within the specified DMGs (including associated construction areas) set out in:</p> <ul style="list-style-type: none"> » Drawing 35328 – Channel Deepening Project – Port of Melbourne – Coastal Management Consent Scope of Works 	<p>Drawing 35328 is not applicable to the Entrance of Port Phillip Bay.</p>	<p>Not applicable</p>	

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
<p>» Drawing 35331 – Channel Deepening Project – Port Phillip Entrance – South Channel – Coastal Management Consent Scope of Works</p> <p>(Drawings are included in Annexure 7)</p>	<p>Vessel tracking data has been reviewed for the Queen of the Netherlands for the dates 16 to 21 April 2008, 1 June 2008, 10 June 2008, 15 to 20 June 2008, 4 July 2008 and 21 to 26 August 2008. Dredged material placement during these periods occurred in the SE DMG, as indicated by drawing 35331.</p>	Full compliance	<p>Daily trip reports, vessel tracking data and EnviroSys screen prints for Queen of the Netherlands for 1 June 2008, 10 June 2008, and 4 July 2008</p> <p>Vessel tracking data for the Queen of the Netherlands for 16 to 21 April 2008, 15 to 20 June 2008 and 21 to 26 August 2008</p>
<p>Dredged material placement – All dredged material to be placed in accordance with Table 16 'Dredging Summary'.</p>	<p>The EMP Dredging Schedule (Revision 1 Update 7) indicates that the Queen of the Netherlands has been used for dredging (excavation) in the Entrance of Port Phillip Bay and is the only Alliance vessel with a hopper capacity of 22,000 – 35,000 m³ (Jumbo TSHD).</p> <p>Onboard inspection of the Queen of the Netherlands on 25 September 2008, under instruction of Vessel Master (Alliance), included an overview of tracking instruments and details, and showed how tracking of equipment activity for the TSHD is carried out.</p> <p>Reporting by the Alliance indicates that dredged material has been placed in accordance with the requirements of the Dredging Summary. As a check of this reporting, the auditor reviewed vessel tracking data for the dates 16 to 21 April 2008, 1 June 2008, 10 June 2008, 15 to 20 June 2008, 4 July 2008 and 21 to 26 August 2008. Dredged material placement during these periods occurred in the SE DMG, as indicated by drawing 35331. The tracking data indicates that placement was made directly from the hopper. The auditor concludes that dredged material placement is occurring in accordance with Table 16.</p>	Full compliance	<p>Daily trip reports, vessel tracking data and EnviroSys screen prints for the Queen of the Netherlands on 1 June 2008, 10 June 2008, 4 July 2008</p> <p>Vessel tracking data for the Queen of the Netherlands for 16 to 21 April 2008, 15 to 20 June 2008 and 21 to 26 August 2008</p> <p>Alliance demonstration of the tracking data on EnviroSys Database (8 October at Alliance office Fishermans Wharf)</p> <p>Onboard inspection of Queen of the Netherlands (25 September 2008)</p> <p>EMP Dredging Schedule (Rev 1 Update 7)</p>
<p>Dredged material placement including capping – to be undertaken in accordance with EMP Method Statement for material placement in PoM DMG (CDP_ALL_MS_410).</p>	<p>CDP_ALL_MS_410 does not apply to dredging in the Entrance of Port Phillip Bay.</p>	Not applicable	

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
Dredging and disposal locations to be recorded as per tracking of equipment table (refer to Table 11 – Dredging and plume PDS).	<p>Vessel tracking data for the Queen of the Netherlands was reviewed for the dates listed in the previous requirement relating to dredged material placement. The tracking data includes records of vessel coordinates and time and date for the vessel activity codes for “disposing”, “sailing empty” and “sailing loaded”. This is the required information as per Table 11 of the Dredging and plume PDS. While equipment type is not specifically stated, the vessel used indicates what equipment has been used. For example, the Queen of the Netherlands is a jumbo-sized TSHD. Tracking data for the Cornelis Zanen has also been reviewed for the Activity 1 Audit 1; this included recording of dredging and disposal locations.</p> <p>This review also provided evidence of an automated data collection system whereby the equipment activity is tracked and recorded every thirty seconds. Evidence of the tracking extent was confirmed during the Alliance’s EnviroSys demonstration to the auditors on 8 October 2008.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>	Full compliance	<p>Vessel tracking data for the Queen of the Netherlands for 16 to 21 April 2008, 1 June 2008, 10 June 2008, 15 to 20 June 2008, 4 July 2008 and 21 to 26 August 2008</p> <p>Alliance demonstration of the tracking data on EnviroSys Database (8 October 2008 at Alliance office Fishermans Wharf)</p>
Volumes are to be calculated from hydrographic survey data.	Not applicable to the Entrance of Port Phillip Bay	Not applicable	
Dredged material placement will not commence if a whale is sighted within 300 m of the TSHD placing material into a DMG. If a whale is sighted, placement can commence if the whale has been seen to move beyond 300m, or has not been sighted within 300m for at least 15 minutes.	A review of the cetacean logs provided indicates that there were no whales sighted within 300 m of a TSHD during material placement at a DMG.	Full compliance	<p>Cetacean sighting logs</p> <p>Email correspondence between PoMC and DSE, re whale sightings.</p>
40 Draghead design			
The draghead will be designed to minimise rockfall in accordance with the recommendations contained within Report number Z4117, <i>Physical Model Experiments with Ripper Dragheads in Rock</i> .	Evers Consult dredging and marine consultants conducted an independent peer review to verify that the ripper draghead has been designed in accordance with the Delft Hydraulics report number Z4117 to minimise rockfall and	Full compliance	<p>Evers Consult Verification Report, Ripper Dragheads Modifications, 26 March 2008</p> <p>Physical Model Experiments with Ripper</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
<i>Experimental research program on reduction of spill WL Delft Hydraulics, October 2006.</i>	that the draghead has been constructed in accordance with the design. Evers Consult issued a <i>Verification Report: Ripper Dragheads Modification</i> dated 26 March 2008.		Dragheads in Rock, October 2006
<p>An independent peer reviewer is to verify:</p> <ul style="list-style-type: none"> » that the draghead design is in accordance with the above mentioned report. <p>And:</p> <ul style="list-style-type: none"> » that the draghead has been constructed in accordance with the design. 	<p>The Evers Consult report indicates that all three Ripper Dragheads at the Port of Melbourne depot at Short Road were inspected on 6 March 2008 and it was established by Evers Consult that the changes made since the Trial Dredging reflected the development at the laboratory. Evers Consult was “<i>satisfied that the design of the improvements is in line and reflects the findings of the Delft report and that the improvements are in accordance with that design.</i>”</p> <p>The Verification Report No 1 for DSE, Victoria – Ripper Draghead Compliance Verification, Dredging Research June 2008 states that the dragheads have been designed and constructed in accordance with the Delft Hydraulics 2006 report.</p>	Full compliance	<p>Evers Consult Verification Report, Ripper Dragheads Modifications, 26 March 2008</p> <p>Verification Report No 1 for DSE, Victoria – Ripper Draghead Compliance Verification DRL, June 2008</p>
41 Dredging in the Entrance			
All dredging to be conducted with the ripper draghead.	<p>PoMC has prepared a statement dated 13 October 2008 stating that: “<i>Other dragheads haven’t been used in the Entrance as they are not suitable for dredging rock. No material would be cut at all. Moreover, standard dragheads would be damaged to a great extent if deployed in the Entrance.</i>”</p> <p>Work orders 10069.21701 and 10069.21705 with Target Start dates of 30-03-2008 and with all activities completed by 05-04-2008 were observed. Both of these work orders involved the activity: “<i>change claydraghead for ripperdraghead with pickpoints.</i>”</p> <p>The PoMC statement also indicates that: “<i>substantial maintenance repairs on the dragheads were undertaken during bunkering, which occurred approximately every three weeks. There were three ripper dragheads available. Two ripper dragheads were fitted to the dredger and the third one was used as a replacement. During bunkering, a ripper draghead was replaced by the third one if too extensive</i></p>	Full compliance	<p>PoMC statement in letter that the ripper draghead was used (Alliance Engineering Manager, 13 October 2008)</p> <p>Work orders 10069.21701 and 10069.21705 (30 March 2008)</p> <p>Draghead maintenance records for the Queen of the Netherlands and relating to the ripper draghead were sighted for the dates 10 April 2008, 17 May 2008, 24 May 2008, 22 August 2008, and 25 August 2008</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p><i>repairs had to be undertaken. The other fitted draghead was repaired while attached to the suction pipe". Draghead maintenance records for the Queen of the Netherlands and relating to the ripper draghead were sighted for the dates 10 April 2008, 17 May 2008, 24 May 2008, 22 August 2008, and 25 August 2008 also indicating that the ripper draghead was being used during this period.</i></p>		
<p>When dredging towards the canyon, the draghead to be lifted so that no rock will be removed within 5 metres of the canyon edge, as defined in EMP Method Statement for Dredging works South – Entrance (CDP_ALL_MS_409).</p> <p>When dredging the canyon edge itself, dredging to be conducted from the canyon towards the plateau.</p>	<p>Plots of vessel tracking data for the Queen of the Netherlands showing individual dredge passes for the dates 8/06/2008, 16/06/2008, and 25/06/2008 were reviewed. This data is recorded on a 30 second basis, and provides a very detailed record of the location of where dredging has taken place, and where placement of dredged material takes place. This data indicates that on these days the dredging passes were completed from the north-east to the south-west.</p> <p>Review of the draghead tracking data plots revealed a number of possible anomalies where dredging towards the canyon may have occurred within 5 metres of and then across the canyon edge. However, more detailed analysis of vessel tracking data by the audit team revealed that on each of these occasions the draghead was lifted prior to the draghead being within 5 metres of the canyon edge.</p> <p>The remaining plots of vessel dredging tracks on these three dates either show that dredging was being conducted from the canyon towards the plateau along the northern side of Nepean Bank, or that dredging had stopped just inside the southern boundary of Nepean Bank. Review of the vessel tracking data for the three days shows that the dragheads had been lifted after each dredge pass.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>	<p>Full compliance</p>	<p>Plots of vessel tracking data for the Queen of the Netherlands showing individual dredge passes for the dates 8/06/2008 to 16/06/2008, and 25/06/2008</p> <p>Vessel tracking data for the Queen of the Netherlands for the dates 8/06/2008 to 16/06/2008, and 25/06/2008</p>
42 Clean up in the Entrance			
<p>All clean up activities to be conducted with the clean up draghead. This may be either the ripper draghead</p>	<p>PoMC has provided a statement, dated 14 October 2008, that declares the ripper draghead's teeth are replaced by a</p>	<p>Full compliance</p>	<p>PoMC statement in email that ripper draghead was used with teeth shielded</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
with the teeth shielded or else a separate draghead.	slide during clean-up activities. An accompanying photograph of the fitted slide on the ripper draghead was sighted. An email from PoMC to the Office of the Environmental Monitor dated 29 August 2008 indicates that the Cornelis Zanen was used to assist with clean up in the Entrance. The vessel master of the Cornelis Zanen advised the auditor during the auditor's vessel inspection that the dragheads on the Queen of the Netherlands are not interchangeable with the dragheads on the Cornelis Zanen. A statement from the Alliance Engineering Manager confirms that the ripper draghead cannot be deployed on the Cornelis Zanen and that a standard draghead was used during clean up in the Entrance.		(Alliance Engineering Manager, 14 October 2008) Photograph of draghead slide Email from PoMC to the Office, dated 29 August 2008 with subject: The Entrance Notes taken during vessel inspection on 25 September 08 (Queen of the Netherlands) and 26 September 08 (Cornelis Zanen). Alliance Engineering Manager statement re draghead used by CoZa during clean up (28 Jan 2009)
Clean-up to be undertaken in accordance with EMP Method Statement for Dredging works South – Entrance (CDP_ALL_MS_409). Weather forecasts will be obtained from a reputable service provider.	Review of the information indicated that the clean up has been undertaken in accordance with the EMP Method Statement, with a minor non-compliance for the spatial extent of clean up as noted below on page 44. The EMP Method Statement states that weather forecasts would be obtained from Offshore Weather Services (OWS) and would be received daily by the Operations Manager. A copy of the Purchase Order dated 19 March 2008 for Offshore Weather Services to provide weather forecasting data to Boskalis has been sighted. Email correspondence between Boskalis and Offshore Weather Services dated 30 October 2007 to 18 March 2008 indicated that weather forecasts were requested to start on the 24 th March 2008 and continue until works in the Entrance of Port Phillip Bay were completed. A 3-day outlook was to be provided twice daily and a 5-10 day outlook provided on Monday and Friday. The 3-day forecast from Offshore Weather Services for 0600LT 24 March 2008 was also sighted and included a prediction of significant wave heights, as required by the EMP Method Statement. The auditor concludes that compliance has been achieved with the requirement to obtain weather forecasts.	Minor non-compliance Full compliance	Weather forecast provider agreement 3-day weather forecast for 0600LT 24 March 2008 from Offshore Weather Services 3-day weather forecast for 1800LT 24 June 2008 from Offshore Weather Services 3-day weather forecast for 1800LT 09 July 2008 from Offshore Weather Services 3-day weather forecast for 0800LT 21 August 2008 from Offshore Weather Services EMP Method Statement for Dredging works South – Entrance (CDP_ALL_MS_409) Environmental incident report no. CDP_ALL_EIR_001-Rev01 dated 8 August 2008, revised 2 February 2009

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence												
<p>Conduct removal of loose material in accordance with the table below. This will result in approximately twenty programmed clean up events. After clean up, dredging may recommence.</p> <table border="1" data-bbox="203 437 593 906"> <thead> <tr> <th data-bbox="210 448 331 528">Quantity Dredged (Q)</th> <th data-bbox="344 448 450 528">Hs predicted < 3 m</th> <th data-bbox="463 448 584 528">Hs predicted > 3 m</th> </tr> </thead> <tbody> <tr> <td data-bbox="210 555 331 603">< 10,000 m³</td> <td data-bbox="344 555 450 603">Continue dredging</td> <td data-bbox="463 555 584 603">Continue dredging</td> </tr> <tr> <td data-bbox="210 628 331 724">< 10,000 m³ < Q < 24,000 m³</td> <td data-bbox="344 628 450 724">Continue dredging</td> <td data-bbox="463 628 584 724">Clean-up for 8 to 18 hours depending on quantity dredged</td> </tr> <tr> <td data-bbox="210 799 331 847">~ 24,000 m³</td> <td data-bbox="344 799 450 895">Clean-up for at least 18 hours</td> <td data-bbox="463 799 584 895">Clean-up for at least 18 hours</td> </tr> </tbody> </table> <p data-bbox="210 922 584 970">Note: Q = quantity dredged, Hs = significant wave height</p>	Quantity Dredged (Q)	Hs predicted < 3 m	Hs predicted > 3 m	< 10,000 m ³	Continue dredging	Continue dredging	< 10,000 m ³ < Q < 24,000 m ³	Continue dredging	Clean-up for 8 to 18 hours depending on quantity dredged	~ 24,000 m ³	Clean-up for at least 18 hours	Clean-up for at least 18 hours	<p>Clean up records for the Entrance of Port Phillip Bay dated 9 April 2008 to 15 September 2008 (Revised Clean-up summary INTERNAL.pdf) were reviewed and showed that a total of twenty-two clean up events occurred during this period. The clean up and dredging reports for all dredging in the Entrance of Port Phillip Bay were reviewed. These reported that on six occasions high seas greater than 3 metres were predicted, resulting in the cessation of dredging until weather conditions improved. These dredging events are reported in clean up reports 11A, 12A, 13A, 16A, 18A and 22A. On each of these occasions the dredged volume was less than 10 000 m³, with dredged volumes ranging from 2640 m³ to 9947 m³. As a result no clean up was required and dredging recommenced when weather conditions improved and clean up was completed and described in clean up reports 11, 12, 13, 16, 18 and 22.</p> <p>Clean up events have been conducted after dredging volumes ranging from 5 244 m³ to 25 039 m³, with clean up occurring for at least 18 hours, except for on three occasions (25 June 2008, 10 July 2008 and 22 August 2008) where clean up was stopped due to weather. On each of these occasions the dredged volume was between 10 000 m³ and 24 000 m³ and clean up had achieved at least 80 % cover with less than one hour of clean up time remaining based on the quantity dredged. This is compliant with this PDS and is discussed further below. The weather reports received by PoMC from Offshore Weather Services for 24 June 2008, 9 July 2008 and 21 August 2008 were sighted and confirmed that significant wave heights greater than 3 metres had been predicted on each of these occasions.</p>	Full compliance	<p>Revised Clean-up summary INTERNAL.pdf</p> <p>Entrance Clean Up reports 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 11A, 12, 12A, 13, 13A, 14, 15, 16, 16A, 17 Rev01, 18, 18A, 19, 20, 21, 22, 21A</p> <p>Queen of the Netherlands daily trip reports for 25 June 2008, 10 July 2008 and 22 August 2008</p> <p>3-day weather forecast for 1800LT 24 June 2008 from Offshore Weather Services</p> <p>3-day weather forecast for 1800LT 09 July 2008 from Offshore Weather Services</p> <p>3-day weather forecast for 1800LT 09 July 2008 from Offshore Weather Services</p>
Quantity Dredged (Q)	Hs predicted < 3 m	Hs predicted > 3 m													
< 10,000 m ³	Continue dredging	Continue dredging													
< 10,000 m ³ < Q < 24,000 m ³	Continue dredging	Clean-up for 8 to 18 hours depending on quantity dredged													
~ 24,000 m ³	Clean-up for at least 18 hours	Clean-up for at least 18 hours													
<p>In addition to the programmed clean-up events, conduct other clean-up events:</p> <ul style="list-style-type: none"> » prior to removal of the ridge along the north-west side of Nepean Bank as identified in EMP Method Statement for Dredging works South – Entrance (CDP_ALL_MS_409) 	<p>A summary of clean-up records for the Entrance of Port Phillip Bay between 9 April 2008 and 15 September 2008 (Revised Clean-up summary INTERNAL.pdf) was reviewed. These records confirmed that clean-up event 19 was conducted at the Nepean and Rip Bank from 17:25 on 11 August 2008 until 16:40 on 12/08/2008 for a total time of 27.4 hours. This clean-up event was annotated “Last Clean-</p>	Full compliance	<p>Revised Clean-up summary INTERNAL.pdf</p> <p>Entrance Clean Up reports 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 11A, 12, 12A, 13, 13A, 14, 15, 16, 16A, 17 Rev01, 18, 18A, 19, 20, 21, 22, 21A</p>												

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p><i>up before dredging NW ridge Nepean bank</i>". The clean up report for this event was also reviewed, and showed that the clean up area covered Nepean Bank, with the exception of the ridge along the north-west edge. The coverage of this event was 96% of the dredged area.</p> <p>A plot of the draghead location when dredging was reviewed for dredging between 02 August 2008 and 10 August 2008. This plot confirmed that there was no dredging of the ridge prior to clean up event 19. Based on this data, the auditor concludes that a clean up was conducted prior to removal of the ridge along the north-west side of Nepean Bank.</p>		<p>Queen of the Netherlands trip reports 378, 379, 385, 398, 399, 400</p> <p>Trackplot of draghead status when dredging between 02 August 2008 and 10 August 2008</p>
<p>» once design profile has been achieved.</p>	<p>Clean-up event 22 was conducted at the Nepean and Rip Bank from 01:05 on 13 September to 20:00 on 15 September 2008 for a total duration of 52.8 hours. This clean-up event was annotated "<i>Final clean-up of Nepean and Rip Bank</i>". The clean up report for this event was also reviewed and showed that the clean up area included the dredged areas on Nepean Bank and Rip Bank. The coverage of this clean up event was 93.7% of the dredged area. Review of the dates on all the Entrance of Port Phillip Bay clean up reports confirms that this was the last clean up in the Entrance.</p> <p>The CDP Targeted EMP Audit Report Entrance Final Clean-up dated 1 October 2008 confirmed that the final entrance clean up has been completed. Notifications addressed to the DSE and the Office dated 2 October 2008 notifying them of the completion of the final Entrance clean-up were also sighted. The auditor concludes that the requirement for a final clean up once design profile has been achieved has been met.</p>	<p>Full compliance</p>	<p>CDP Targeted EMP Audit Report Entrance Final Clean-up (1 October 2008)</p> <p>Notification of final clean up in the Entrance to Deputy Secretary DSE (2 October 2008)</p> <p>Notification of final clean up in the Entrance to the Environmental Monitor (2 October 2008)</p> <p>Notification email of final clean up to OEM, DSE and EPA (1 October 2008)</p>
<p>In any areas identified at Management Review meetings (e.g. areas identified through towed video survey)</p>	<p>Review of the Entrance of Port Phillip Bay Management Review minutes from 4 June 2008 confirmed that the towed video survey undertaken 4 to 6 weeks following commencement of dredging in the Entrance was reviewed in this meeting. The Management Review on 4 June 2008 did not identify a need for additional clean-up.</p>	<p>Full compliance</p>	<p>Entrance Management Review minutes 4 June 2008</p> <p>Entrance Management Review minutes 6 November 2008</p> <p>Attendance at the Entrance</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p>The minutes and final recommendations from the Entrance Management Review on 6 November 2008 indicated that the final towed video survey and management review had been conducted and did not identify a need for additional clean up. The Entrance Construction Plateau Inspection Report confirms that an assessment was made that an additional clean up in the Entrance was not required.</p>		<p>Management Review on 6 November 2008</p> <p>PoMC 2008, Entrance Construction Plateau Inspection Report Rev 0, dated 17 December 2008</p>
<p>The following process is to be used to monitor spatial extent of the clean up events. This process applies to each dredge – clean up cycle.</p> <p>» Apply a grid over the dredging area for comparison of draghead passes (dredging) and draghead passes (clean up)</p>	<p>The Environmental Incident Report CDP_ALL_EIR_001-Rev01 indicates that a grid cell counter system has been applied to the area and is used to count the number of draghead passes during both dredging and clean up. An overall clean-up coverage is calculated using the number of dredged grid cells and the number of dredged grid cells that have also been cleaned up.</p>	<p>Full compliance</p>	<p>Environmental incident report no. CDP_ALL_EIR_001-Rev01 dated 8 August 2008, revised 2 February 2009</p>
<p>» The x,y,z coordinates of the draghead tracks will be recorded during dredging and clean up.</p>	<p>Vessel tracking records reviewed for the Queen of the Netherlands during this audit have included tracking of the x,y,z coordinates for both the port and starboard dragheads during all activities, both dredging and non-dredging.</p> <p>Draghead dredging and clean up tracks have been plotted in drawings in each of the Entrance clean up reports further supporting the conclusion that the spatial extent of clean-up events is monitored.</p>	<p>Full compliance</p>	<p>Revised Clean-up summary INTERNAL.pdf</p> <p>Entrance Clean Up reports 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 11A, 12, 12A, 13, 13A, 14, 15, 16, 16A, 17 Rev 01, 18, 18A, 19, 20, 21, 22, 21A</p> <p>Vessel tracking data for the Queen of the Netherlands (16 to 21 April 2008, 1 June 2008, 10 June 2008, 15 to 20 June 2008, 4 July 2008, 21 to 26 August 2008)</p>
<p>» Clean up is to continue until clean up has occurred in no fewer than 90% of the grid cells, which were dredged during the cycle.</p>	<p>The summary of clean-up records for the Entrance of Port Phillip Bay between 9 April 2008 and 15 September 2008 (Revised Clean-up summary INTERNAL.pdf) indicate that clean up events have occurred until 90% of the area dredged has been cleaned-up, except where clean-up has been stopped due to bad weather (25 June 2008, 10 July 2008 and 22 August 2008). On each of these occasions the spatial extent of clean-up achieved was greater than 80% (see clause below).</p>	<p>Minor non-compliance</p>	<p>Environmental incident report no. CDP_ALL_EIR_001 Rev 01 dated 8 August 2008, revised 2 February 2009</p> <p>Revised Clean-up summary INTERNAL.pdf</p> <p>Entrance Clean Up reports 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 11A, 12, 12A, 13, 13A, 14, 15, 16, 16A, 17</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p>On 20 July 2008 a non-conformance was recorded by PoMC for clean up event 15 by the Queen of the Netherlands in Rip Bank. This non-conformance was also reported in the Activity 1 Audit 1. The Environmental Incident Report No. CDP_ALL_EIR_001-Rev01 for this event states that <i>“the on-board system that calculates the percentage clean up displayed that greater than 90% coverage had been achieved and the full 18 hour requirement had been met. The clean up was deemed to have conformed to the requirements of the EMP and a new dredging cycle commenced. A subsequent routine quality control check of the data undertaken in the Alliance office at South Wharf revealed that the clean up had covered 78.1% of the dredged area. The office quality control result was validated as being correct.”</i> Investigation into this event indicated the event was initiated by a computer failure, which resulted in the coverage not being calculated. As the grid cell wasn't correctly reinstated a minor software bug was encountered, which caused a malfunction of the calculation of the coverage.</p> <p>This incident resulted in a non-compliance with the requirement to clean-up 90% of the dredged area. An estimate of the volume of material not recovered due to the incomplete clean-up event has been estimated as 94 m³.</p> <p>The Environmental Incident Report states that immediate corrective actions completed for this event included:</p> <ul style="list-style-type: none"> » Clean up of this area subsequently completed during clean-up event 17 on 31 July 2008. » Amendment of the standard procedure for clean up cycles to ensure the office based quality check is completed prior to recommencing dredging in the area subject to clean up. » Additional training for the vessel crew in the correct use of the on board system, especially if intervention is required. 		<p>Rev01, 18, 18A, 19, 20, 21, 22, 21A</p> <p>Vessel tracking data for the Queen of the Netherlands (16 to 21 April 2008, 1 June 2008, 10 June 2008, 15 to 20 June 2008, 4 July 2008, 21 to 26 August 2008)</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence								
	<p>Because the volume involved is small, it would not be expected that the non-compliance represents a serious risk to the environment, even if some scour from the residual material were to occur. The auditor has included consideration of the potential for scour of residual material to occur and has assigned a minor non-compliance to this requirement.</p>										
<p>If the time and/ or spatial coverage clean-up requirements described above are not achieved as a result of safety considerations due to unfavourable metocean conditions, then the following apply:</p>	<p>Clean up records for the Entrance of Port Phillip Bay dated 9 April 2008 to 15 September 2008 (Revised Clean-up summary INTERNAL.pdf) were reviewed and show that clean up was conducted in accordance with the Table in the PDS. On three occasions (25 June 2008, 10 July 2008 and 22 August 2008) clean up was stopped due to weather. On each of these occasions the dredged volume was between 10 000 m³ and 24 000 m³ and clean up had achieved at least 80 % cover with less than one hour of clean up time remaining based on the quantity dredged.</p> <p>The weather reports received by PoMC from Offshore Weather Services for 24 June 2008, 9 July 2008 and 21 August 2008 were sighted and confirmed that significant wave heights greater than 3 metres had been predicted on each of these occasions.</p> <p>The auditor concludes that this PDS requirement has been met.</p>	<p>Full compliance</p>	<p>Revised Clean-up summary INTERNAL.pdf</p> <p>Entrance Clean Up reports 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 11A, 12, 12A, 13, 13A, 14, 15, 16, 16A, 17 Rev01, 18, 18A, 19, 20, 21, 22, 21A</p> <p>3-day weather forecast for 1800LT 24 June 2008 from Offshore Weather Services</p> <p>3-day weather forecast for 1800LT 9 July 2008 from Offshore Weather Services</p> <p>3-day weather forecast for 1800LT 21 August 2008 from Offshore Weather Services</p>								
<table border="1"> <thead> <tr> <th colspan="2" data-bbox="421 624 698 671">Spatial extent of clean up</th> </tr> <tr> <th data-bbox="421 671 566 719">≥80%</th> <th data-bbox="566 671 698 719"><80%</th> </tr> </thead> <tbody> <tr> <td data-bbox="197 719 421 979"> <p>≤ 1 hour clean up remaining</p> </td> <td data-bbox="421 719 698 979"> <p>No further clean-up required. Dredging may recommence when metocean conditions permit</p> </td> </tr> <tr> <td data-bbox="197 979 421 1246"> <p>>1 hour clean up remaining</p> </td> <td data-bbox="421 979 698 1246"> <p>Clean up is to resume when metocean conditions permit until the clean up requirements described above are achieved.</p> </td> </tr> </tbody> </table>	Spatial extent of clean up		≥80%	<80%	<p>≤ 1 hour clean up remaining</p>	<p>No further clean-up required. Dredging may recommence when metocean conditions permit</p>	<p>>1 hour clean up remaining</p>	<p>Clean up is to resume when metocean conditions permit until the clean up requirements described above are achieved.</p>			
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<p>>1 hour clean up remaining</p>	<p>Clean up is to resume when metocean conditions permit until the clean up requirements described above are achieved.</p>										

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
43 North-west side of Nepean Bank			
<p>Along the north-west side of Nepean Bank (i.e. in the direct vicinity of the Point Lonsdale section of the Port Phillip Heads Marine National Park) a ridge at least 5 m wide along the north-west edge of the bank will be left in place until the remaining area has been dredged to the required design depth (as shown in drawing CDP-Env-50439). (Drawings are included in Annexure 7), and as identified in EMP Method Statement for Dredging works South – Entrance (CDP_ALL_MS_409).</p> <p>The north-west edge of Nepean Bank to be dredged last in the dredging schedule for Nepean Bank.</p>	<p>The Entrance of Port Phillip Bay Management Review minutes dated 04 June 2008 indicate that a ridge has been retained along the north-west side of Nepean Bank as shown in the drawing CDP-Env-50439. The Entrance Management Review also includes slides showing the bathymetry surveys, which appear to show this (dated 5 April 2008, 2 May 2008 and 3 June 2008), however these slides do not include the colour key for depths and do not have a suitable resolution to confirm the requirement.</p> <p>The auditor’s team conducted an independent analysis of the bathymetric survey data for Nepean Bank prior to removal of the north west side of Nepean Bank. This analysis confirmed that a ridge had been left in place along the north west side of Nepean Bank and that design depth had been achieved in the remaining area of Nepean Bank (refer Appendix A). The dredging and clean-up pass drawings for clean up events 18, 20, 21 and 22 show the dredge passes for removal of the ridge. These drawings indicate that the ridge retained would likely have been in the range of 5 to 10 metres wide.</p> <p>The summary of clean-up records for the Entrance between 9 April 2008 and 15 September 2008 (Revised Clean-up summary INTERNAL.pdf) also indicate that the north-west edge of Nepean Bank was dredged last in the dredging schedule as clean-up event 19 on 12 August 2008 is annotated “<i>Last Clean-up before dredging NW ridge Nepean bank</i>”.</p> <p>Review of the clean up reports for dredging in the Entrance of Port Phillip Bay show that areas were dredged near the north-west edge of Nepean Bank during the dredge trips covered in clean up events 2, 4, 7, 10 and 11. The drawings in these clean up reports that show the number of dredge and clean up passes clearly mark the area along the north-west ridge of Nepean Bank that is to be retained as a no-go area. It is noted that the dredge and clean-up passes in the reports 2, 4, 7, 10 and 11 appear to be cropped along the</p>	<p>Full compliance</p>	<p>Drawing CDP-Env-50439 in Annexure 7.</p> <p>Entrance Management Review minutes – 04 June 2008</p> <p>Revised Clean-up summary INTERNAL.pdf</p> <p>Entrance Clean Up reports 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 11A, 12, 12A, 13, 13A, 14, 15, 16, 16A, 17 Rev01, 18, 18A, 19, 20, 21, 22, 21A</p> <p>Nepean Bank bathymetric survey data prior to removal of ridge along north west edge of Nepean Bank [NB_080816_K6.3-6.6_O-125—275.pts]</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p>edge of this no-go area and it appears that they may at times enter this no-go area. However, based on the number of dredge passes and apparent direction of dredging along the edge of the no-go area it can be concluded that any dredging in this area would be minimal and would be unlikely to significantly contribute to the removal of the ridge. In particular it is not expected that this activity would result in removal of the edge of the ridge adjacent to the canyon.</p> <p>As discussed in PDS 42, the final clean up of Nepean Bank, prior to dredging of the north-west edge, occurred in clean up event 19 over the 11 to 12 August 2008. Clean up reports for clean-up events associated with dredging post this date (clean up reports 18, 20, 21 and 22) showed that dredging on Nepean Bank was focussed on the north-west edge, with only minor touch ups on other parts of Nepean Bank. This supports the auditor's conclusion that the north-west ridge was dredged last in the dredging schedule.</p> <p>The auditor has concluded from the available information that a 5 metre ridge has been retained along the north west edge of Nepean Bank, and that this was removed last in the dredging schedule for Nepean Bank. The auditor concludes that compliance has been achieved with this requirement.</p>		
45 Pre-construction plateau inspection			
<p>Conduct bathymetric survey and visual monitoring of scour holes at 3 monthly intervals in the trial dredge area and immediately adjacent areas of the Great Ship channel until the start of dredging. Following final survey, report to be prepared containing assessment of rate of scour and accretion and the mobility of material, the maximum potential depth of scour and the potential extent of lateral erosion in the scour holes. The assessment to include the consideration of hydrodynamic data records. Report to be available during construction.</p>	<p>The report "CDP Scour Assessment Report: The Entrance" was prepared by SKM and made available during construction. It includes assessment of rate of scour and accretion and the mobility of material, the maximum potential depth of scour and the potential extent of lateral erosion in the scour holes. Consideration of hydrodynamic data records (earlier bathymetric surveys) was included.</p> <p>Dredging for the CDP commenced on 8 February 2008. The SKM report included bathymetric survey during March 2008. Dredging in the Entrance of Port Phillip Bay commenced on 5 April 2008 and hence only one round of bathymetric survey was required. The auditor concludes that compliance has been achieved with this requirement.</p>	<p>Full compliance</p>	<p>"CDP Scour Assessment Report; The Entrance", SKM, June 2008</p> <p>PoMC Quarterly Project Report No. 2 – September 2008</p> <p>PoMC Quarterly Project Report No. 1 – May 2008</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
46 Construction plateau inspection			
<p>4-6 weeks following commencement of dredging, and subject to weather conditions and dredge schedule, conduct towed video survey of dredged and adjacent areas. Results to be considered at CDP Management review meeting.</p>	<p>Section 6.1.2 of the quarterly report states that the towed video survey was carried out in accordance with the EMP (4 to 6 weeks following commencement of dredging in the Entrance of Port Phillip Bay), and that the video survey provides good spatial coverage, but the information was semi-quantitative due to tidal conditions at the Entrance and equipment limitations. The video survey was reviewed at the CDP Management review meeting on 4 June 2008. Actions were identified and scheduled.</p> <p>The dredging commenced on Saturday 5 April 2008 and the towed video survey was conducted Thursday – Saturday 1 – 3 May 2008; this corresponds to 3 weeks and 5 days to 4 weeks and 0 days rather than 4 – 6 weeks following commencement of dredging. PoMC has advised that this survey commenced early due to favourable weather conditions, namely slack water options and significant wave heights. PoMC has provided a graph showing the significant wave heights, tides and towed video opportunities between 1 May 2008 and 21 May 2008 to support this decision. The auditor notes that the timing from 1 to 3 May has the lowest significant wave heights and slowest current flow during this period. As such the auditor has accepted PoMC’s advice and concluded that this timing meets the PDS requirement of “4-6 weeks following commencement of dredging, and subject to weather conditions” The auditor concludes that compliance has been achieved with this requirement.</p>	<p>Full compliance</p>	<p>PoMC Quarterly Project Report No. 2 – September 2008</p> <p>Entrance Management Review Minutes 4 June 2008</p> <p>Tow Video – Opportunities INTERNAL.pdf</p> <p>Tow Video – Commencement – INTERNAL.pdf</p>
<p>Commence towed video survey at Rip Bank and Nepean Bank dredge plateaus to assess existence of loose rock as soon as practicable once design profile has been achieved and final clean up has been completed. Results of video to be reviewed to determine requirement for any additional clean up. Implement management action as determined.</p>	<p>The summary of clean- up events in the Entrance of Port Phillip Bay (Revised Clean-up summary INTERNAL.pdf) states that the final clean-up event started on 15 September 2008 and occurred for 52.8 hours.</p> <p>A member of the auditor’s team attended the CDP Management Review for the Entrance on 6 November 2008. The objectives of this CDP Management Review were to:</p> <ul style="list-style-type: none"> » Close-out Entrance Management Review Actions 4 June 	<p>Full compliance</p>	<p>Revised Clean-up summary INTERNAL.pdf</p> <p>Attendance at CDP Management Review for the Entrance on 6 November 2008</p> <p>PoMC 2008, Entrance Construction Plateau Inspection Report Rev 0, dated 17 December 2008</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<ul style="list-style-type: none"> » Review conformance with EMP requirements relating to clean up in the Entrance (PDS 42) » Review towed video survey undertaken following achievement of design profile and completion of final clean up. Determine requirement for any additional clean up (Standard 46) and post-construction plateau inspection (Standard 47). <p>The Management Review concluded that the Entrance Management Review Actions from the 4 June 2008 had been completed and were closed out. The Management Review also concluded that the EMP requirements in PDS 42 had been conformed with.</p> <p>During the Management Review, the Alliance Engineering Manager stated that the towed video survey was conducted between 4 October 2008 and 2 November 2008 and collected a total of 160 hours of video footage. The dates of this video footage are compliant with the requirement to conduct survey post-completion of the final clean up. The Alliance made a presentation at the Management Review, which outlined the methodology used to assess the video footage to determine the effectiveness of clean up and the extent of remaining loose rock. One action was identified in the Entrance Management Review minutes: to "Prepare submission to seek confirmation that clean-up is to the satisfaction of the Minister for Environment and Climate Change or delegate."</p> <p>The Entrance Construction Plateau Inspection Report from PoMC, dated 17 December 2008, states that: "<i>A towed video survey was undertaken following attainment of design depth and following final clean up. The results of the towed video survey provide semi-quantitative information on the volume of rock spill on Rip and Nepean Banks, from which rockfall can be estimated. A statistical review of the sampling design confirmed that the sampling scheme is fit for purpose.</i>" The Report contains details on the calculations of spill and rockfall volumes in the Entrance and concludes that: "<i>Further clean up at the Entrance is not warranted based on</i></p>		<p>Letter from Deputy Secretary DSE to Executive General Manager PoMC dated 19 December 2009</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
	<p><i>conformance with the EMP controls, the outcomes being within SEES predictions and because the risk profile is unchanged from that considered and approved for the project."</i></p> <p>This information was considered by DSE and a letter was issued (dated 19 December 2008) confirming that all the requirements of the EMP have been met, and that the clean up results are consistent with the performance envisaged through the EMP.</p> <p>The auditor concludes from this information that the requirements of PDS 46 have been complied with.</p>		
47 Post-construction plateau inspection			
<p>Undertake towed video survey at Rip Bank and Nepean Bank dredge plateaus to assess existence of loose rock within 3 months following completion of dredging in the Entrance.</p>	<p>Completion of this PDS does not fall within the time period of this audit and will be assessed in future audits.</p>	<p>Not applicable</p>	<p>Letter from Deputy Secretary DSE to Executive General Manager PoMC dated 19 December 2009</p>
48 Pre and post-construction bathymetric survey			
<p>Bathymetric survey of the Entrance to be undertaken to identify bathymetric changes at following intervals:</p> <ul style="list-style-type: none"> » Prior to commencement of dredging in the Entrance 	<p>An overview chart of the areas surveyed in the Entrance of Port Phillip Bay and South Channel for the insurvey was sighted which showed that the survey area included the construction areas in the Entrance. The plots of the bathymetric surveys for the Entrance: CDP-ALL-DWG-210001 Entrance – Rip Bank INTERNAL.pdf and CDP-ALL-DWG-210002 Entrance – Nepean bank INTERNAL.pdf were also sighted. The plots of the bathymetric insurvey data are dated 05 March 2008 confirming that this survey occurred prior to commencement of dredging in the Entrance on 05 April 2008 and is compliant with the PDS requirement.</p>	<p>Full compliance</p>	<p>CDP-ALL-DWG-210000 Overview charts Entrance and South Channel Internal.pdf</p> <p>CDP-ALL-DWG_210001 Entrance – Rip Bank INTERNAL.pdf</p> <p>CDP-ALL-DWG-210002 Entrance – Nepean Bank INTERNAL.pdf</p>
<ul style="list-style-type: none"> » 3, 6, 9, 12 months post-dredging » 2 years post dredging » 4 years post dredging 	<p>Completion of this PDS does not fall within the time period of this audit and will be assessed in future audits.</p>	<p>Not applicable</p>	

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
<ul style="list-style-type: none"> » 10 years post dredging » prior to programmed major maintenance dredging campaign (towed video survey also to be conducted at this time). 			
<p>Report to be prepared following each survey containing assessment of accumulation and mobility of accretion due to scour, confirmation of the declared channel depth, and identify any management responses such as no further action, further hydrodynamic modelling, further investigation or risk review (e.g. Aboriginal and non-Aboriginal heritage assessment) and/or additional clean-up.</p>	<p>Completion of this PDS does not fall within the time period of this audit and will be assessed in future audits.</p>	<p>Not applicable</p>	
49 Post-construction deep reef habitat – impact and recovery assessment			
<p>Due to the difficulties of using quantitative ecological methods in the Entrance environment, there is a need for flexibility in undertaking the following:</p> <ul style="list-style-type: none"> » Quantitative surveys by diver-operated video and remotely operated vehicles to describe the nature and distribution of impacts on the deep reef habitats. Surveys will be along standardised isobaths. 	<p>Completion of this PDS does not fall within the time period of this audit and will be assessed in future audits.</p>	<p>Not applicable</p>	
<ul style="list-style-type: none"> » Survey will compare the coverage and distribution of physical and biological parameters, to document the status of any ongoing physical disturbance, any biological impacts and recovery. 	<p>Not applicable at the time of writing this audit report.</p>	<p>Not applicable</p>	
<ul style="list-style-type: none"> » Locations will include areas at Rip Bank and Nepean Bank and within the Port Phillip Heads Marine National Park impacted by rockfall, plus areas both within and remote from the general area of rockfall. 	<p>Not applicable at the time of writing this audit report.</p>	<p>Not applicable</p>	

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
<ul style="list-style-type: none"> » Timing will be: <ul style="list-style-type: none"> » commence as soon as practicable after the completion of dredging, but no later than 30 days after the final Entrance clean up has been completed (once design profile is achieved) to the satisfaction of the Minister for Environment and Climate Change. And results reported as soon as practicable following the completion of the survey and its analysis. » Approximately four and ten years after completion of dredging. 	Not applicable at the time of writing this audit report.	Not applicable	
50 Post-construction tide monitoring report			
Collect tide gauge data at Queenscliff (296000N 5761900E), Hoveell Pile (316325N 5755800E), West Channel Pile (303538N 5770405E), Williamstown (Breakwater Pier) (316790N 5807470E), Fawkner Beacon (317863N 5797863E) and Point Lonsdale Jetty (291600N 5759150E) for at least one year after completion of construction activities. Prepare a report to identify any changed tide conditions at Williamstown, Queenscliff, Geelong, Point Cook, Werribee and Mordialloc subsequent to completion to the project.	Not applicable at the time of writing this audit report.	Not applicable	
51 Minimise use of hydrohammer			
Hydrohammer is only to be used following confirmation that material cannot be practically dredged by the TSHD. All available practical measures will be taken to break up hard material prior to use of the hydrohammer.	The hydrohammer has not been deployed in the dredging program. PoMC advises that the hydrohammer is specialised equipment and the Cetus is the only vessel equipped with the hydrohammer. The Cetus has not visited Melbourne as part of the current program of the CDP. This was confirmed by a review of a screen dump provided by PoMC that indicated the Cetus was not found to be in Melbourne during this time.	Not applicable	<p>Screen dump of an "OpenROAD" record indicating that the Cetus has not berthed in Melbourne.</p> <p>Verbal advice from Manager Environment and Integrated Systems, PoMC during inception meeting that the Cetus is specialised equipment and has</p>

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
			not been used (Environment Manager, 09 September 2008)
52 Hours of operation			
Hydrohammer and marine-based pile driving operations to take place during daylight only (daylight is defined as where there is adequate light to see a minimum distance of 600 m).	As per PDS 51 - the hydrohammer has not been deployed in the current program. Works in the Entrance of Port Phillip Bay do not involve pile driving.	Not applicable	
Hydrohammer only to be used Monday to Friday, excluding public holidays.	As per PDS 51 - the hydrohammer has not been deployed in the current program.	Not applicable	
53 Start procedure			
The start procedure for the hydrohammer and pile driving unit will comprise the use of a noise producing device that is capable of gradually increasing the level of acoustic energy for 10 minutes prior to use of this equipment. The noise producing device shall provide an initial noise level that is no greater than 140 dB (this noise level is less than that known to produce a Temporary Threshold Shift for cetaceans). This is to enable mobile fauna to move away.	As per PDS 51 - The hydrohammer was not deployed in the program. Works in the Entrance of Port Phillip Bay do not involve pile driving.	Not applicable	
54 Hydrohammer – noise assessment			
An initial noise check of the hydrohammer, confirming actual noise emissions against the modelling used to evaluate underwater noise impacts from the CDP will be undertaken, as follows:	As per PDS 51 - the hydrohammer has not been deployed in the current program.	Not applicable	
Underwater noise monitoring of the hydrohammer by marine biology acoustic specialist.	As above.	Not applicable	
Hydrohammer operations only to continue for as long as necessary to obtain sufficient data to confirm	As above.	Not applicable	

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
the source noise level and ambient underwater noise levels.			
Analysis by marine biology acoustic specialist to confirm that the emission measurements conform to model used in the SEES risk assessment. Once confirmed, no further monitoring is required.	As above.	Not applicable	
Hydrohammer operations only to resume following written confirmation by marine biology acoustic specialist that the results of the noise emission monitoring are within those modelled.	As above.	Not applicable	
If the specialist confirms that the noise results significantly differ from those assessed in the noise modelling (either more or less), the contingencies identified within the Underwater Noise Contingency Plan are to be considered and appropriate action taken prior to continuing the use of the hydrohammer for the CDP.	As above.	Not applicable	
55 Hydrohammer – cetaceans			
Hydrohammer vessel master to ensure that there are personnel available to observe a minimum of 600 m radius from the hydrohammer vessel (may be in combination with other project vessel crews or land based).	As per PDS 51 – the hydrohammer has not been deployed in the current program.	Not applicable	
A minimum of 15 minutes of active cetacean spotting required before hydrohammer operations commence.	As above.	Not applicable	
Vessel master to confirm 'all clear' for cetaceans within a 600 m radius of the hydrohammer before the commencement of hydrohammer operations.	As above.	Not applicable	
Hydrohammer vessel master will advise other CDP vessels in the vicinity that hydrohammer operations	As above.	Not applicable	

Project Delivery Standard	Audit Findings (to 22 December 2008)	Compliance	Supporting Evidence
<p>are scheduled. Crews of these vessels will then also keep a watch for cetaceans before and during hydrohammer operations.</p> <p>If a cetacean is spotted within 600 m of the hydrohammer vessel or is assessed as likely to move within 600 m of the hydrohammer vessel, the hydrohammer to suspend operations immediately. Operations may only recommence when no cetacean has been sighted within 600 m of the hydrohammer for at least 15 minutes, or if the cetacean(s) are seen to move beyond 600 m.</p>			
<p>Any break in hydrohammer operations that results in a break in observations will require the 15 minutes pre-start-up observation to be redone before hydrohammer operations can resume.</p>	<p>As above.</p>	<p>Not applicable</p>	
<p>56 Hydrohammer – no dive zone</p>			
<p>A 1.4 km 'no-dive zone' to be established around the hydrohammer operations. Beach activities (e.g. swimming, snorkelling, surfing) will be unrestricted within 500 m off shore.</p>	<p>As per PDS 51 - the hydrohammer has not been deployed in the current program.</p>	<p>Not applicable</p>	



Appendix A

Review by the Auditor of Information relating to the Entrance



Analysis of bathymetric survey data

The audit team conducted an analysis of the pre and post-construction SKM certified bathymetric survey data (insurvey and outsurvey) and survey data collected immediately prior to the removal of the north-west edge of Nepean Bank provided by PoMC for the Entrance. The following analyses were conducted through plotting and analysing the data via GIS:

Depths

- » Dredging has achieved a depth of at least 17.3 m in the Great Ship Channel: Outsurvey data was plotted and analysed to confirm that there were no depths of less than 17.3 metres in the Great Ship Channel.
- » A minimum of 50% of the area to be dredged and within toe lines is within 1.3 m of 17.3 m depth (i.e. less than 18.6 m depth): outsurvey data was plotted and the percentage of the area within 1.3 m of design depth was estimated.
- » A minimum of 90% of the area to be dredged and within toe lines is within 1.8 m of 17.3 m depth (i.e. less than 19.1 m depth): insurvey and outsurvey data was plotted and compared to determine the area dredged, and the percentage of the area dredged that was within 1.8 m of design depth was estimated.

Widths

- » Final dredged channel width is no greater than 15 m outside of the Entrance design toe line; and 50% of the delivered toe line is within 9 m of the Entrance design toe line: insurvey and outsurvey data was mapped and visually compared against the 17.3 m depth contour line.

Volume

- » An estimate of the volume dredged was determined from data relating to the change in depth from the insurvey to the outsurvey.

Nepean Bank (PDS 43)

- » The bathymetric survey data from a survey immediately prior to removal of the north-west edge of Nepean Bank was analysed to verify that a ridge at least 5 m wide had been left in place along the north-west edge of Nepean Bank and that the remaining area had been dredged to the design depth (17.3 m). The analysis included plotting depths for three depth categories: deeper than 19 metres, between 19 metres and 17 metres depth, and between 17 metres and 15 metres depth.





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