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Office of the Environmental Monitor

Report for Channel Deepening Independent Audit

Activity No.2

Targeted audit of EMP requirements for construction of the bund

August 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 *targeted audit of EMP requirements for construction of the bund*. The audit covered the period from 8 February 2008 to 31 May 2009.

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.

The audit team included Peter Nadebaum of GHD Pty Ltd (GHD) as the lead auditor, and he was supported by a team of specialist staff from GHD.

Findings

The audit found that 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 three EMP mechanisms identified as being relevant to the construction of the bund.

Table 1 Overview of compliance with EMP mechanisms for construction of the bund

Mechanism	Full Compliance	Minor Non-Compliance	Undetermined	Not Applicable
1. Bund Location	Yes	-	-	-
Relevant components of PDS 35	Yes	-	-	-
2. Bund Construction	Yes	-	-	-
Relevant components of PDS 34	Yes	-	-	-
Relevant components of PDS 35	Yes	-	-	-
Relevant components of PDS 36	Yes	-	-	-
3. Bund Geometry	Yes	-	-	-
Relevant components of PDS 35	Yes	-	-	-
Relevant components of PDS 37	Yes	-	-	-

With respect to the 12 auditable items or requirements that arise from the components of the PDSs relevant to the three mechanisms, the audit found that:

- » There were 12 requirements for which the audit concluded full compliance was achieved;

- » There were no major, critical or minor non-compliances;
- » There were no requirements that were not applicable (typically this could arise because the requirement pertained to a future activity not current in the audit period or to an item that has been fully assessed in a previous audit and closed out); and
- » There were no requirements for which there was insufficient information available at the time of the audit to reach a conclusion regarding compliance.

Overall the audit concluded that there was a high level of compliance with the various requirements. A summary of the findings for each mechanism is provided below.

Bund Location

Item 1 addresses whether the bund location complies with the design specifications. SKM's independent review and GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 35 confirms that the requirements relating to bund location have been complied with.

Bund Construction

Item 2 addresses whether appropriate equipment has been used for the construction of the bund in accordance with EMP Table 16 'Dredging Summary'. GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 34 confirms that these requirements relating to bund construction have been complied with.

Item 3 addresses whether appropriate materials and material placement plans have been used for the construction of the bund. GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 35 confirms that these operational requirements relating to the bund have been complied with.

Item 4 addresses whether appropriate placement of sand loads and contaminated clays has achieved in accordance with EMP Table 16 'Dredging Summary' when constructing the bund. GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 34 confirms that these operational requirements relating to the bund have been complied with.

Item 5 addresses whether the partially constructed bund was constructed in accordance with design specification and that the regularity of hydrographic surveys was in accordance with requirements. SKM's independent review, a list of hydrographic survey dates and GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 36 confirms that these construction and operational requirements have been complied with.

Item 6 addresses the adequacy and regularity of surveys to confirm the bund capacity and volume of contaminated unconsolidated sediments to be dredged. SKM's independent review, GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 36, and GHD's independent review of survey data and a list of hydrographic survey dates confirm that these requirements relating to the bund have been complied with.

Item 7 addresses whether appropriate notification is in place when placement of contaminated materials in the bund is occurring. GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 35 confirms that the requirements relating to notification have been complied with.

Bund Geometry

Independent reviews of the bund geometry were separately conducted by GHD and SKM through analysis of bathymetric survey data (Appendix 1) that covered the following items.

Item 8 addresses whether the crest width of the bund has been constructed in accordance with design specifications.

Item 9 addresses whether the maximum elevation of the bund has been constructed in accordance with design specifications.

Item 10 addresses whether the stub wall of the bund has been constructed in accordance with design specifications.

Item 11 addresses whether surveys of the bund confirm it has been constructed in accordance with design specifications.

Item 12 addresses whether the crest elevation of the bund or stub wall is above the dredge material in the bund and constructed in accordance with design specifications.

In each case, SKM's independent review and GHD's independent review of survey data confirms that the requirements have been complied with.

Recommendations and Opportunities for Improvement

No recommendations¹ were made.

No opportunities for improvement² were noted.

¹ In the context of this report, "recommendations" refer to recommendations made by the auditor that relate to items of non-compliance and are intended to assist in avoiding future non-compliance. As such, it might be expected that recommendations will be carried out prior to the next audit.

² In the context of this report, "opportunities for improvement" are suggestions made by the auditor that relate to areas where full compliance has been achieved and that may offer improvement in management systems and audit program. As such, they are not mandatory.

1. Introduction

The Office of the Environmental Monitor (Office) has appointed Dr 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).

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 construction of the bund to contain contaminated sediments.

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 is focussed on EMP requirements for construction of the bund.

1.2 Scope of the Independent audits – Overview

1.2.1 Purpose

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.
 - 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:
 - » 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 done in the audits for Activity 2 may overlap audits undertaken in Activity 1.

This audit is a targeted audit of EMP requirements for construction of the bund.

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; and
- » Reports of focussed audits on selected EMP requirements.

1.4 Reference Documents

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

- » **Environmental Management Plan**
<http://www.channelproject.com/environment/management.asp>
- » **EMP Dredging Schedule**
http://www.channelproject.com/schedulelocation/dredging_schedule.asp
- » **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_P_MDMG.pdf
http://www.channelproject.com/global/docs/WMS_080205_Method_Statement_EM_P_Contaminated.pdf
http://www.channelproject.com/global/docs/WMS_080205_Method_Statement_EM_P_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 in the deepened shipping channels, some existing navigation aids are being upgraded or replaced 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 works described in Section 2.1 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 from 8 February 2008 to 31 May 2009, the approved EMPs were as follows:

- » 5 February 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)
- » 23 January 2009 EMP (CDP_IMS_PL_004 Revision 6)
- » 27 May 2009 EMP (CDP_IMS_PL_004 Revision 7)

2.3.2 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.

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 of the Environmental Monitor (the Office) for the audit of PoMC's implementation of the EMP.

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 of 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 subject of what are described as Activity 2 audits. This audit report is an Activity 2 targeted audit of EMP requirements for construction of the bund to contain contaminated sediments.

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 audit of the requirements of the EMP and the PDSs.

The scope of this audit was to assess the implementation of the EMP requirements for construction of the bund, based on the information available to 31 May 2009. Three mechanisms have been identified to ensure the bund has been constructed as required by the EMP, as shown in Table 2.

Table 2 EMP mechanisms for bund construction

Mechanism	EMP Requirements
1. Bund Location	PDS 35 EMP Drawings C001, C002 and C003 Work Method Statement PoM DMG
2. Bund Construction	PDS 34, 35, 36 EMP Tables 6 and 16 EMP Drawings C001, C002 and C003 Work Method Statement PoM DMG
3. Bund Geometry	PDS 35, 37 EMP Drawings C002 and C003 Work Method Statement PoM DMG

Within these three mechanisms, 12 auditable items were identified from within the EMP and Work Method Statement PoM DMG.

This audit is based on information available for the audit period from 8 February 2008 to 31 May 2009. Items that have been fully assessed in previous audits and which contain no further requirements are considered to be closed out and have not been reassessed as part of this audit.

The 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 the basis for the requirements of the EMP and PDSs, or to confirm compliance with aspects of the PDSs that relate to other aspects such as on-ship or on-shore occupational health and safety, or structural or geotechnical considerations.

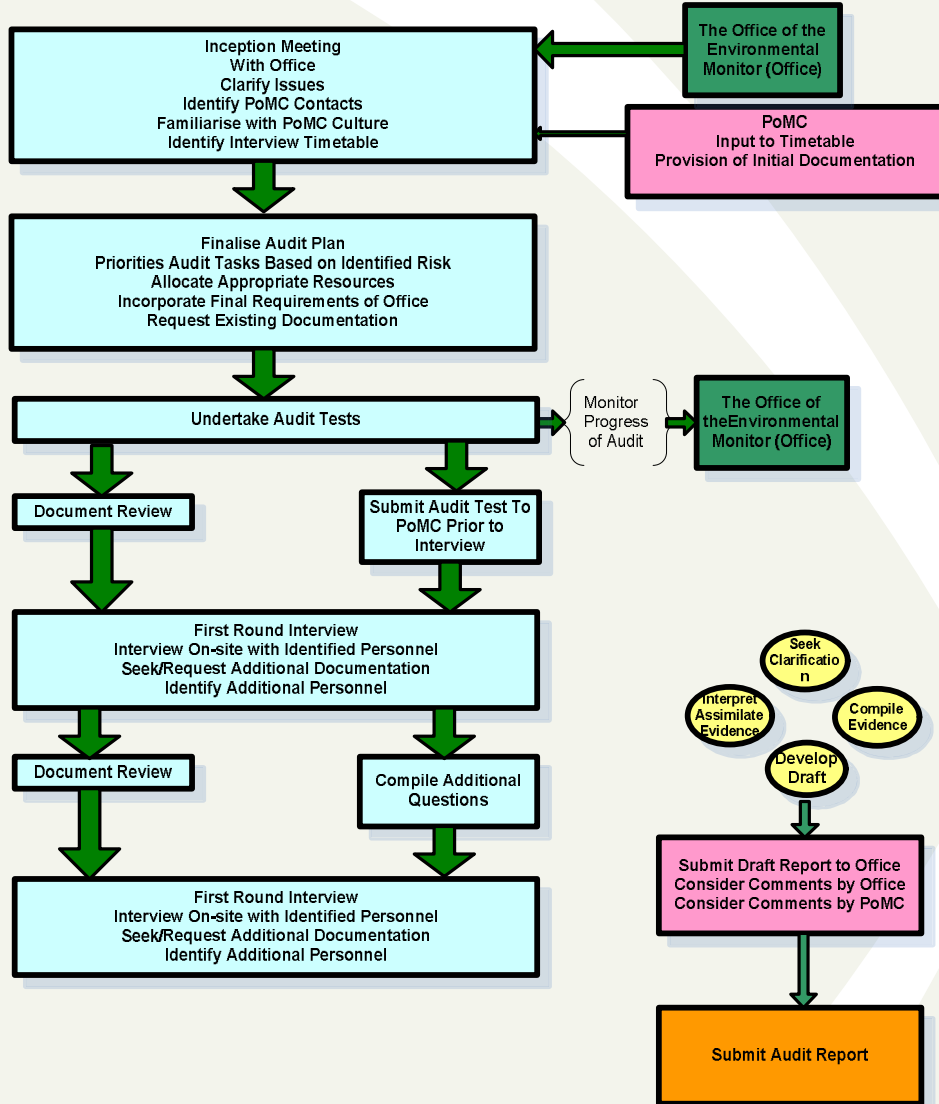
In assessing compliance of CDP activities and procedures with requirements of the EMP and the PDSs, check sheets were prepared by GHD and used to assist in identifying and obtaining evidence relevant to assessing compliance. The audit team met with PoMC nominated environmental representatives and sought 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.

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

3.3 Independence

In conducting the audit the independence requirements outlined in the Auditor's Declaration of Independence were complied with.

Figure 1 : Summary of Audit Methodology



3.4 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, Victorian regulators and the Commonwealth on 9 September 2008.

Later the same day a meeting was also held with the Office and POMC to ascertain the form of the information held by POMC. 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.

A primary objective of these meetings was for the auditor and audit team to develop working relationships, mutual understandings and expectations with the Office and PoMC 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.

3.5 Audit Tests and Ranking of Compliance

The requirements for determining compliance were discussed with the Office, Victorian regulators 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 3. This grading was drawn from the method of grading compliance outlined in guidelines to auditors³ under the Victorian Government *Safe Drinking Water Act 2003*.

Table 3 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-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.

³ Victorian Government Department of Human Services, Water Regulatory Audit Guidance Note November 2007

Compliance Grade	Description
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.

3.6 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 berths and the dredging vessels, The Queen of the Netherlands and the Cornelius Zanen on 25 and 26 September 2008.

3.7 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 three mechanisms for bund construction. The findings of the report are presented in tabular form for each of the three mechanisms, as listed in Table 2. The listing and findings are not presented in a "prioritised order" or "order of significance". Reference numbers assigned to audit requirements are arbitrary numbers and do not refer to sections in the EMP or other CDP documents.

4. Audit Findings

4.1 Summary of Findings

4.1.1 Overview

The audit found that 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 4 presents an overview of the findings for the three EMP mechanisms identified as being relevant to the construction of the bund.

Table 4 Overview of compliance with EMP mechanisms for construction of the bund

Mechanism	Full Compliance	Minor Non-Compliance	Undetermined	Not Applicable
1. Bund Location	Yes	-	-	-
Relevant components of PDS 35	Yes	-	-	-
2. Bund Construction	Yes	-	-	-
Relevant components of PDS 34	Yes	-	-	-
Relevant components of PDS 35	Yes	-	-	-
Relevant components of PDS 36	Yes	-	-	-
3. Bund Geometry	Yes	-	-	-
Relevant components of PDS 35	Yes	-	-	-
Relevant components of PDS 37	Yes	-	-	-

With respect to the 12 auditable items or requirements that arise from the EMP, the audit found that:

- » There were 12 requirements for which the audit concluded full compliance was achieved;
- » There were no major, critical or minor non-compliances;
- » There were no requirements that were not applicable (typically this could arise because the requirement pertained to a future activity not current in the audit

period or to an item that has been fully assessed in a previous audit and closed out); and

- » There were no requirements for which there was insufficient information available at the time of the audit to reach a conclusion regarding compliance.

Overall the audit concluded that there was a high level of compliance with the various requirements. A summary of the findings for each mechanism is provided below.

4.1.2 Bund Location

Item 1 addresses whether the bund location complies with the design specifications. SKM's independent review and GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 35 confirms that the requirements relating to bund location have been complied with.

4.1.3 Bund Construction

Item 2 addresses whether appropriate equipment has been used for the construction of the bund in accordance with EMP Table 16 'Dredging Summary'. GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 34 confirms that these requirements relating to bund construction have been complied with.

Item 3 addresses whether appropriate materials and material placement plans have been used for the construction of the bund. GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 35 confirms that these operational requirements relating to the bund have been complied with.

Item 4 addresses whether appropriate placement of sand loads and contaminated clays has achieved in accordance with EMP Table 16 'Dredging Summary' when constructing the bund. GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 34 confirms that these operational requirements relating to the bund have been complied with.

Item 5 addresses whether the partially constructed bund was constructed in accordance with design specification and that the regularity of hydrographic surveys was in accordance with requirements. SKM's independent review, a list of hydrographic survey dates and GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 36 confirms that these construction and operational requirements have been complied with.

Item 6 addresses the adequacy and regularity of surveys to confirm the bund capacity and volume of contaminated unconsolidated sediments to be dredged. SKM's independent review, GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit*

of the EMP requirements for management of contaminated sediments and in particular the review of evidence supplied for PDS 36, and GHD's independent review of survey data and a list of hydrographic survey dates confirm that these requirements relating to the bund have been complied with.

Item 7 addresses whether appropriate notification is in place when placement of contaminated materials in the bund is occurring. GHD's previous audit, Activity No. 2 Audit No. 1 – *Targeted audit of the EMP requirements for management of contaminated sediments* and in particular the review of evidence supplied for PDS 35 confirms that the requirements relating to notification have been complied with.

4.1.4 Bund Geometry

Independent reviews of the bund geometry were separately conducted by GHD and SKM through analysis of bathymetric survey data (Appendix 1) that covered the following items.

Item 8 addresses whether the crest width of the bund has been constructed in accordance with design specifications.

Item 9 addresses whether the maximum elevation of the bund has been constructed in accordance with design specifications.

Item 10 addresses whether the stub wall of the bund has been constructed in accordance with design specifications.

Item 11 addresses whether surveys of bund confirm it has been constructed in accordance with design specifications.

Item 12 addresses whether the crest elevation of the bund or stub wall is above the dredge material in the bund and constructed in accordance with design specifications.

In each case, SKM's independent review and GHD's independent review of survey data confirms that the requirements have been complied with.

With regard to Item 9 relating to the maximum elevation of the bund, the survey data indicates that there were isolated areas higher than RL –14.0m CD. There is a requirement for the maximum crest height of the bund and/or stub wall to be no greater than –14 m CD. The observed elevations do not represent non-compliance at the time of this audit as there are a number of construction elements still to occur prior to handover, such as capping and spreading, and a final audit of compliance with the crest height requirements will be carried out at the time of bund handover.

4.2 Recommendations and Opportunities for Improvement

No recommendations⁴ were made.

No opportunities for improvement⁵ were noted.

⁴ In the context of this report, "recommendations" refer to recommendations made by the auditor that relate to items of non-compliance and are intended to assist in avoiding future non-compliance. As such, it might be expected that recommendations will be carried out prior to the next audit.

4.3 Acknowledgement

The auditor wishes to acknowledge that PoMC responded to the many requests made by the audit team for information and evidence, and a large body of information was made available to the audit team for the purposes of the audit.

4.4 Details of Compliance

Details pertaining to the requirements, evidence and compliance for each of the audit requirements are provided in Table 5.

⁵ In the context of this report, "opportunities for improvement" are suggestions made by the auditor that relate to areas where full compliance has been achieved and that may offer improvement in management systems and audit program. As such, they are not mandatory.

Table 5 Summary of Requirements, Evidence and Compliance

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
BUND LOCATION				
1	<p>Bund location</p> <p>Bund location to be constructed in accordance with design specifications (Drawings C001, C002 and C003). (Drawings are included in Annexure 7)</p> <p>(Refer PDS 35).</p>	<p>SKM's PoM DMG Bund Acceptance Letter, dated 1 May 2009, states that <i>"after undertaking a review of 'as constructed' information... to assess the Bund's stability, and ability to act as barrier to contaminant migration – in accordance with the requirements of the CDP EMP... the Bund satisfies the CDP EMP bund construction design requirements"</i>. The letter also states that a <i>"review of supplied documentation indicates that the Bund satisfies Notes 5, 8, 9, 10, 15 and 19 of Drawing C002"</i>.</p> <p>Correspondence from Alliance Engineering Manager to PoMC, dated 13 May 2009, indicates that <i>"about 99% of the bund construction was completed by 16 October 2008 (the end date for the previous audit, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments). Since this time, 9 clay loads were added by the Coza and the top of the bund was levelled by the sweep bar. Both activities were to finalise the construction of a stub wall in order to fulfil the bund requirements for capping."</i></p> <p>This statement is supported by the Dredge Schedule Final Rev 2 Upd 4 (6 May 2009), indicating that both TSHD vessels departed Port Phillip Bay shortly after this date (16 October 2008) and returned to activities not directly relating to the PoM DMG bund construction.</p> <p>A visual comparison of two bathymetric surveys, dated 11 September 2008 and 23 April 2009, of the PoM DMG indicates that there has been very little change or additional bund construction. The comparison was made between the Bund Completion Survey CDP-Env-51065v0 (23 April 2009, the Bund Notification dated 19 September 2008, and the survey dated 11 September 2008.</p> <p>The assessment made of PDS 35 in the previous audit, Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i> confirmed that the as-built alignment of the bund conforms to the design specification. The previous audit found that these requirements of PDS 35 were fully complied with.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoM DMG Bund Acceptance Letter (SKM letter to PoMC) 1 May 2009</p> <p>POMC C683 Certification of Survey_PMDMG-2.pdf</p> <p>Raw survey data from CDP-Env-51065v0 on 20 and 23 April 2009 for independent analysis</p> <p>Letter Alliance to PoMC (Advice re main bund status.pdf), dated 13 May 2009</p> <p>GHD 2009, Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i></p> <p>Bund Notification dated 19 September 2008 and corresponding survey dated 11 September 2008</p> <p>Dredge Schedule Final Rev 2 Upd 4 (6 May 2009)</p>

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
BUND CONSTRUCTION				
2	<p>Appropriate equipment used for construction of the bund</p> <p>Dredged material placement – All dredged material to be placed in accordance with Table 16 'Dredging Summary'.</p> <p>(Ref PDS 34 and EMP Table 16)</p>	<p>As previously noted for item 1, correspondence from Alliance Engineering Manager to PoMC, dated 13 May 2009, indicates that <i>"about 99% of the bund construction was completed by 16 October 2008 (the end date for the previous audit, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments). Since this time, 9 clay loads were added by the Coza and the top of the bund was levelled by the sweep bar. Both activities were to finalise the construction of a stub wall in order to fulfil the bund requirements for capping. This statement is supported by the Dredge Schedule Final Rev 2 Upd 4 (6 May 2009), and a visual comparison of two bathymetric surveys, dated 11 September 2008 and 23 April 2009, of the PoM DMG.</i></p> <p>The assessment made of PDS 34 in the previous audit, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments, which incorporates EMP Table 16, confirmed that appropriate equipment was used for construction of the bund, including placement of dredge material, and it was concluded that the requirements were fully complied with.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>Letter Alliance to PoMC (Advice re main bund status.pdf) dated 13 May 2009</p> <p>Dredge Schedule Final Rev 2 Upd 4 (6 May 2009)</p> <p>CDP-Env-51065v0 – PoM DMG Bund Survey 23 April 2009 – all depths.pdf</p> <p>Bund Notification dated 19 September 2008 and corresponding survey dated 11 September 2008</p> <p>GHD 2009, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments.</p>
3	<p>Materials and material placement plans</p> <p>Bunds to be constructed using:</p> <ul style="list-style-type: none"> » consolidated sediments (clays) dredged from Port Melbourne Channel. 	<p>As previously noted for item 1, correspondence from Alliance Engineering Manager to PoMC, dated 13 May 2009, indicates that <i>"about 99% of the bund construction was completed by 16 October 2008 (the end date for the previous Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments). Since this time, 9 clay loads were added by the Coza and the top of the bund was levelled by the sweep bar. Both activities were to finalise the construction of a stub wall in order to fulfil the bund requirements for capping... no additional sand loads have been placed in the main bund... no contaminated clay has been incorporated in the PoM DMG main bund". This statement is supported by the Dredge Schedule Final Rev 2 Upd 4 (6 May 2009), and a visual comparison of two bathymetric surveys, dated 11 September 2008 and 23 April 2009, of the PoM DMG.</i></p> <p>The assessment made of PDS 35 in the previous audit, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments, which incorporates WMS PoM DMG, confirmed that the materials and material placement plans for both TSHDs and barges used in bund construction were in accordance with the requirements.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>Letter Alliance to PoMC (Advice re main bund status.pdf) dated 13 May 2009</p> <p>GHD 2009, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments.</p> <p>Bund Notification dated 19 September 2008 and corresponding survey dated 11 September 2008</p> <p>Dredge Schedule Final Rev 2 Upd 4 (6 May 2009)</p>

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
	» uncontaminated clays dredged from Yarra River and Williamstown Channels (this is due to a deficit of clay from the Port Melbourne Channel).	As above	Full compliance	
	» sand from South Channel used for cleaning the TSHD hopper.	As above	Full compliance	
	» contaminated clay from Appleton Dock, near Webb Dock and batter walls. The contaminated clays will be covered with uncontaminated clays or by capping, effectively isolating the contaminated clay from the marine environment. (Ref PDS 35)	As above	Full compliance	
	<i>Bund construction with TSHD</i> A material placement plan will be made, i.e. establishing the layout and number of TSHD loads at all cross-sections. The material placement plan is to be implemented in accordance with the steps laid out in the Work Method Statement Port of Melbourne Dredged Material Ground (CDP_ALL_MS_410_rev01) (Ref WMS PoM DMG)	As above	Full compliance	
	<i>Bund construction with barges</i> A placement plan will be prepared and communicated to the Vessel Master (Tug and/or Barge) with a map indicating where each material type can be placed. The placement plan is to be implemented in accordance with the steps laid out in the Work Method Statement Port of Melbourne Dredged Material Ground (CDP_ALL_MS_410_rev01) (Ref WMS PoM DMG)	As above	Full compliance	

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
4	<p>Placement of sand loads and contaminated clays</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>(Ref PDS 34)</p>	<p>As previously noted for item 1, correspondence from Alliance Engineering Manager to PoMC, dated 13 May 2009, indicates that since the 16 October 2008 cut-off date for the previous audit, Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i>, “no additional sand loads have been placed in the main bund, which is confirmed by the dump register, which is based on daily reports”. Additionally, “no contaminated clay has been incorporated in the PoM DMG main bund. Contaminated clay has only been placed in the PoM DMG extension bund”. This statement is supported by the Dredge Schedule Final Rev 2 Upd 4 (6 May 2009), and a visual comparison of two bathymetric surveys, dated 11 September 2008 and 23 April 2009, of the PoM DMG.</p> <p>The assessment made of PDS 34 in the previous audit, Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i>, which incorporates EMP Table 16, found that the placement of dredge materials, namely the placement of “sand loads and contaminated clays”, was in accordance with the requirements.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>Letter Alliance to PoMC (Advice re main bund status.pdf) dated 13 May 2009</p> <p>GHD 2009, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments.</p> <p>Bund Notification dated 19 September 2008 and corresponding survey dated 11 September 2008</p> <p>Dredge Schedule Final Rev 2 Upd 4 (6 May 2009)</p>
	<p>Contaminated clays to be used in the core of the bund (including construction of future maintenance bunds), or within the DMG or the inside face of the capped side of the bund.</p> <p>(Ref EMP Table 16)</p>	As above	Full compliance	
	<p>Disposal of contaminated clays to be directly from hopper or directly from barge (for material dredged with backhoe dredge or grab dredge)</p> <p>(Ref EMP Table 16)</p>	As above	Full compliance	
	<p>South Channel sand from cleaning the hopper to be used for the construction of the bund. Sand loads not to be contiguous.</p> <p>(Ref EMP Table 16)</p>	As above	Full compliance	
	<p>Sand to be disposed directly from the hopper.</p> <p>(Ref EMP Table 16)</p>	As above	Full compliance	

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
5	<p>Surveys</p> <p>Contaminated unconsolidated sediments will require dredging and disposal into the DMG prior to completing the bund. As a result, contaminated unconsolidated sediments will be placed within the partially constructed bunded DMG. Therefore, before the placement of the contaminated unconsolidated sediments the following information is required:</p> <p>» Confirmation that the partially constructed bund has been constructed in accordance with design specifications.</p> <p>(Ref PDS 36)</p>	<p>As previously noted for item 1, correspondence from Alliance Engineering Manager to PoMC, dated 13 May 2009, indicates that <i>"about 99% of the bund construction was completed by 16 October 2008</i> (the end date for the previous audit, Activity No. 2 Audit No. 1 - <i>Targeted audit of the EMP requirements for management of contaminated sediments</i>). This statement is supported by the Dredge Schedule Final Rev 2 Upd 4 (6 May 2009), and a visual comparison of two bathymetric surveys, dated 11 September 2008 and 23 April 2009, of the PoM DMG.</p> <p>The assessment made of PDS 36 in the previous audit, Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i>, which incorporates WMS PoM DMG, found that the partially constructed bund was constructed in accordance with the design specifications.</p> <p>SKM has certified the bathymetric surveys dated 20 and 23 April 2009 as an accurate representation of the seabed of the PoM DMG at the time of the surveys (PoM DMG Certification of Bathymetric Surveys Letter). After reviewing the bathymetric surveys, dated 20 and 23 April 2009, SKM prepared the PoM DMG Bund Acceptance Letter, which states that <i>"the Bund satisfies the CDP EMP bund construction design requirements, related to its stability and barrier properties"</i>.</p> <p>A visual comparison of two bathymetric surveys of the PoM DMG indicates that there has been very little change or additional bund construction. The bund freeboard was maintained, as was the integrity of contaminated material containment. The comparison was made between the recent Bund Completion Survey CDP-Env-51065v0 (23 April 2009), the previous Bund Notification 19 September 2008, and the survey dated 21 September 2008.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoM DMG Bund Acceptance Letter (SKM letter to PoMC) 1 May 2009</p> <p>PoM DMG Certification of Bathymetric Surveys Letter (SKM letter to PoMC) 1 May 2009</p> <p>Bund Notification 19 September 2008 and survey dated 21 September 2008</p> <p>Letter Alliance to PoMC (Advice re main bund status.pdf) dated 13 May 2009</p> <p>GHD 2009, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments.</p> <p>Bund Notification dated 19 September 2008 and corresponding survey dated 11 September 2008</p> <p>Dredge Schedule Final Rev 2 Upd 4 (6 May 2009)</p>
	<p>The integrity of the bund will be checked by hydrographic survey on a regular basis but at least weekly during construction.</p> <p>(Ref WMS PoM DMG)</p>	<p>The previous audit, Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i> determined that the WMS PoM DMG requirements had been complied with. In addition, the auditor sighted a list of bathymetric surveys conducted after that audit, between 15 and 30 November 2008. A review of selected dates (18 and 24 November 2008 numbered 827 and 845 respectively) confirmed that weekly surveys were conducted on the PoM DMG in this time period in accordance with the requirements.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoMC bathymetric survey read-out, 15 – 30 November 2008 (PoMDMG surveys 15-30 Nov 2008.pdf)</p>

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
6	<p>Bund capacity and freeboard</p> <p>Contaminated unconsolidated sediments will require dredging and disposal into the DMG prior to completing the bund. As a result, contaminated unconsolidated sediments will be placed within the partially constructed bunding DMG. Therefore, before the placement of the contaminated unconsolidated sediments the following information is required:</p> <p>» Confirmation of bund capacity and volume of contaminated unconsolidated sediments to be dredged.</p> <p>(Ref PDS 36)</p>	<p>As previously noted for item 1, correspondence from Alliance Engineering Manager to PoMC, dated 13 May 2009, indicates that <i>“about 99% of the bund construction was completed by 16 October 2008 (the end date for the previous audit, Activity No. 2 Audit No. 1 - Targeted audit of the EMP requirements for management of contaminated sediments.)</i>. This statement is supported by the Dredge Schedule Final Rev 2 Upd 4 (6 May 2009), and a visual comparison of two bathymetric surveys, dated 11 September 2008 and 23 April 2009, of the PoM DMG.</p> <p>The assessment made of PDS 36 in the previous audit, Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i>, which incorporates WMS PoM DMG, found that the partially constructed bund was constructed in accordance with the design specifications.</p> <p>Previously reviewed interim bund notifications, most recently dated 19 September 2008, included tabulated details of the interim bund’s capacity with calculations, the volume and source of dredged material to be disposed of, confirmation of bund stability, and relevant drawings. CDP senior management accepted each notification.</p> <p>SKM has certified the bathymetric surveys dated 20 and 23 April 2009 as an accurate representation of the seabed of the PoM DMG at the time of the surveys (PoM DMG Certification of Bathymetric Surveys Letter). After reviewing the bathymetric surveys, dated 20 and 23 April 2009, SKM prepared the PoM DMG Bund Acceptance Letter, which states that <i>“the Bund satisfies the CDP EMP bund construction design requirements, related to its stability and barrier properties... the maximum elevation of New Dredge Material (NDM) is more than 1.25m below minimum crest elevation”</i>.</p> <p>The audit team independently analysed the data from these SKM certified surveys and independently calculated and plotted the depth profile. It was concluded that the bund conforms to design specifications and that the bund capacity and freeboard comply with the requirements.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoM DMG Bund Acceptance Letter (SKM letter to POMC) 1 May 2009</p> <p>PoM DMG Certification of Bathymetric Surveys Letter (SKM letter to PoMC) 1 May 2009</p> <p>CDP-Env-51065v0 – PoM DMG Bund Survey 23 April 2009 – all depths.pdf</p> <p>Letter Alliance to PoMC (Advice re main bund status.pdf) dated 13 May 2009</p> <p>Raw survey data from CDP-Env-51065v0 on 20 and 23 April 2009 for independent analysis</p> <p>GHD 2009, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments.</p> <p>Bund Notification dated 19 September 2008 and corresponding survey dated 11 September 2008</p> <p>Dredge Schedule Final Rev 2 Upd 4 (6 May 2009)</p>

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
	<p>For placement with the TSHD, daily hydrographic surveys (weather permitting) will be done to confirm freeboard, capacity and depth contours.</p> <p>(Ref WMS PoM DMG)</p>	<p>The previous audit, Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i> determined that the WMS PoM DMG requirements had been complied with. The auditor sighted a list of bathymetric surveys, Alliance document “Overview 2 weeks material placement and surveys at PoM DMG” and it’s linked hydrographic surveys 090122m01 to 090122m06, illustrate a two week period of TSHD and barge disposal activity at the PoM DMG from 10 September 2008 to 24 September 2008. This list indicates that hydrographic surveys were undertaken daily for TSHD when disposing in the PoM DMG.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>Alliance document “Overview 2 weeks material placement and surveys at PoM DMG CONFIDENTIAL” and linked hydrographic surveys:</p> <p>090122m01 – 13-09-2008 Daily and Weekly</p> <p>090122m02 – 16-09-2008 Daily and Weekly</p> <p>090122m03 – 21-09-2008 Daily</p> <p>090122m06 – 21-09-2008 Weekly</p> <p>090122m04 – 23-09-2008 Daily</p> <p>090122m05 – 24-09-2008 Daily</p> <p>GHD 2009, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments.</p>
	<p>For placement with barges, weekly hydrographic surveys (weather permitting) will be done to confirm freeboard, capacity and depth contours.</p> <p>(Ref WMS PoM DMG)</p>	<p>While fully compliant with the WMS PoM DMG requirement in the previous audit Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i>, the auditor sighted an additional list of bathymetric surveys conducted between 15 and 30 November 2008. This list indicates that hydrographic surveys were undertaken weekly for barges when disposing in the PoM DMG. Dates 18 and 24 November 2008 (numbered 827 and 845 respectively) show that weekly surveys were conducted on the PoM DMG in this time period.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoMC bathymetric survey read-out, 15 – 30 November 2008 (PoM DMG surveys 15-30 Nov 2008.pdf)</p> <p>GHD 2009, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments.</p>

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
7	<p>Bund notifications</p> <p>DSE, EPA and the independent environmental monitor notified within 12 hours (any time of day) of determining that requirements for the placement of contaminated material in bund have been met.</p> <p>(Ref EMP Table 6)</p>	<p>PoMC advised on 21 April 2009 that there were no additional bund notifications following the 19 September 2008 Bund Notification.</p> <p>The previous audit Activity No. 2 Audit No. 1 – <i>Targeted audit of the EMP requirements for management of contaminated sediments</i> found that authorities were notified within 12 hours of determining that the requirements for the placement of contaminated material in the bund had been met. This confirmed that compliance for this requirement was achieved.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>GHD 2009, Activity No. 2 Audit No. 1 – Targeted audit of the EMP requirements for management of contaminated sediments.</p> <p>PoMC response to information request document (21 April 2009) advising of no further bund notifications since 19 September 2008.</p> <p>Bund Notification dated 19 September 2008 and corresponding survey dated 21 September 2008</p>
BUND GEOMETRY				
8	<p>Crest width</p> <p>Crest width of bund to be constructed in accordance with design specifications (Drawings C001, C002 and C002). (Drawings included in Annexure 7.</p> <p>The bund will be a number of hopper loads wide such that the total width is not less than 40 m.</p> <p>(Ref PDS 35 and WMS PoM DMG))</p>	<p>SKM has certified the bathymetric surveys dated 20 and 23 April 2009 as an accurate representation of the seabed of the PoM DMG at the time of the surveys (PoM DMG Certification of Bathymetric Surveys Letter). After reviewing the bathymetric surveys, dated 20 and 23 April 2009, SKM prepared the PoM DMG Bund Acceptance Letter, which states that <i>“the Bund satisfies the CDP EMP bund construction design requirements, related to its stability and barrier properties... the crest width of the bund is not less than 40m”</i>.</p> <p>The independent SKM Bund Acceptance letter and the Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1), both dated 1 May 2009, confirm the constructed crest width of the bund is in accordance with design specifications with a total width of not less than 40 m.</p> <p>The audit team independently analysed the SKM certified data from consecutive hydrographic surveys undertaken not less than 24 hours apart, on 20 and 23 April 2009, and independently calculated and plotted the depth profile. It was concluded that the crest width was not less than 40 m wide and has been constructed in accordance with design specifications.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoM DMG Bund Acceptance Letter (SKM letter to PoMC) 1 May 2009</p> <p>PoM DMG Certification of Bathymetric Surveys Letter (SKM letter to PoMC) 1 May 2009</p> <p>Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1) dated 1 May 2009</p> <p>CDP-Env-51065v0 – PoM DMG Bund Survey 23 April 2009 – all depths.pdf</p> <p>SKM certified raw survey data from CDP-Env-51065v0 on 20 and 23 April 2009 for independent analysis</p>

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
9	<p>Maximum crest elevation</p> <p>Maximum crest elevation of the main bund and/or stub wall at handover to be in accordance with design specifications (Drawings C001, C002 and C002). (Drawings included in Annexure 7.</p> <p>(Ref PDS 35)</p>	<p>SKM has certified the bathymetric surveys dated 20 and 23 April 2009 as an accurate representation of the seabed of the PoM DMG at the time of the surveys (PoM DMG Certification of Bathymetric Surveys Letter). After reviewing the bathymetric surveys, dated 20 and 23 April 2009, SKM prepared the PoM DMG Bund Acceptance Letter, which states that <i>"the Bund satisfies the CDP EMP bund construction design requirements, related to its stability and barrier properties"</i>.</p> <p>The independent SKM Bund Acceptance letter and the Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1), both dated 1 May 2009, confirm the maximum crest elevation of the main bund and/or stub wall is in accordance with design specifications and that capping can commence. Both pieces of evidence indicate that the elevation requirements, outlined in relevant notes in Drawing WC03604 C002, relate to the bund crest height at handover.</p> <p>The audit team analysed the SKM certified data of the consecutive hydrographic surveys undertaken not less than 24 hours apart on 20 and 23 April 2009 and independently calculated and plotted the depth profile. This analysis indicated that the relevant requirements mentioned above have been complied with.</p> <p>The auditor notes that there is a requirement that at the time of handover the maximum crest height of the bund and/or stub wall is to be no greater than –14 m CD. Analysis of the April survey data indicated that there were two small localised areas that are currently higher than RL –14.0m CD but the auditor understands that these are not structural components of the bund required for containment of contaminated sediment and hence the exceedences do not indicate non-compliance.</p> <p>The auditor concludes that compliance has been achieved with this requirement.</p>	Full compliance	<p>PoM DMG Bund Acceptance Letter (SKM letter to PoMC) 1 May 2009</p> <p>PoM DMG Certification of Bathymetric Surveys Letter (SKM letter to PoMC) 1 May 2009</p> <p>Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1) dated 1 May 2009</p> <p>CDP-Env-51065v0 – PoM DMG Bund Survey 23 April 2009 – all depths.pdf</p> <p>SKM certified raw survey data from CDP-Env-51065v0 on 20 and 23 April 2009 for independent analysis</p> <p>PoM DMG – Crest Wall Height and Bund Stability Letter (SKM letter to PoMC) 23 July 2009</p>

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
10	<p>Stub wall</p> <p>Stub walls of bund to be constructed in accordance with design specifications (Drawings C001, C002 and C002). (Drawings included in Annexure 7.</p> <p>Additional storage capacity can be created by putting a stub wall on top of the main bund. This stub wall should be at least 5 m wide. However, it may not be higher than 1 m and its crest may not exceed RL –14.0 m.</p> <p>(Ref PDS 35 and WMS PoM DMG)</p>	<p>SKM has certified the bathymetric surveys dated 20 and 23 April 2009 as an accurate representation of the seabed of the PoM DMG at the time of the surveys (PoM DMG Certification of Bathymetric Surveys Letter). After reviewing the bathymetric surveys, dated 20 and 23 April 2009, SKM prepared the PoM DMG Bund Acceptance Letter, which states that <i>“the Bund satisfies the CDP EMP bund construction design requirements, related to its stability and barrier properties... the stub wall crest width is not less than 5m”</i>.</p> <p>The independent SKM Bund Acceptance letter and the Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1), both dated 1 May 2009, confirm the stub walls of the bund are constructed in accordance with design specifications and meet the required minimum 5 m width and maximum 1 m height, without exceeding a depth of –14.0 m CD. Both pieces of evidence indicate that the elevation requirements, outlined in relevant notes in Drawing WC03604 C002, relate to the bund crest height at handover.</p> <p>The audit team analysed the SKM certified data of consecutive hydrographic surveys undertaken not less than 24 hours apart on 20 and 23 April 2009 and independently calculated and plotted the depth profile. It was concluded that the design of the stub walls of the bund conforms to design specifications. As noted in Item 9, the maximum crest elevation will be checked at time of bund handover.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoM DMG Bund Acceptance Letter (SKM letter to PoMC) 1 May 2009</p> <p>PoM DMG Certification of Bathymetric Surveys Letter (SKM letter to PoMC) 1 May 2009</p> <p>Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1) dated 1 May 2009</p> <p>CDP-Env-51065v0 – PoM DMG Bund Survey 23 April 2009 – all depths.pdf</p> <p>SKM certified raw survey data from CDP-Env-51065v0 on 20 and 23 April 2009 for independent analysis</p>
11	<p>Surveys to confirm construction in accordance with design specifications</p> <p>Prior to placement of cap material the following is required:</p> <ul style="list-style-type: none"> » Confirmation by survey that bund has been constructed in accordance with design specifications. <p>At completion two hydrographical surveys not less than 24 hours apart are required to ensure compliance of the bund with SKM drawings.</p> <p>(Ref PDS 37 and WMS PoM DMG)</p>	<p>SKM's Certification of Bathymetric Surveys for the PoM DMG, dated 1 May 2009, records that the SKM Project Surveyor stated <i>“the data is an accurate representation of the seabed of the PoM DMG at the time the surveys were conducted on 20 and 23 April 2009”</i>. The survey dates indicate that two hydrographical surveys were undertaken not less than 24 hours apart to confirm compliance of the bund with design specifications at completion.</p> <p>Both the independent SKM Bund Acceptance letter and the Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1), dated 1 May 2009, confirm the surveys indicate bund construction is in accordance with design specifications.</p> <p>The audit team independently analysed the data from these surveys, dated 20 and 23 April 2009, and verified that construction of the PoM DMG is in accordance with design specifications and that the surveys complied with PDS 8, 9, 10 and 12.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoM DMG Bund Acceptance Letter (SKM letter to PoMC) 1 May 2009</p> <p>PoM DMG Certification of Bathymetric Surveys Letter (SKM letter to PoMC) 1 May 2009</p> <p>Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1) dated 1 May 2009</p> <p>PoMC C683 Certification of Survey_PMDMG-2.pdf</p> <p>CDP-Env-51065v0 – PoM DMG Bund Survey 23 April 2009 – all depths.pdf</p> <p>SKM certified raw survey data from CDP-Env-51065v0 on 20 and 23 April 2009 for independent analysis</p>

Item	Requirement	Audit Findings (to 31 May 2009)	Compliance	Supporting Evidence
12	<p>Crest elevation above dredge material</p> <p>Crest elevation above dredge material in bund to be in accordance with design specifications (Drawings C001, C002 and C002). (Drawings included in Annexure 7.</p> <p>At completion of placement, the final level of the silt should be no higher than 1.25 m below the lowest level of the crest of the bund or stub wall.</p> <p>(Ref PDS 35 and WMS PoM DMG)</p>	<p>SKM has certified the bathymetric surveys dated 20 and 23 April 2009 as an accurate representation of the seabed of the PoM DMG at the time of the surveys (PoM DMG Certification of Bathymetric Surveys Letter). After reviewing the bathymetric surveys, dated 20 and 23 April 2009, SKM prepared the PoM DMG Bund Acceptance Letter, which states that <i>“the Bund satisfies the CDP EMP bund construction design requirements, related to its stability and barrier properties... the maximum elevation of New Dredge Material (NDM) is more than 1.25m below minimum crest elevation”</i>.</p> <p>The independent SKM Bund Acceptance letter and the Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1), both dated 1 May 2009, confirm the crest elevation above dredge material in the bund is in accordance with design specifications, and meeting the requirement that, at the completion of placement, the final level of silt should be no higher than 1.25 m below the lowest level of the crest of the bund or stub wall.</p> <p>The audit team analysed the SKM certified data from consecutive hydrographic surveys undertaken not less than 24 hours apart on 20 and 23 April 2009 and independently calculated and plotted the depth profile. It was concluded that the crest elevation above the dredge material in the bund conforms to the design specifications.</p> <p>The auditor concludes that compliance has been achieved for this requirement.</p>	Full compliance	<p>PoM DMG Bund Acceptance Letter (SKM letter to PoMC) 1 May 2009</p> <p>PoM DMG Certification of Bathymetric Surveys Letter (SKM letter to PoMC) 1 May 2009</p> <p>Internal PoMC Audit Report: PoM DMG Bund Completion (Stage 1) dated 1 May 2009</p> <p>CDP-Env-51065v0 – PoM DMG Bund Survey 23 April 2009 – all depths.pdf</p> <p>SKM certified raw survey data from CDP-Env-51065v0 on 20 and 23 April 2009 for independent analysis</p>

Appendix A
Analysis of Bathymetric Survey Data

Analysis of bathymetric survey data

The audit team conducted an analysis of two separate post bund construction surveys, taken not less than 24 hours apart, on 20 and 23 April 2009. Both bathymetric surveys were certified by SKM. The following analyses were conducted through re-plotting and analysing the data via GIS:

Elevation

- » The crest height of the bund and/or stub wall does not exceed the maximum elevation of RL –14.0 m. This was verified by plotting depth contours and visually inspecting the survey data to confirm no exceedences of the RL –14.0 m contour. There are small isolated areas that exceed a maximum elevation of RL – 14.0 m, however these are not considered to comprise structural components of the bund required for containment of contaminated sediment and hence do not indicate non-compliance.

Crest width

- » The crest width of the bund is to be not less than 40 m wide. This was verified by plotting a depth contour for the crest of the bund and then visually inspecting the data with the assistance of a GIS measurement tool to confirm that there were no points that were less than 40 m wide.

Stub wall

- » The stub wall is to be at least 5 m wide and not higher than 1 m. This stub wall width was verified by plotting a depth contour for the stub wall and then visually inspecting the data with the assistance of a GIS measurement tool to confirm that there were no points that were less than 5 m wide. The stub wall height was verified as demonstrated above for elevation, as the bund crest level did not exceed RL –14.0 m.

Freeboard (crest elevation above dredge material in the bund)

- » The final level of the silt in the bund should be no higher than 1.25 m below the lowest level of the crest of the bund or stub wall at completion of placement. This was verified by plotting depth contours and visually inspecting to confirm that the lowest level of the crest of the bund was at least 1.25 m above the silt level.

Overall the bund was constructed in accordance with design specifications.



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