



Port of Melbourne Corporation

Channel Deepening Project Environmental Management Plan

CDP_IMS_PL_004 Rev 1

Revision history

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Abbreviations

CD	Chart datum
Cd	cadmium
CDP	Channel Deepening Project
CEMP	Construction Environmental Management Plan
CEO	Chief Executive Officer
Cu	copper
Cr	chromium
dB	decibels
DEWHA	Department of the Environment, Water, Heritage and the Arts (Cwlth)
DHS	Department of Human Services
DMG	Dredged Material Ground
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
EMP	Environmental Management Plan
EMS	Environmental Management System as defined under ISO 14001
EPA	Environment Protection Authority (Victoria)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth).
EWMA	Exponentially Weighted Moving Average
Hg	mercury
HMAS	Her Majesty's Australian Ship
IMS	Integrated Management System
km	kilometre(s)
Laeq	'A' weighted equivalent noise level
m	metre(s)
ML	Local Magnitude (Unit of scale for measuring seismic activity)
MPB	Microphytobenthos
MPEMP	Melbourne Port Emergency Management Plan
N	nitrogen
NES	National Environmental Significance
NH ₄	ammonium
Ni	nickel
NO ₂	nitrogen dioxide
NO ₃	nitrate
NTU	Nephelometric Turbidity Units
OC/OP	Organochloride / Organophosphate Pesticides
P	phosphorus
PAH	Polycyclic Aromatic Hydrocarbons
Pb	lead
PBDE	Polybrominated diphenyl ethers
PCB	Polychlorinated Biphenyls
PCDD	Polychlorinated dibenzo-p-dioxins
PCDF	Polychlorinated dibenzofuran
PDS	Project Delivery Standard
PEL	Physics Engineers Laboratory navigation aid
PMP	Project Management Plan
PO ₄	phosphate
PoM	Port of Melbourne
PoM DMG	Port of Melbourne Dredged Material Ground
PoMC	Port of Melbourne Corporation
RMS	Root Mean Squared

SE DMG	South East Dredged Material Ground
SEES	Supplementary Environment Effects Statement
SEMS	Safety and Environmental Management System
SEPP	State Environment Protection Policy
SEPP N-1	SEPP (Control of Noise from Commerce, Industry and Trade) No. 1
SiO ₄	silicate
TBT	tributyl tin
TPH	Total Petroleum Hydrocarbons
TSHD	Trailing Suction Hopper Dredge
TSS	Total Suspended Solids
WAG	Westernport-Altona-Geelong (oil pipeline)
WIP	Work Implementation Plan
Zn	zinc

1 Introduction

1.1 Scope

This Environmental Management Plan (EMP) details the environmental management requirements to be followed for the Channel Deepening Project (CDP). This EMP includes:

- the requirements for environmental management during the planning, implementation, evaluation and review of CDP construction activities
- the responsibilities for implementing this 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
- the transition arrangements from construction phase to operations.

This EMP applies to the capital works described below and, environmental monitoring programs. PoMC has overall responsibility for the implementation of the CDP in accordance with the requirements of this EMP.

1.2 Project description

The CDP incorporates the following components:

- Capital dredging works associated with the channels, swing basins and berth pockets.
- Management of dredged material.
- 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 dredging contractor is Boskalis Australia Pty Ltd, which will also undertake services protection works. These works will be undertaken under an alliance partnership with PoMC. Other CDP works will be undertaken by contractors and managed in accordance with contractor management plans and procedures.

The CDP components are described in the following sections.

1.2.1 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 Fawkner Beacon) is naturally deeper and does not require dredging. Figure 1 shows the location of the dredging works.

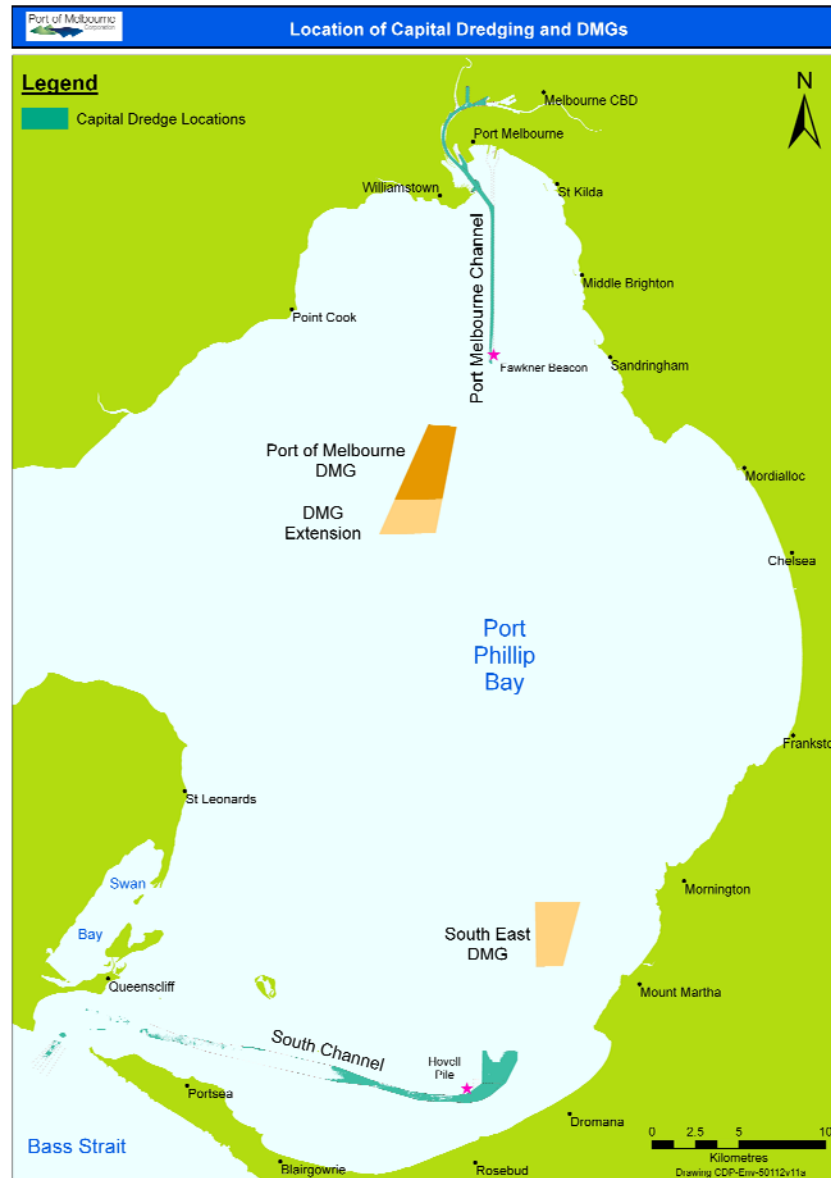
1.2.2 Management of dredged material

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, as well as in a new DMG in the south east of the bay. The locations of these DMGs are shown in Figure 1.

All of the dredged material sourced from the Port Melbourne, Williamstown and Yarra River Channels and associated docks will be placed in the PoM DMG. The PoM DMG will be extended to the south to provide future capacity for material from 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.

Figure 1: Dredging locations and dredged material grounds (DMG) for the CDP



1.2.3 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 river bed. The swing basins at Swanson Dock and Gellibrand Pier will be enlarged to accommodate turning movements of larger vessels.

1.2.4 Services

Several utility services crossing the Yarra River and Port Phillip Bay will require protection from dredging activity and shipping movements as a result of the proposed CDP works. The following services are proposed to be 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.
- 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 will be decommissioned and the services rerouted by the respective utility service providers.

1.2.5 Navigation Aids

To ensure ongoing safe navigation of vessels in the deepened shipping channels there is a need for the upgrading or replacement of some existing navigation aids and in some locations the installation of new navigation aids. The navigation aids include:

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

1.3 Key assets, environmental effects and risks

The key assets, predicted effects and risk events associated with the CDP are summarised below. Detailed information is contained within the risk register (refer to Section 2.4)

The key ecological assets and potential impacts include:

- listed and protected species – disruption of migration patterns for the Australian grayling and the Australian mudfish due to turbidity, and impacts to protected species due to turbidity and impacts on seagrass habitat
- seagrass habitat – reduced light due to turbidity from dredging has the potential to affect seagrass health
- deep reef habitat – dredging at the Entrance is predicted to result in rockfall within the canyon
- Marine Protected Areas – dredging in South Channel will produce turbidity plumes in the vicinity of all the components of the Port Phillip Heads Marine

National Park. Additionally, dredging in the Entrance has the potential to impact on the Point Lonsdale and Point Nepean components

- Ramsar sites (Swan Bay, Mud Island and the Spit Wildlife Reserve) – potential impact due to hydrodynamic changes and turbidity plumes.

The key social values, economic uses and potential impacts include:

- public amenity – noise and visual impacts of the project
- recreational activities (diving, fishing, boating and beach use) – impacts due to dredging works
- commercial uses (including commercial diving and fishing activities, charter fishing, ecotourism) – potential disruption due to turbidity, and safety zones and no-dive zones around dredging equipment. Potential effects on the Newport Power Station cooling water intake
- cultural heritage – potential disturbance to the shipwreck sites *HMAS Goorangai* and the Unidentified Dromana (former Hovell pile light), and disturbance to previously unidentified heritage sites.

1.4 Environmental policy

The PoMC Environmental Policy (Annexure 1) provides the umbrella policy direction for the CDP. The CDP Statement of Intent (Annexure 2) outlines PoMC commitment at a project level.

These policies will be displayed in the workplace. Key requirements and responsibilities within these policies will be communicated via inductions or other training programs (refer to Training and awareness Section 2.8).

PoMC is committed to delivering the CDP in an environmentally responsible manner and in accordance with its statutory approvals and this EMP.

1.5 Environmental Management System overview

An Environmental Management System (EMS), consistent with the requirements of *ISO 14001:2004 Environmental management systems – Requirements with guidance for use* has been 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. This 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 EMS has been designed to be consistent with the PoMC Safety and Environmental Management System (SEMS). This provides for efficient integration with PoMC systems at the completion of the project as well as providing synergies during the construction phase.

The structure of the EMS is shown in Figure 2.

Figure 2: Structure of the EMS

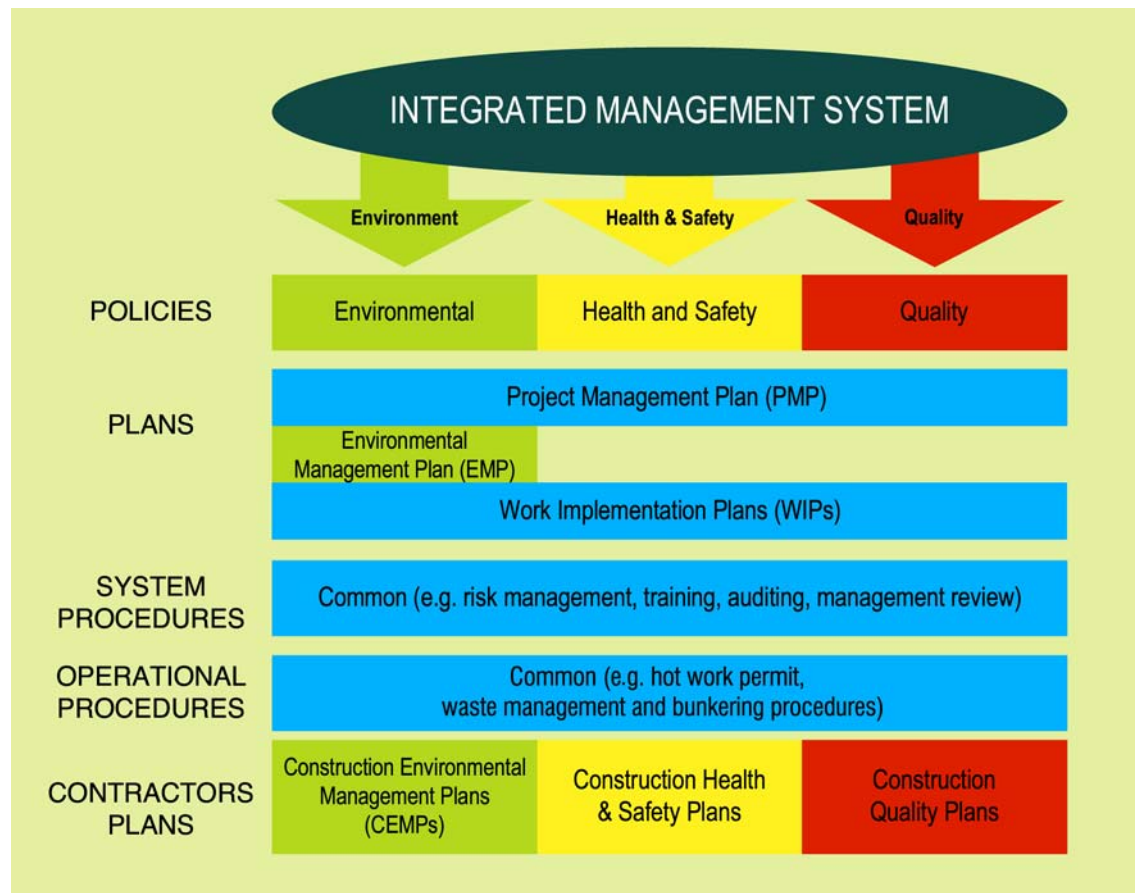


The EMS is integrated with the CDP quality and occupational health and safety systems to ensure the effectiveness of the overall management of the project. This combined system is called the CDP Integrated Management System (IMS). Overall project management requirements will be documented within the CDP Project Management Plan (PMP). Other key project documents include Work Implementation Plans (WIPs), which will be prepared for the various components of the project (called work packages). WIPs will identify project requirements specific to the work package, including the requirements of this EMP.

Contractors will be required to incorporate the requirements of this EMP into Construction Environmental Management Plans (CEMPs). All CEMPs will be reviewed by PoMC before works start to ensure consistency with this EMP.

The IMS structure is outlined in Figure 3.

Figure 3: Integrated Management System structure



The relationship between CDP environmental management documents, and ownership of documents is illustrated in Figure 4. A summary of each document is further described in Table 1.

Figure 4: Relationship between environmental management documents and ownership

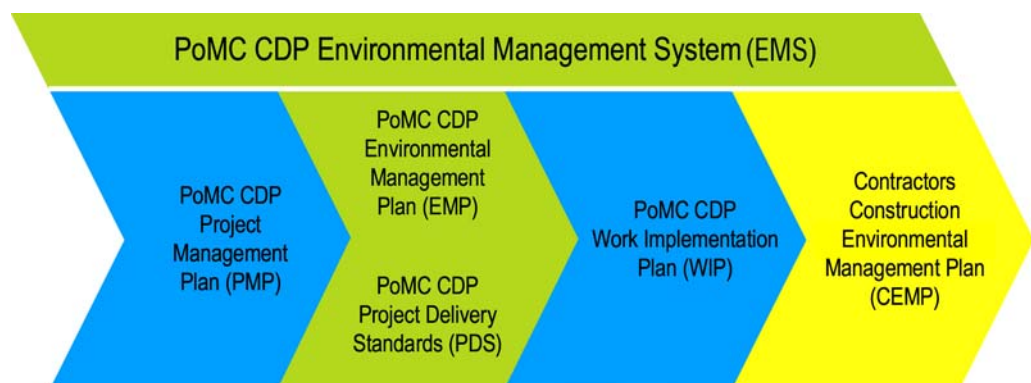


Table 1: Summary of key documents

Document	Description	Content
PoMC CDP Project Management Plan (PMP)	The PMP is prepared by PoMC to guide the planning, implementation and close-out of all aspects of the CDP project.	Whole of project objectives, schedule, budget, roles and responsibilities and processes.
PoMC CDP Environmental Management Plan (EMP) (CDP_IMS_PL_004)	The EMP is prepared by PoMC to establish the processes and methods by which the environmental aspects of the project will be managed to ensure that the CDP is delivered with no greater than the level of predicted effects or risk events set out in the SEES.	Description of the main elements of the CDP EMS, their interaction and direction to key procedures (including legal requirements, risk management, induction and training, emergency response, incident reporting, measurement and evaluation, and management review). External notification and reporting requirements. PDS (incorporating environmental controls and environmental limits). Description of environmental monitoring programs and contingency plans.
PoMC CDP Work Implementation Plan (WIP)	WIPs are prepared by PoMC for each work package and incorporate relevant requirements of the PMP and EMP.	Work package specific objectives, schedule, budget, roles and responsibilities and processes, including relevant requirements of this EMP.
Construction Environmental Management Plan (CEMP)	CEMPs are prepared and implemented by contractors, and document the environmental requirements specific to construction activities.	Requirements relevant to the contractor and the scope of work. Content to include relevant requirements of this EMP (including risk management, induction and training, emergency response, incident reporting, measurement and evaluation).

1.6 Environmental Management Plan context

This EMP has been prepared to fulfil the following objectives:

- To describe the main elements of the CDP EMS, their interaction, and direction to key procedures as required by *ISO 14001:2004 Environmental management systems – Requirements with guidance for use*.

- To establish the processes and controls that will be implemented to ensure that the CDP is delivered with no greater risk or effects than those identified in the SEES.
- To communicate environmental management requirements to contractors. Requirements will be incorporated into WIPs and CEMPs for each work package.
- To ensure that the project does not result in unacceptable impacts on matters of National Environmental Significance (NES).

1.7 EMP approval and independent environmental monitor

This EMP is a controlled document and will be approved and revised in accordance with the requirements outlined in Table 2.

PoMC will consult DEWHA on all proposed revisions to the EMP and seek advice whether these revisions require approval by the Commonwealth. Where approval is required, this will be sought prior to implementing the change. Where approval is not required, DEWHA will be notified of the change within 14 days.

Table 2: EMP approval requirements

	Approval	
	PoMC	Victorian Government
Initial version	Approval by PoMC Board.	Approval required.
Procedural revision (administrative changes e.g. amendment of procedure reference, formatting)	Approved by CDP General Manager Environment.	Notification of change to the Department of Sustainability and Environment (DSE). Reported on a monthly basis.
Minor revision (changes within CDP conditions or consents)	Approved by CDP Executive General Manager. Reported to PoMC CEO on a monthly basis. Quarterly summary to PoMC Board.	Notification of change to DSE. Reported on a monthly basis.
Major revision (changes requiring amendment to CDP conditions or consents)	Approved by PoMC Board.	Approval required.

The independent environmental monitor will be appointed by the Minister for Environment and Climate Change to advise both PoMC and relevant Ministers on the delivery of the project in accordance with this EMP. PoMC will

cooperate with the requests of the independent environmental monitor in fulfilling this role.

2 Planning

2.1 Legal requirements

Project approvals, legal requirements, and other relevant requirements such as guidelines and codes of practice will be identified, documented and reviewed as outlined in the CDP IMS Legal and Other Requirements Procedure (CDP_IMS_PR_003).

Where legislation requires a specific management action or response, these requirements have been identified within the PDS as environmental controls, environmental limits, environmental monitoring programs, or within contingency plans. The content of a PDS is further described in Section 2.2.1. The PDS associated with key legislation are identified in Table 3.

Compliance with legal and other relevant requirements will be evaluated in accordance with the CDP IMS Internal Audit Procedure (CDP_IMS_PR_016).

Table 3: Key legislation and associated Project Delivery Standards

Legislation	Applicable Project Delivery Standards
<i>Coastal Management Act 1995 (Vic).</i> <i>Environment Protection Act 1970 (Vic).</i>	All PDS.
<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth).</i>	Marine-based works (all areas). Dredging and plume. Dredging schedule. Dredged material management. Entrance dredging. Hydrohammer use and marine-based pile driving.
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cwlth).</i> <i>Archaeological and Aboriginal Relics Preservation Act 1972 (Vic).</i> <i>Aboriginal Heritage Act 2006 (Vic).</i>	Land-based works.
<i>Historic Shipwrecks Act 1976 (Cwlth).</i> <i>Heritage Act 1995 (Vic).</i>	Marine-based works (all areas).

Legislation	Applicable Project Delivery Standards
<i>National Parks Act 1975 (Vic).</i> <i>Wildlife Act 1975 (Vic).</i>	Marine-based works (all areas). Dredging and plume. Entrance dredging. Hydrohammer use and marine-based pile driving.

2.2 Project Delivery Standards

2.2.1 Content of Project Delivery Standards

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

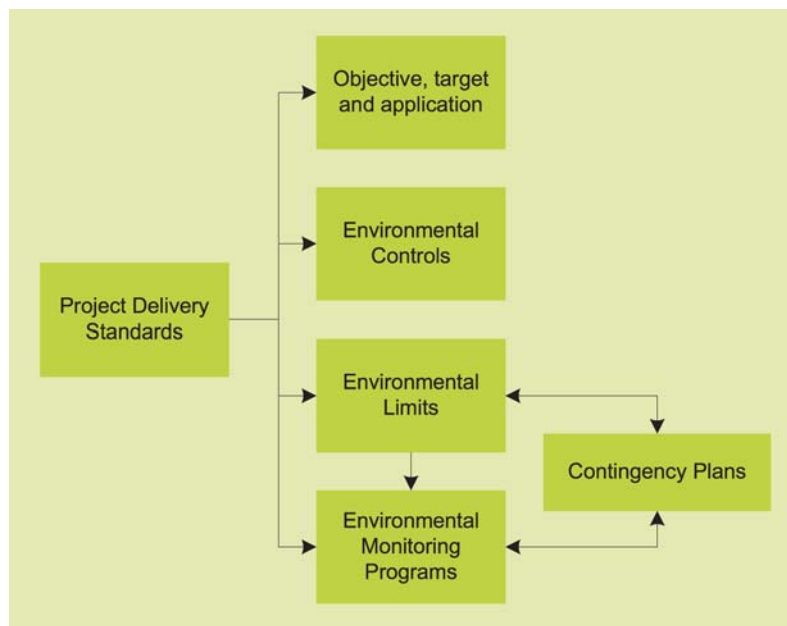
The content of a PDS is illustrated in Figure 5.

PDS 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 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.

- 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.

Figure 5: Content of PDS



A guide to the applicability of environmental limits, monitoring programs and contingency plans to the PDS is shown in Table 4. The Marine-based works (all areas), Land-based works, Dredging schedule, Dredged material management and Entrance dredging PDS do not have associated environmental limits, monitoring programs or contingency plans.

Contractors must incorporate relevant PDS into respective CEMPs. A guide to the applicability of PDS to each project area is contained in Annexure 3. The CDP PDS are contained in Annexure 4 of this EMP.

The CDP IMS Objectives and Targets Procedure (CDP_IMS_PR_004) and CDP IMS Monitoring and Evaluation Procedure (CDP_IMS_PR_017) outline the requirements for reviewing and evaluating PDS.

Table 4: Guide to the applicability of environmental limits, monitoring programs and contingency plans to the PDS

Project delivery standard	Environmental limit	Environmental monitoring	Contingency plan
Construction management (all activities)	Airborne noise	Airborne noise	Airborne noise
Dredging and plume	Turbidity	Turbidity	Turbidity
Hydrohammer use and marine-based pile driving	—	Underwater noise	Underwater noise

2.2.2 Environmental limits and response levels

Environmental limits for the CDP have been set for:

- airborne noise
- turbidity.

A graduated process to management is provided through response levels. Response levels provide an early warning to enable management action to be taken in order to remain within the level of risk or predicted effect set out in the SEES. A two-tier approach to response levels has been developed for turbidity. Airborne and underwater noise have one response level each.

The environmental limits and response levels are identified within the Environmental Monitoring Programs in Annexure 5 of this EMP.

The overall management action to a response level or environmental limit being exceeded is described in Table 5. Specific management actions are identified in contingency plans (further described in Section 3.5).

The Environmental Monitoring Programs and associated contingency plans are located in Annexure 5.

Table 5: Management action required if a response level or environmental limit is exceeded

	Action
Response level reached	<p>Modify or suspend the activity if the environmental limit may be exceeded.</p> <p>Assess cause(s) and identify and implement appropriate management actions as identified in the contingency plan.</p>
Environmental limit exceeded	<p>Suspend the project activity contributing to and/or causing the exceedence. Project activities that do not contribute to the environmental limit being exceeded can continue without disruption.</p> <p>Assess cause(s) and identify and implement appropriate management actions as identified in the contingency plan.</p> <p>Resume activity when conditions have returned to below the environmental limit and will remain below the limit once activities resume. Approval to resume activity required from CDP Executive General Manager, following approval from the relevant agency.</p>

2.3 External notification and reporting requirements

Performance against this EMP will be reported to government agencies as described in Table 6.

Table 6: Notification and reporting requirements

Subject	Reporting or notification	
	Government agency	Timeframe
Response level reached	Airborne noise – DSE, Environment Protection Authority (EPA), independent environmental monitor Turbidity – DSE, EPA, DEWHA*, independent environmental monitor Underwater Noise – DSE, EPA, DEWHA*, independent environmental monitor	Notification within 1 working day (normal business hours) of verifying that a response level has been reached. No report required.
Environmental limit exceeded	Airborne noise – EPA, DSE Turbidity – DSE, EPA, DEWHA*, independent environmental monitor	Notification within 12 hours (any time of day) of verifying that environmental limit has been exceeded. Incident report required.
Pollution event or imminent environmental hazard (as defined in Environmental Auditor Guidelines for Conducting Environmental Audits, Publication 953.2, October 2007, EPA, Victoria)	DSE, EPA, DEWHA*, independent environmental monitor	Notification within 12 hours (any time of day) of verifying imminent environmental hazard. Incident report required.
Non-Aboriginal heritage	Heritage Victoria, DSE, independent environmental monitor	Notification within 7 working days of discovery of historic shipwreck. Notification prior to any additional surveys being conducted. Report to be forwarded following heritage inspections.
Aboriginal heritage	Aboriginal Affairs Victoria, DSE, independent environmental monitor	Notification as soon as practicable and within 7 working days if potential Aboriginal site identified.

Subject	Reporting or notification	
	Government agency	Timeframe
Underwater noise assessment of hydrohammer	DSE, Parks Victoria, DEWHA*, independent environmental monitor	Notification at least 2 working days prior to use of hydrohammer (where underwater noise monitoring confirms that noise levels are consistent with the model and existing controls are adequate). Notification to include the reason for use of the hydrohammer and extent of use proposed.
Completion of dredging of contaminated sediments within an area	DSE, EPA, DEWHA*, independent environmental monitor	Notification within 12 hours (any time of day) of determining that requirements for commencement of dredging of underlying uncontaminated material within an area have been met.
Placement of contaminated material in bund	DSE, EPA , independent environmental monitor	Notification within 12 hours (any time of day) of determining that requirements for placement of contaminated material in bund have been met.
Entrance clean up	DSE, Minister for Environment and Climate Change or delegate, independent environmental monitor	Notification within 12 hours (any time of day) of determining that final Entrance clean up is complete (once design profile is achieved). PoMC will seek confirmation that clean-up is to the satisfaction of the Minister for Environment and Climate Change or delegate.
Audit of PoMC implementation of the EMP by external auditor	DSE, EPA, DEWHA*, independent environmental monitor	Audit report forwarded within 7 days of finalising the audit report.
Dredging schedule	DSE, independent environmental monitor	Monthly updates and revisions of the dredging schedule forwarded within 2 working days of approval by CDP management.

Subject	Reporting or notification	
	Government agency	Timeframe
Quarterly project report containing summary of: <ul style="list-style-type: none"> ▪ project activities, ▪ inductions, training, management review outcomes ▪ audit, monitoring, and inspection activities and results, including conformance with PDS ▪ communication and consultation summary ▪ management review for environmental monitoring (6 monthly) 	DSE, EPA, DPI, DEWHA*, independent environmental monitor	Quarterly reports during construction and 2 years post-construction. Forwarded within 4 weeks after the end of the quarter. Note: Process, environmental monitoring data, baywide monitoring data and internal audit reports will be made available for inspection by relevant agencies and the independent environmental monitor at any time.
Annual report on performance against EPBC / NES matters referenced in Annexure 8	DEWHA	Annual report forwarded to DEWHA after independent audit (by auditor agreed to by DEWHA) and published within 1 month of submission.
Project close-out report	DSE, EPA, DEWHA*, independent environmental monitor	Close-out report to be forwarded within 90 days of completion of construction activities.
Deep reef, Entrance plateau and PoM DMG marine pest post-construction inspection programs, Entrance bathymetry survey, post-construction towed video survey.	DSE, EPA, DEWHA*, independent environmental monitor	Report to be forwarded within 90 days following completion of post-construction inspection or survey.
Tide monitoring report	DSE, EPA, DEWHA*, independent environmental monitor	Report to be forwarded within 90 days following completion of post-construction monitoring.
Baywide monitoring – algal blooms	DSE, DEWHA*, independent environmental monitor	Notification where chlorophyll-a concentrations are indicative of a bloom within 3 days of receipt of verified data. Notification of toxic species within 12 hours of verified data.

Subject	Reporting or notification	
	Government agency	Timeframe
Sands and adjacent coast and beaches monitoring	DSE, DEWHA*, independent environmental monitor	Report to be forwarded within 90 days following completion of survey or monitoring.
Protected areas in Entrance	DSE, independent environmental monitor	Consolidated monitoring report on protected areas. Report to be forwarded following finalisation of post-construction deep reef monitoring reports.

* components relating to EPBC Act / NES only – refer to Annexure 8

2.4 Risk management

Environmental risks associated with the CDP have been identified and documented in a risk register consistent with *AS/NZS 4360:2004 Risk Management*.

Adverse predicted effects and risk events are identified in the risk register. The risk register contains event trees that show the linkages between initiating events and their subsequent chains of impacts and consequences. Risks are then assessed in terms of likelihood and consequence.

The risk register will be reviewed periodically to incorporate environmental performance monitoring results, and to reflect changes identified through the change management process, or as a result of incident investigations. Changes to the risk register will be approved by the CDP Executive General Manager.

Risk management, including review and reporting requirements, are outlined in the CDP IMS Risk Management Procedure (CDP_IMS_PR_005).

Task-based risk assessments (e.g. Job Safety and Environment Assessments) will be undertaken during the project to identify and control work place hazards.

2.5 Organisational structure and responsibility

PoMC has overall responsibility for the implementation of the CDP in accordance with the requirements of this EMP. PoMC is responsible for communicating responsibilities to Boskalis Australia Pty Ltd, as part of its Alliance arrangement, and other contractors.

The CDP Executive General Manager is accountable for:

- implementing the EMP
- co-ordinating all activities relating to the EMP,

- providing adequate resources to undertake the CDP in accordance with the EMP.

Responsibility for implementing the EMP will be delegated by the CDP Executive General Manager through the management team to the workforce. All levels within the management structure have duties and responsibilities associated with implementing the EMP.

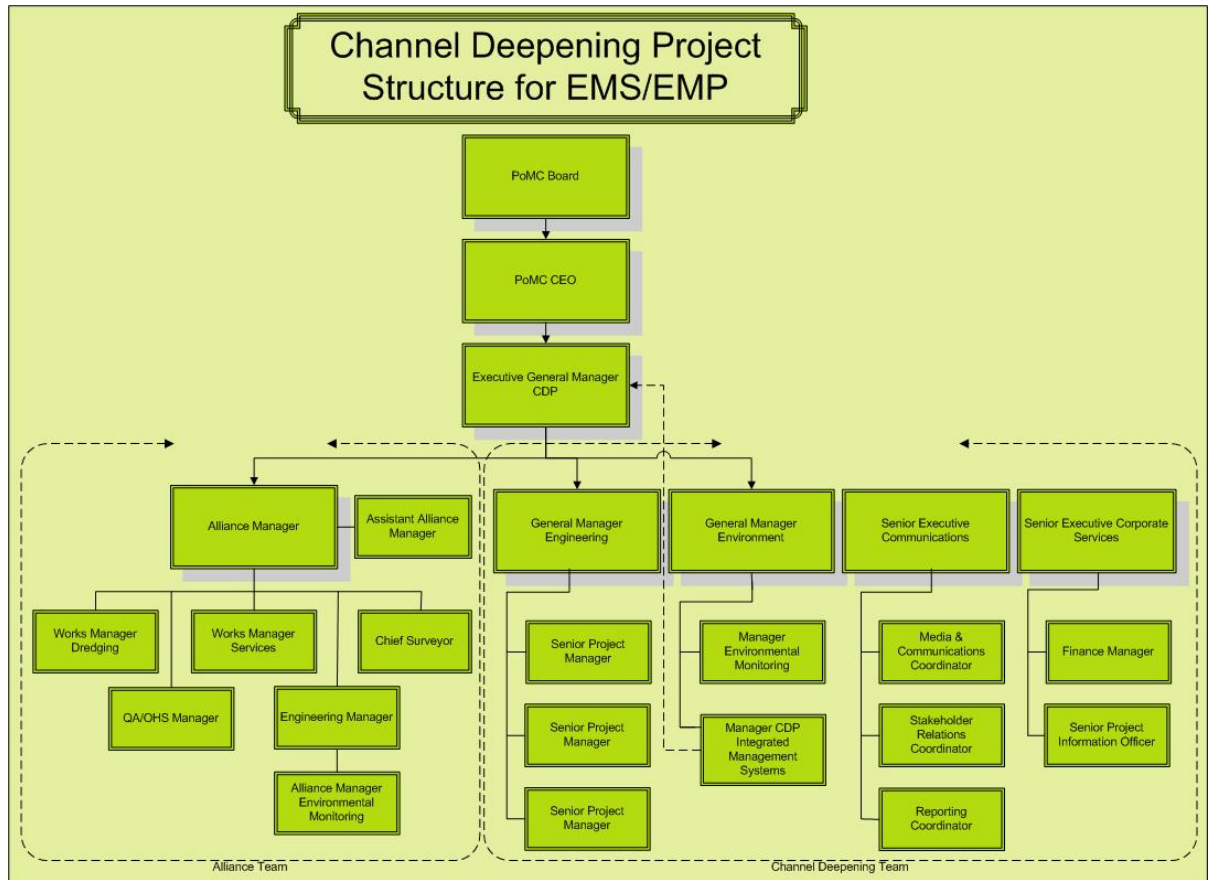
Specific responsibilities for implementing the EMP will be identified in plans and procedures including:

- PMP – responsibilities of CDP Management Team including CDP Executive General Manager, Alliance Manager, General Manager Engineering, General Manager Environment, Senior Executive Corporate Services, Senior Executive Communications and Manager CDP Integrated Management System.
- WIPs – responsibilities relevant to each work package.
- CEMPs – identifying responsibilities within team undertaking works.
- Procedures – identifying responsibilities for specific activities.

PoMC will monitor the appropriate delegation of responsibility through the review of key documentation including CEMPs and during audits.

CDP responsibilities are identified within the Responsibility Matrix (CDP_IMS_MD_001). The CDP will operate 24 hours per day, seven days per week during the implementation phase of the project, therefore a single role may be undertaken by several people. Figure 6 shows the indicative organisation structure.

Figure 6: CDP indicative organisation structure



2.6 Document and record control

Environment documents and records will be managed in accordance with the CDP IMS Document Creation, Control and Records Management Procedure (CDP_IMS_PR_001). This procedure includes requirements for document creation, review and approval, and record storage, retention and disposal.

At the completion of construction works, documentation relevant to the berth works, navigation aids, services protection, channel capital dredging works and dredged material grounds will be incorporated into PoMC ongoing operational systems. These may include as-built records, calculations, drawings and any operations and maintenance manuals.

2.7 Change management

Proposed changes to the project will be assessed and documented following the CDP IMS Change Management Procedure (CDP_IMS_PR_007) in order to identify and manage any consequences of the change. This will include an assessment of the risk, and compliance with legal requirements. Changes may include:

- alteration of project schedule

- modification of work methods within approved scope
- adjustment of environmental monitoring response levels
- change to project description
- change to dredging technology.

Changes will be approved by the CDP Executive General Manager or delegate and in accordance with Table 2.

2.8 Training and awareness

All personnel shall be suitably qualified and experienced to undertake their work in an environmentally responsible manner. Personnel who have formal responsibilities under this plan will be trained in the requirements of this EMP.

Requirements for training and inductions are documented in the CDP IMS Training and Induction Procedure (CDP_IMS_PR_008). Training may include formal courses, tool box meetings and in-field mentoring. Records of training and inductions will be maintained.

Training requirements will include:

- relevant personnel to be trained in the identification of potential heritage items. A guide regarding the identification of potential heritage items will be prepared for the project team
- personnel reviewing multibeam surveys to be trained in the identification of possible cultural anomalies
- relevant personnel to be trained in spotting and identification of cetaceans (whales, dolphins).

All personnel involved in the CDP will be required to complete a project induction which will incorporate key environmental aspects of the project. All personnel will be required to complete an assessment to demonstrate an understanding of key issues, requirements and responsibilities.

Induction topics will include the following:

- PoMC Environmental Policy.
- Key environmental issues and controls.
- Environmental limits and monitoring programs.
- Emergency response.
- Incident reporting.
- Waste management.
- Cetacean requirements.
- Heritage requirements.
- Responsibilities.
- Communication requirements.

- Consequence of departure from the requirements of this EMP.

2.9 Communication

Internal and external communication and consultation arrangements are described in the CDP IMS Communication and Consultation Procedure (CDP_IMS_PR_009) and the CDP Communications Strategy – Capital Dredge Program (CDP_COM_MD_001). The CDP Communications Strategy – Capital Dredge Program will be finalised prior to commencement of works.

The Senior Executive Communications or his/ her delegate will be responsible for and undertake all requirements with respect to community liaison.

2.9.1 Internal communication

Internal communication methods include meetings, emails, newsletters and notices, and environment notice boards.

Regular meetings between CDP personnel and contractors will be scheduled. Environmental matters will be included as a standard agenda item at these meetings.

2.9.2 External communication

A variety of methods may be used to enable information to be distributed to, and received from, interested members of the community and key stakeholders. These include the following:

- CDP website (refer www.channelproject.com).
- 24-hour toll free telephone number (1800 731 022).
- Newsletters.
- Mailing list.
- Media releases.
- Newspaper and/or radio advertisements.
- Signage around the bay.
- Direct verbal or written advice (e.g. telephone, letter, email).
- Notices to Mariners and shipping protocols.

The provision of information to bay users of non English speaking origin will be consistent with current PoMC protocol for the translation and distribution of communications in languages other than English.

Key communication activities and content include the following:

- All complainants will receive a response within 24 hours. Complaints will be managed following the process described in Annexure 6 and resolved as soon as practicable.

- All enquiries received through CDP website or 24-hour toll free telephone number will receive a response within two working days and resolved as soon as practicable.
- Communication of 600 m radius safety zones or restricted access zones around all major marine equipment.
- Communication of 1.4 km radius no-dive zone around hydrohammer when in use. Beach activities (e.g. swimming, snorkelling, surfing) will be unrestricted within 500 m of shore.
- Communication of project schedule and location of activities to the community and other stakeholders who may be affected by project activities.
- Communication of alternative areas of the bay as practicable, and updates on locations not affected by the project, which may be used for activities such as boating, fishing and diving.
- Communications with operators, tenants and utility providers within the port.
- Information for bay users (e.g. water craft, swimmers, fishers, recreational divers).
- Briefings/meetings with community, recreational, Aboriginal and conservation groups where requested and/or required.
- Notify local dive and ecotourism industry a minimum of two working days in advance of use of the hydrohammer.
- Notice to Mariners to be issued before start of pile driving for navigation aids. Notice to specify general locations and expected duration of works.
- Two key groups will be established by PoMC. The Community Liaison Group and Dive Industry Liaison Group will be involved in information dissemination and feedback for key representative stakeholders and the CDP and will meet on a quarterly basis. The Community Liaison Group will comprise key stakeholders and community members from around the bay and will be established for a period of 3 years. Expressions of interest will be the process used to determine membership of this group. The Dive Industry Liaison Group has been established and will continue during the construction phase of the project.
- Preparation of a quarterly public project report containing a summary of key activities, conformance with PDS, monitoring activities, and a communication and consultation summary.

Key stakeholders include:

- Industry businesses – including freight, logistics and transport operators, port users, industry and business associations, and owners/operators of Yarra River services to be relocated.
- Heritage/Indigenous – including Bunurong Land Council, Victorian Boonerwung Elders Land Council, Wathaurong Aboriginal Corporation, Wurundjeri Tribe Land Council, Wathaurong Aboriginal Co-operative.

- Recreational and tourism groups – including divers, recreational boaters and fishers, and tourism and ecotourism operators and associations.
- Government – Commonwealth, state and local government.
- Community – bay users, residents in bayside suburbs, environmental interest groups, general community.

2.10 Contractor management

All contractors shall comply with the requirements of this EMP. Contractor management requirements are identified in project documentation including the PMP and WIPs.

Contractor requirements and key performance expectations will include:

- mandatory contractor systems and plans (including a CEMP) for the management of environment and emergency preparedness
- induction, site and hazard specific training
- inspection regimes and schedules
- environmental performance monitoring and reporting.

All contractors will be required to demonstrate that they have the necessary skills and experience to undertake the work.

2.11 Emergency preparedness, response and recovery

Emergency scenarios are identified in the risk register. The CDP IMS Emergency Management Procedure (CDP_IMS_PR_011) details requirements for emergency planning, recovery, training and responsibilities.

An Emergency Response Procedure will be prepared for all work areas. Linkages with the Melbourne Port Emergency Management Plan (MPEMP) will be identified and documented. All Emergency Response Procedures will be reviewed by PoMC for consistency with the MPEMP.

All procedures will be in accordance with operational requirements, Harbour Master's directions and emergency management provisions contained in the Port Waters of Melbourne Operations Handbook, 2006.

CDP inductions will provide an overview of emergency response requirements. Site specific instruction and training will be undertaken by contractors.

Following an emergency incident, an investigation will be conducted and corrective actions identified and addressed in accordance with the MPEMP and CDP IMS Incident and Hazard Reporting and Investigation Procedure (CDP_IMS_PR_019).

3 Measurement and evaluation

3.1 Incident reporting and investigation

Environmental incidents and hazards, including pollution incidents will be reported and recorded. This requirement will be included in inductions and reinforced during the project.

The CDP IMS Incident and Hazard Reporting and Investigation Procedure (CDP_IMS_PR_019) details CDP incident reporting, recording and investigation requirements including the identification of appropriate management actions. External reporting requirements in relation to hazards and incidents are identified in Table 6.

3.2 Audits

Audits will be undertaken to monitor compliance with the EMS and EMP, and to ensure continued conformance with ISO14001. Improvement opportunities will also be identified during audits.

Audits will be scheduled for all CDP project components (i.e. dredging, management of dredged material, protection of services, berth upgrades and installation of navigation aids) to ensure project activities are in accordance with the EMS and EMP. The audit schedule will take into account the following:

- The timing of the proposed works.
- The nature of the proposed works including consideration of the level of associated risk.
- Incident investigation outcomes.
- Previous audit outcomes.
- Management review outcomes.

As a minimum, audits will be scheduled to coincide with the commencement of key activities and the use of key equipment, and on a 6 monthly basis whilst the activity occurs.

Conformance with this EMP will be assessed through observation of project activities, interviews and review of records. Records will include the following:

- Environmental monitoring, process monitoring and management performance monitoring results.
- Inspection and audit reports.
- Surveys.
- Meeting minutes.
- Heritage and cetacean logs.

- Mapping of vessel tracking data will be reviewed to confirm dredging and dredged material placement has occurred within specified dredging areas.

Audits of CDP processes and work areas will be undertaken on an annual cycle to ensure that environmental management arrangements conform to ISO14001.

The CDP IMS Internal Audit Procedure (CDP_IMS_PR_016) details CDP internal audit requirements including the identification of appropriate management actions. Proposed and completed audits will be documented in the CDP Schedule.

PoMC implementation of the EMP will be audited using an external auditor engaged by PoMC.

The annual report on performance against EPBC / NES matters will be independently audited by an auditor agreed to by DEWHA.

3.3 Monitoring of environmental performance

Environmental performance will be monitored via four mechanisms:

1. Environmental monitoring – monitoring of environmental conditions (turbidity, underwater noise, airborne noise).
Environmental monitoring programs are described further in Section 3.4. Environmental monitoring data informs operations. Management actions that may be adopted if response levels or environmental limits are reached are identified in contingency plans.
2. Process monitoring, inspections and surveys – monitoring of operational activities, physical conditions and post-construction environmental conditions (e.g. equipment tracking, monitoring of bund and cap construction, bathymetric surveys). Process monitoring, inspections and surveys are identified in PDS alongside process controls. Monitoring data informs any additional management action that may be required.
3. Management performance monitoring – monitoring of the implementation and effectiveness of the environmental management system (e.g. nature of complaints, number of corrective actions completed). Monitoring is IMS wide and performance indicators are identified in the PMP. Monitoring data informs the overall management of the project. It does not directly inform operational aspects, but may indirectly through the management review process.
4. Baywide monitoring – monitoring of baywide environmental conditions (e.g. water quality, seagrass). Baywide monitoring programs are outlined in Section 3.8. Baywide monitoring data informs management review for environmental monitoring (refer to Section 4.2).

The CDP IMS Monitoring and Evaluation Procedure (CDP_IMS_PR_017) outlines environmental performance monitoring, quality assurance and calibration requirements.

3.4 Environmental monitoring programs

Environmental monitoring programs are identified in the PDS. The environmental monitoring programs are:

- turbidity
- airborne noise
- underwater noise.

A description of each environmental monitoring program is provided in Annexure 5. Detailed monitoring procedures will be prepared prior to the commencement of works and will include monitoring locations and methods, frequency and statistical basis.

Each monitoring procedure will include appropriate measures to be taken in the event that monitoring cannot be undertaken due to extended poor weather, equipment loss or failure or other factors. Flexibility in the form of redundancy of equipment and scheduling of monitoring will be incorporated into monitoring programs to minimise disruptions to the project. Should monitoring in accordance with the procedure not be possible, then the overall management approach to a disruption to monitoring will be as follows:

- Assess the impact of the monitoring failure on the ability to evaluate performance and determine whether to continue, modify or suspend activities.
- Where the failure of monitoring would affect the ability to evaluate conformance with an environmental limit, activities will be suspended.
- Monitoring in accordance with the EMP will be reinstated as soon as practicable.

3.5 Contingency plans

Contingency plans have been identified for the environmental monitoring programs. Contingency plans describe the process to be followed in the event that response levels or environmental limits have been reached, or monitoring results indicate that management action may be required. The management actions identified in the contingency plans are not an exhaustive list but tangible responses that the project will implement if required. The most appropriate management action will be selected on a case by case basis.

The contingency plans for the project are:

- turbidity
- airborne noise

- underwater noise.

The contingency plans are contained in Annexure 5.

3.6 Process monitoring

Process monitoring is identified in the PDS (for simplicity they are included with environmental controls as they are associated with a process control). Process monitoring includes the following:

- Equipment tracking – Dredging and plume PDS and Dredged material management PDS.
- Hydrographic surveys – Dredged material management PDS.
- Monitoring of energy consumption and greenhouse emissions – Construction management (all activities) PDS.
- Cooling water intake monitoring for Newport Power Station – Dredging and plume PDS.
- Monitoring removal of contaminated sediments – Dredging and plume PDS.
- Maritime Heritage – monitoring of the riverbank modification works.

3.7 Inspections and surveys

Inspections and surveys are identified in the PDS. These include:

- PoM DMG bund and cap integrity – regular inspections of the bund commencing shortly after completion of the bund and continuing as part of the long term management of the bund. These are identified in the Dredged material management PDS.
- Maritime heritage – multibeam surveys and inspections at sites identified in the Marine-based works (all areas) PDS.
- Entrance plateau inspection program – identified in Entrance dredging PDS.
- Post-construction deep reef habitat – impact and recovery assessment – identified in Entrance dredging PDS.
- Marine pest post-construction survey of POM DMG – identified in Dredged material management PDS.
- Sands and adjacent coast and beaches bathymetric and multibeam surveys – identified in Dredging and Plume PDS.
- Post-construction bathymetric survey at the Entrance – identified in Entrance dredging PDS.

3.8 Baywide monitoring programs

The CDP Risk Assessment as part of the SEES assessed the impacts of the CDP on the health of Port Phillip Bay. Where significant impacts were predicted,

management and mitigation measures, such as turbidity monitoring, were incorporated into the project. These measures provide timely and efficient feedback to ensure that any flow-on impacts do not become unacceptable.

To support these management and mitigation measures, a suite of Baywide monitoring programs have been developed to provide broader information on the status of key species, habitats and ecological processes in the Bay. A total of nine programs including five sub programs for the fish stock and recruitment program have been developed. The objectives of these programs, and reference to the appropriate detailed design document are summarised in Table 7. Baywide monitoring Locations are identified in Figure 7.

These programs will be subject to an evaluation to identify any refinements and if required will be resubmitted to Victorian and Commonwealth regulatory agencies for approval within three months of project commencement.

Table 7: Summary of Baywide monitoring programs

Baywide Monitoring Program	Details
Seagrass	
Objective	To detect changes in seagrass health in Port Phillip Bay outside expected variability.
Indicator	Aerial % cover, upper and lower boundary of seagrass, quadrat % cover, height and shoot density, epiphyte cover and light (PAR).
Scope	<p>Seagrass in Port Phillip Bay will be monitored at three spatial scales.</p> <ul style="list-style-type: none"> Large scale aerial photography (i.e. high resolution covering large extent) of key stretches of coastline to characterise broad areas of seagrass in the Bay annually. Detailed assessments of this aerial photography will be undertaken in nine regions in the Bay (Altona, Kirk Point, Point Henry West, Curlewis Bank, Point Richards, St Leonards, Swan Bay, Mud Islands and Blairgowrie). At a smaller scale, seagrass health will be monitored at six of these nine regions (Kirk Point, Point Richards, St Leonards, Swan Bay, Mud Islands and Blairgowrie). Plots will be sampled quarterly for the first two years of the program with the frequency then reviewed to determine if six-monthly sampling is sufficient. Sampling will occur during April/May (autumn), July/August (winter), October/November (spring) and January/February (summer). Sampling periods will assist to characterise seasonal trends by including periods of maximum and minimum biomass in the Bay. Measurements are taken inside quadrates within 10m diameter plots, located in the intertidal, shallow subtidal and deeper subtidal zones at these regions (where present). This field monitoring will also include measurements of the distributional limits of seagrass in these

	<p>regions.</p> <ul style="list-style-type: none"> In addition, key environmental factors will be monitored such as light, epiphytes and turbidity and these results will be interpreted together with nutrient and turbidity results from other monitoring programs to help identify the likely driver/s behind any observed changes in seagrass.
Reporting Frequency	Quarterly, after each field event.
Detailed Design Document Reference	CDP_ENV_MD_022

Water Quality	
Objective	To detect changes in water quality outside expected variability.
Indicator	Nutrients (ammonium, nitrate, nitrite, Total N, dissolved organic nitrogen, phosphate, Total P, organic phosphorus), SiO ₄ , chlorophyll-a, phaeophytin, phytoplankton species composition, physico-chemical parameters (TSS, turbidity, temperature, dissolved oxygen, salinity and secchi depth), light (PAR) and heavy metals (As, Cd, Cr, Cu, Hg, Pb, Ni, Zn) at all sites. Plus TBT in Yarra River & Hobsons Bay.
Scope	<p>Monthly monitoring at a total of eleven sites across the Bay – Yarra River, Hobsons Bay, Long Reef, Corio Bay, Central Bay, PoM DMG, Patterson River Inflow, Dromana, Sorrento Bank, Middle Ground Shelf and Popes Eye.</p> <p>At each site, water samples for laboratory analysis are collected, and physico-chem parameters are monitored <i>in situ</i> across the water profile.</p>
Reporting Frequency	A brief field report is prepared to present data after each field event, and a summary/status report is prepared 6 monthly.
Detailed Design Document Reference	CDP_ENV_MD_023

Nutrient Cycling	
Objective	To detect changes in critical elements of bay nitrogen cycling processes outside expected variability.
Indicator	<p>Benthic sediment fluxes including dissolved oxygen, pH, carbon dioxide, ammonium, nitrate, nitrite, nitrogen gas, phosphate and silicate.</p> <p>Water column temperature, salinity, chlorophyll-a, DO and light (PAR).</p>

Nutrient Cycling	
Scope	<ul style="list-style-type: none"> Continuous <i>in situ</i> monitoring of key water quality characteristics at two depths at each of four sites in the Bay (Hobsons Bay, Central, Middle Ground Shelf and Long Reef). Interpretation of samples collected by the Water Quality monitoring program for dissolved organic nitrogen concentration at four sites in the Bay (Hobsons Bay, Central, Middle Ground Shelf and Long Reef). Deployment of benthic chambers at three sites in the Bay (Hobsons Bay and Central quarterly, plus Middle Ground Shelf in winter and summer) to monitor nutrient flux and benthic denitrification efficiency in sediments. A one-off study of the impact of a Yarra River storm event on denitrification in the northern part of Port Phillip Bay.
Reporting Frequency	Benthic chamber results (denitrification) reported quarterly. Continuous <i>in situ</i> loggers reported 2 monthly.
Detailed Design Document Reference	CDP_ENV_MD_019

Contaminants in Fish	
Objective	To identify if the concentration of contaminants in fish tissue in the lower Yarra River after dredging of contaminated sediments requires review of the current Health Advisory.
Indicator	Tissue concentrations of heavy metals (Cd, Cu, Cr, Zn, Pb, Se, As, Hg), OCP, PAHs, TBT, TPH, PCBs, PCDD/PCDF/PBDEs.
Scope	<p>Tissue from recreationally popular species – targeted species are black bream and yellow-eyed mullet, plus eels and mulloway where these are caught in sufficient numbers.</p> <p>Two sites in lower Yarra River including upstream of Maribyrnong River Junction (South Wharf No. 6-10, Docklands) and Lower Yarra River (the “Warmies”).</p> <p>One event will be undertaken around 3 months after dredging contaminated sediments in Yarra River and Williamstown Channel.</p>
Reporting Frequency	A report will be prepared following the field event.
Detailed Design Document Reference	CDP_ENV_MD_013

Algal Blooms	
Objective	To detect changes in the occurrence of algal blooms outside expected variability.
Indicator	Laboratory results for chlorophyll-a concentration, phaeophytin-a concentration, phytoplankton species identification and enumeration (NB: Toxic species identified to species level, non-toxic identified to taxonomic group). <i>In situ</i> measures of fluorescence.
Scope	The biomass of and composition of phytoplankton (small, water column algae) will be monitored using data collected in the Baywide Water Quality and Nutrient Cycling monitoring programs. <ul style="list-style-type: none"> ▪ The Water Quality program will provide monthly data on chlorophyll-a, phaeophytin-a and species composition, plus <i>in situ</i> fluorescence, at eleven sites across the Bay. ▪ The Nutrient Cycling program will provide continuous data from loggers of chlorophyll fluorescence in surface and bottom waters at four locations (Central, Hobsons Bay, Long Reef and Middle Ground Shelf). This data is uploaded 2 monthly.
Reporting Frequency	A separate report on Algal Blooms will be prepared quarterly. Data will also be reported under their primary monitoring programs (ie. Water Quality and Nutrient Cycling).
Detailed Design Document Reference	CDP_ENV_MD_012

Little Penguins	
Objective	To detect changes in Little Penguin body mass (an indicator of health) outside expected variability.
Indicator	Little penguin weight.
Scope	Data is collected continuously by Phillip Island Nature Park using a weighing platform located on the main natural path between the beach and the colony.
Reporting Frequency	Quarterly.
Detailed Design Document Reference	CDP_ENV_MD_020

Fish Stock and Recruitment – Sub Program 1 Port Phillip Bay Trawl	
Objective	To detect interannual changes in the abundance of all common fish in Port Phillip Bay outside of expected variability.
Indicator	Species present and their abundance, biomass, length frequency distribution.
Scope	Benthic trawls are conducted annually (March) at a total of twenty two sites in the Bay. These sites are located along transects that run from the centre of the Bay to the coast at Hobsons Bay, Werribee, Beaumaris, Mornington, St Leonards and Geelong. Data analysis focuses on the twenty most common species.
Reporting Frequency	One report is prepared annually after the monitoring event.
Detailed Design Document Reference	CDP_ENV_MD_014

Fish Stock and Recruitment – Sub Program 2a Egg and Larval Survey	
Objective	To detect changes in the abundance of snapper and anchovy eggs and larvae outside of expected variability.
Indicator	Abundance of snapper and anchovy eggs/larvae, body length (size frequency distribution).
Scope	Two sampling events are undertaken during December-January at a total of seven sites – Hobsons Bay, Mordialloc, Carrum, Frankston, Central Bay, Point Wilson plus Port Phillip Heads.
Reporting Frequency	One report is prepared annually after the monitoring events.
Detailed Design Document Reference	CDP_ENV_MD_015

Fish Stock and Recruitment – Sub Program 2b Anchovy Study	
Objective	To collect data on anchovy abundance, distribution in the Bay and population structure that will fill existing knowledge gaps and assist in the assessment of any changes observed in other Baywide programs.
Indicator	Anchovy abundance, biomass and length. Age by otolith banding.
Scope	Mid-water trawl undertaken during May-June each year, at twenty of the locations listed for Fish sub-program 1 (excludes the two sites in Geelong Arm).

Fish Stock and Recruitment – Sub Program 2b Anchovy Study	
Reporting Frequency	One report is prepared annually after the monitoring event.
Detailed Design Document Reference	CDP_ENV_MD_016

Fish Stock and Recruitment – Sub Program 3 Recreational Fishing	
Objective	To detect changes in the abundance and recruitment of key recreational fishery species outside of expected variability.
Indicator	On-site surveys: target species, caught species abundance and size plus other parameters such as level of experience, location and time spent fishing Diarist anglers: size and abundance of species caught (both individuals kept and those discarded), plus other factors such as time spent fishing.
Scope	On site surveys/interviews of anglers are undertaken as they return to boat ramps all around the Bay. Surveys are undertaken year-round. Approximately 50 diarist anglers will fish in nine defined areas around the Bay throughout the year, plus during two intensive periods per year (10-15 trips per diarist) in November/December and March/April.
Reporting Frequency	Two reports are prepared each year – one after each of the intensive diarist angler periods.
Detailed Design Document Reference	CDP_ENV_MD_017

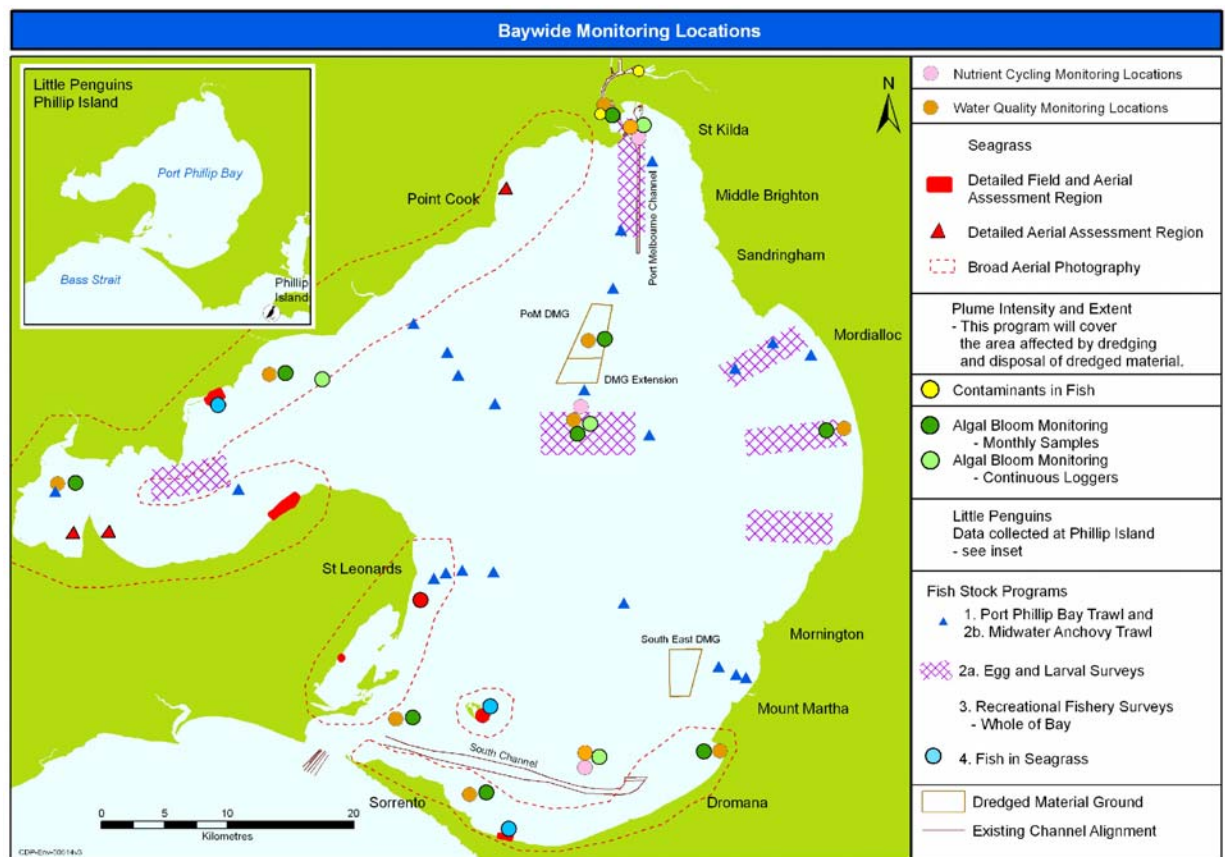
Fish Stock and Recruitment – Sub Program 4 Fish Species in Seagrass Beds	
Objective	To collect data on the types and abundance of fish in shallow and deeper seagrass beds that will fill existing knowledge gaps and assist in understanding the significance of any observed changes in seagrass habitat for these fish.
Indicator	Abundance and length of fish species. Seagrass biomass and stem/leaf length.

Fish Stock and Recruitment – Sub Program 4 Fish Species in Seagrass Beds	
Scope	<p>Monitoring is undertaken twice per year (October/November and April/May) at Kirk Point, Blairgowrie and Mud Islands. These three sites and sampling periods match up with those monitored under the Baywide Seagrass Monitoring Program.</p> <p>Fish samples are collected using seine net hauls through the seagrass habitat.</p>
Reporting Frequency	Two reports are prepared each year – one after each monitoring event.
Detailed Design Document Reference	CDP_ENV_MD_018

Plume Intensity and Extent	
Objective	Detect changes in the intensity and/or extent of the plume outside expectations
Indicator	Field measurement of NTU and qualitative interpretation of satellite imagery against turbidity modelling outputs.
Scope	<p>The plume generated during dredging and disposal is monitored in two ways – i) direct field measurements and ii) satellite imagery.</p> <p>Field monitoring involves collection of NTU data using meters attached to a cable that extends off the back of a vessel into the water column. The cable is raised and lowered to collect data across the water profile, as the vessel traverses defined transects. Field data is collected on a minimum of 15 days during the first significant dredging blocks in the:</p> <ul style="list-style-type: none"> ▪ Yarra River/Hobsons Bay area (contaminated sediments) ▪ Yarra River/Hobsons Bay area (non-contaminated sediments) ▪ Port Melbourne Channel ▪ South Channel <p>Further to this, several additional field events have been scheduled check plume characteristics at different times of year.</p> <p>One satellite image will be collected for each five week period during dredging. Where this is not possible due to cloud cover etc, contingencies are in place including use of alternate satellites or initiation of additional field monitoring events where required.</p>
Reporting Frequency	Quarterly
Detailed Design Document Reference	CDP_ENV_MD_021

Ramsar Wetlands – Key coastal and intertidal vegetation communities	
Objective	To monitor changes in the extent and health of coastal saltmarsh and intertidal mudflats to confirm CDP effects upon Ramsar-listed wetlands are no greater than predicted within the SEES.
Indicator	<p>Saltmarsh health: Shrub life form and herb life form health using categorised grading based on % cover and ratio of living to dead foliage; using quadrates along permanent transects.</p> <p>Saltmarsh and intertidal mudflat extent: Landward and seaward boundary defined using GPS.</p>
Scope	<p>Key coastal and intertidal vegetation communities will be monitored at four Ramsar-listed locations across the Bay – Swan Bay, the Spit, Jawbone and Mud Islands. Monitoring will involve:</p> <ul style="list-style-type: none"> ▪ February/March 2008: Baseline mapping (prior to dredging in Entrance) of the extent of coastal saltmarsh and intertidal mudflats, and assessment of baseline saltmarsh health. This will be assisted were appropriate by data collected during the SEES. ▪ February/March 2009: Mapping of the extent of saltmarsh and intertidal mudflats, and assessment of saltmarsh health during the project. ▪ February/March 2010: Mapping of the extent of saltmarsh and intertidal mudflats, and assessment of saltmarsh health following completion of dredging. ▪ February/March 2011: Mapping of the extent of saltmarsh and assessment of saltmarsh health approximately one year after completion of dredging. <p>Note that monitoring of intertidal mudflat extent is subject to an initial practicality test that will precede the Baseline field event.</p>
Reporting Frequency	One report prepared following each event.
Detailed Design Document Reference	CDP_ENV_MD_025

Figure 7: Baywide Monitoring Programs



All of the programs except the Plume Intensity and Extent program monitor key assets and ecological processes. The Plume Intensity and Extent program is an overarching program to confirm the plume during dredging is not significantly different from that modelled for the CDP risk assessment.

The overarching objectives of the Baywide monitoring programs are to assess the status of the bay and detect changes outside of expected variability. Expected variability includes both natural fluctuations and anticipated CDP-related changes as predicted in the SEES risk assessment. Where possible, Baywide monitoring programs will build on existing government monitoring programs.

Expert opinion and multiple lines of evidence will be used to identify any changes outside of expected variability. Where suitable data is available, statistical tools have been developed and quantitative criteria will be in place to help identify such changes.

The results of the Baywide monitoring programs will be reviewed quarterly as part of the Baywide monitoring report. This review will provide a 'snap shot' of the status of the bay as a whole and will be incorporated into the six monthly environmental management reviews.

Where changes outside of expected variability are identified for a program, an interim risk review will be undertaken to consider the results in light of other relevant Baywide and CDP programs. This review will determine if the changes are significant to the ecosystem of the Bay, the potential causes of the change

and will identify appropriate management measures, where required. This may include alterations to monitoring programs or CDP activities.

This approach ensures the Baywide monitoring programs are not focused on characterising specific localised or short-term impacts of the CDP, but instead are designed to monitor the overall health of the Bay and provide information for management.

4 Management review

4.1 CDP Management review meetings

Reviews of the EMS and environmental performance will be undertaken by senior management in accordance with the CDP IMS Management Review Procedure (CDP_IMS_PR_018).

Reviews will include:

- compliance with PDS
- compliance with legal requirements including statutory approvals and other commitments
- environmental performance monitoring results (including outcomes from Management review for environmental monitoring – see Section 4.2)
- results of inspections and surveys
- results of audits
- project risk profile.

Management reviews will ensure the continued effectiveness, suitability and adequacy of environmental management arrangements and identify opportunities for continuous improvement. The process for management review including management actions that may be considered is outlined in Annexure 6. Any action arising from the management review will be assigned responsibility and tracked until completion.

4.2 Management review for environmental monitoring

Management review for environmental monitoring will provide further assurance that environmental performance is within assessed levels, (that is, that the predicted effects and risk events are no greater than assessed) and identify continuous improvement opportunities.

The objectives of management review for environmental monitoring are:

- to identify changes to assets outside expectations
- to identify changes to the long-term beneficial uses of the bay

- identification of improvement opportunities to operations, environmental controls and limits and CDP environmental monitoring programs.

The management review for environmental monitoring will be coordinated by PoMC. The management review for environmental monitoring will include representatives from PoMC, relevant agencies and specialists as required.

The management reviews will be conducted approximately six-monthly over four years from project commencement. Flexibility in the timing of management reviews will be considered to:

- incorporate project milestones
- accommodate the timing of monitoring reports
- consider significant changes beyond expected natural variation or background conditions identified during qualitative reviews of baywide monitoring data as it is received, and with regard to ecological objectives of environmental limits.

If necessary, supplementary management reviews will be scheduled.

PoMC will summarise baywide monitoring data and trends, and relevant information on project activities and external factors on a quarterly basis. Results of environmental monitoring, inspections and surveys will also be summarised. This information will be included in the PoMC quarterly project report to agencies.

At the management review for environmental monitoring, PoMC and agencies will consider significant changes beyond expected natural variation or background conditions should they occur, the causes, and corrective actions or other measures (such as further investigation) if applicable to the CDP. These will be assessed with regard to ecological objectives of environmental limits and the principles of environmental protection.

For matters that are identified as being applicable to the CDP, the management review may lead to practical adjustments in operational responses that include:

- modification to response levels
- modification to the dredging schedule
- modification to dredging method (overflow/non-overflow, interval dredging).

The management review may also lead to non-operational responses that include:

- modification to baywide monitoring programs (location, frequency, duration)
- consideration of post-construction management responses (including responses to rates of recovery) such as no further action, further investigations, offsets or rehabilitation.

PoMC will respond to significant changes beyond expected natural variation or background conditions of its own accord in a manner that has regard for the principles of environmental protection.

If required, PoMC will implement the directions of Victorian and Commonwealth regulatory agencies, including corrective actions or other measures. It is anticipated that corrective actions or other measures will be proportional to the level of risk or impact, and be based on reasonable and demonstrated cause by CDP, having regard to the principles of environmental policy.

The Management Review for Environmental Monitoring Procedure (CDP_ENV_PR_002) details the process and responsibilities for undertaking the reviews.

4.3 Project close-out

A project close-out report will be prepared following completion of construction activities. The close-out report will contain a summary of project outcomes including:

- a summary of project activities
- total volumes dredged, calculated from hydrographic survey results
- conformance with PDS
- summary of environmental monitoring results obtained during the construction phase
- summary of consultation activities.

The project close-out report will be submitted to relevant government agencies (refer to Table 6).

Post-construction non-Aboriginal heritage, Entrance plateau, deep reef, PoM DMG marine pest inspection, tide monitoring, key coastal and intertidal vegetation community monitoring, and sands and adjacent coast and beaches monitoring reports will also be forwarded to relevant government agencies (refer to Table 6).

Annexure 1 PoMC Environmental Policy



Safety & Environmental Management System
SEMS01-02 Environmental Policy
Authorised by: EGM Port Operations
Issue Date: 23 July 2007

PoMC ENVIRONMENTAL POLICY

Port of Melbourne Corporation (PoMC) is charged with providing the strategic management of the operation and development of the Port of Melbourne and to ensure that this is done in an economically, socially and environmentally sustainable manner.

To achieve the above, PoMC will:

1. Document, implement and maintain an Environmental Management System based on the international standard AS/NZS ISO14001:2004 and will seek continued improvement in its environmental performance;
2. Establish and implement a Safety and Environmental Management Plan in accordance with the *Port Services Act 1995* (Vic), Section 91D;
3. Ensure PoMC policies, objectives and targets address key port environmental issues and periodic review of these policies, objectives and targets;
4. Comply with all environmental legal requirements and other applicable environmental obligations;
5. PoMC is committed to conducting its port and marine operations so as to minimise waste, prevent pollution, promote efficient use of resources and manage environmental impacts;
6. Adopt best practice environmental management techniques where feasible;
7. Encourage a port-wide culture of responsible environmental management;
8. Where able require and influence tenants, contractors and port service providers to develop Environmental Management Plans and/or systems to manage their environmental impacts;
9. Integrate where appropriate environmental management considerations into decision making and work practices related to marine operations, property development, planning, design, construction, maintenance and operation of facilities within the Port of Melbourne;
10. Provide sufficient resources (human, physical and financial) to achieve the aims, objectives and targets of the Environmental Management System; and
11. Communicate this Environmental Policy to POMC employees, PoMC contractors, PoMC stakeholders and where appropriate to the community.

Signed: 

Date: 9/8/07

Stephen Bradford
Chief Executive Office

Annexure 2 CDP Statement of Intent

Port of Melbourne
Corporation



CDP_IMS_PO_002 CDP Statement of Intent
Authorised by: EGM Channel Deepening Project
Issue Date: 15 October 2007

STATEMENT OF INTENT

Port of Melbourne Corporation (PoMC) proposes to deepen existing shipping channels and berths in Port Phillip Bay, Hobsons Bay, the Yarra River and the Entrance to a depth sufficient to accommodate ships with up to a 14 metre draught. This initiative is known as the Channel Deepening Project (CDP).

The Channel Deepening Project key tasks are:

- capital dredging at required locations to accommodate 14 metre draught vessels at all tides
- berth upgrades and stabilisation works
- treatment of existing services across the Yarra River and the Port Melbourne Channel
- upgrade and augmentation of channel navigation aids
- management of dredged material from the capital program and the development of a dredged material ground for ongoing maintenance programs.

The Channel Deepening Project Team is committed to ensuring the project is undertaken in accordance with the following principles and objectives:

- **Health and Safety** - all project decisions will maintain safety as a priority with the objective of preventing incidents in the workplace.
- **Project management** - clarity of responsibilities, communications and reporting lines.
- **Cost** - delivery of project within budget.
- **Schedule** - 14 m draught vessels access to Swanson Dock by the end of 2009.
- **Quality** - a fit for purpose solution that meets project specifications.
- **Environment** - minimise harm to the environment through full compliance with the CDP Environmental Management Plan (EMP).
- **Communications** - to be open, honest, clear and structured in all communications to the community and stakeholders.
- **Technology** - implement the selected 'best practice' technologies.
- **Systems** - develop, implement and maintain processes that integrate into and are consistent with PoMC operations and policies.
- **Risk** - implement the identified risk management process to ensure project risks are identified and managed.
- **Culture** - work cooperatively, seek innovation, meet commitments, respect views and celebrate success.
- **Continuously improve** - strive for continuous improvement in the manner in which we achieve the objectives of the project.

Nick Easy
Executive General Manager
Channel Deepening Project
October 2007

Annexure 3 Project Delivery Standards – applicable works and project areas

Project Delivery Standards – applicable works and project areas (this is a guide only)

Project delivery standard	Service works	Navigation aids	Berth works	Dredging			
				Yarra River and Hobsons Bay*	North of bay*	South of bay*	Entrance*
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		✓	✓				✓

Refer to drawing CDP-Env-50228 in Annexure 7 for the location of the project areas

Annexure 4 Project Delivery Standards

Table 8: Construction management (all activities) PDS

Construction management (all activities)	
Objective	<p>To appropriately plan and implement construction aspects of CDP activities.</p> <p>To ensure noise levels comply with SEPP N-1 requirements.</p> <p>To ensure that materials are appropriately stored, handled and disposed of.</p>
Target	Conformance with all environmental limits and controls specified in this PDS.
Application	The duration of the CDP during all project activities and areas.
Environmental controls	Project phase
1. Hours of operation <ul style="list-style-type: none"> All activities may be conducted on a 24 hour, 7 days a week basis, except where explicitly restricted within a PDS, or relevant legislation. 	All phases
2. Airborne noise <ul style="list-style-type: none"> All activities must be conducted within SEPP N-1 limits. Noise assessment (desktop) of dredging vessels and major equipment (that are new to the CDP and not included in the existing modelling) to be conducted before acceptance and mobilisation onto project. Where the assessment indicates that the vessel or equipment may not conform to the SEES risk assessment outputs, appropriate action is to be taken as described in Airborne Noise Contingency Plan. 	All phases
3. Airborne Noise Monitoring <ul style="list-style-type: none"> Noise monitoring to be undertaken as described in the Airborne Noise Monitoring Program (Annexure 5): <ul style="list-style-type: none"> An initial daytime compliance noise check of CDP activities in the Yarra River and Hobsons Bay will be undertaken at the monitoring location(s) nearest to the work activity over the first 3 days of construction activities. An evening and/or night-time noise check will be undertaken when equipment identified with the potential to exceed SEPP N-1 limits is to be used in the evening or night. Where monitoring indicates an exceedence, or potential exceedence, of SEPP N-1 limits, appropriate action is to be taken as described in Airborne Noise Contingency Plan. 	Construction
4. Waste management <ul style="list-style-type: none"> All marine vessels to have sewage containment or treatment facilities. Sewage treatment will comply with Section 23G of the <i>Pollution of Waters by Noxious Substances Act 1986</i> (Vic). No disposal of untreated sewage or other wastes to the bay. 	Construction

Construction management (all activities)			
<ul style="list-style-type: none">Contractor waste management arrangements to include waste minimisation, containment, segregation and appropriate reuse, recycling, treatment and disposal.The handling and disposal of unexpected materials identified during dredging (e.g. inert debris such as metallic wastes and timber) to be included in waste management arrangements.All waste to be managed in accordance with:<ul style="list-style-type: none">Environment Protection Act 1970 (Vic)Quarantine Act 1908 (Cwlth) (applicable vessels)Pollution of Waters by Oil and Noxious Substances Act 1986 (Vic)			
5.	Energy and greenhouse gases <ul style="list-style-type: none">The project will identify, calculate and report on energy consumption and greenhouse emissions on major plant and equipment consistent with the provisions of the Greenhouse Challenge Plus Program.	Construction	
6.	Equipment maintenance <ul style="list-style-type: none">Maintenance programs will be implemented for all plant and equipment as defined in the <i>Occupational Health and Safety Regulations 2007</i> (Vic).	Construction	
7.	Fuels, oils, chemicals and hazardous goods <ul style="list-style-type: none">Storage and handling of chemicals in accordance with:<ul style="list-style-type: none"><i>Dangerous Goods Act 1985</i> (Vic)<i>International Ship Management (ISM) Code</i> (applicable vessels)<i>Pollution of Waters by Oil and Noxious Substances Act 1986</i> (Vic)Asbestos to be managed in accordance with the <i>Occupational Health and Safety Regulations 2007</i> (Vic).	Construction	
8.	Emergency response preparedness <ul style="list-style-type: none">Development and testing of emergency response procedures, integrated with Melbourne Port Emergency Management Plan, including provision for fuel, oil and chemical spills.All dredge vessels to have oil spill response kits on board. Relevant personnel to be trained in its use.	Construction	
Environmental limit		Environmental monitoring program	
Airborne noise		Airborne noise	
Contingencies	Airborne Noise Contingency Plan Emergency response managed via Emergency Response Procedures (EMP Section 2.11)		

Table 9: Marine-based works (all areas) PDS

Marine-based works (all areas)	
Objective	To appropriately manage marine-based works. To minimise disturbance to and appropriately manage non-Aboriginal heritage. To minimise impacts on cetaceans due to vessel manoeuvring.
Target	Conformance with all environmental controls specified in this PDS.
Application	All marine-based construction activities.
Environmental controls	Project phase
9. Safety <ul style="list-style-type: none"> A safety zone of 600 m radius to be established around major dredging equipment during operations. 	Construction
10. Marine pests <ul style="list-style-type: none"> Marine pest inspection and certification of monitoring and support vessels, dredgers and pontoons is required before mobilisation onto project, where these are sourced from outside Port Phillip Bay. Certification must be received from the final port of call, before entry to Port Phillip Bay. All vessels to comply with “Protocol for Environmental Management – Domestic Ballast Water Management in Victorian State Waters”, EPA Publication 949.1 (June 2006) All vessels to comply with “Australian Ballast Water Management Requirements”, AQIS (1 June 2007) 	Pre-mobilisation Construction
11. Vessel anchoring <ul style="list-style-type: none"> Vessels to anchor in accordance with the Port Waters of Melbourne Operations Handbook, 2006. This does not include the anchoring of pontoons at DMGs. 	Construction
12. Vessel bunkering <ul style="list-style-type: none"> All bunkering to take place in accordance with PoMC Bunkering Guidelines and vessel bunkering procedures. 	All phases
13. Cetaceans – vessel manoeuvring <ul style="list-style-type: none"> If within 300 m of a dolphin or whale the vessel must not: <ul style="list-style-type: none"> approach a whale or dolphin head on be in the path of a whale or dolphin separate any whale or dolphin from a group come between a mother and a calf drop or lower an anchor overboard from the vessel. Within 300 m of a whale or dolphin, the vessel must: <ul style="list-style-type: none"> maintain a constant speed that does not exceed 5 knots avoid sudden changes in direction 	All phases

Marine-based works (all areas)	
<ul style="list-style-type: none"> manoeuvre the vessel to a distance of at least 200 m from the whale or dolphin if it shows any signs of disturbance (where safe to do so). 	
14. Cetacean sightings and log <ul style="list-style-type: none"> Personnel on board vessels are to report all sightings of cetaceans. A log of cetacean sightings and action taken to be kept for all work areas. 	Construction
15. Services protection and removal <ul style="list-style-type: none"> Management measures including positional controls and mechanical devices or annexures to dredging equipment to minimise the risk of damage to services. 	Construction
16. Marine-based berthworks and river protection works <ul style="list-style-type: none"> Management measures to minimise quantity of debris entering the river during demolition and construction works. 	Construction
17. Heritage (marine-based) – identification of potential relics <ul style="list-style-type: none"> If potential relics are identified during construction activities, the process described in Annexure 6 will be followed. 	Construction
18. Maritime heritage – berthworks and river protection <ul style="list-style-type: none"> Recording and removal of Stony Creek Ballast Wharf Yarra River (H7822-0423) site in Newport Park, and the Lower South Wharf (H7822-0598) site associated with the expansion of the Swanson Dock swing basin as follows: <ul style="list-style-type: none"> Recording of above-water and below-water remains of the structure and any visible artefacts associated with the structure. Monitoring of the riverbank modification works leading to the destruction of the site by an appropriately qualified archaeologist. If significant items are uncovered, the works will be suspended and the archaeologist given an opportunity to record the finds. In the event that the riverbed is to be disturbed, to be preceded by test excavations to determine the nature of the archaeological deposit on the riverbed and to recover a sample of significant artefacts. 	Construction
19. Maritime heritage – dredging <ul style="list-style-type: none"> Multibeam survey to be conducted on the bed of South Channel, SE DMG and the PoM DMG extension within 2 months before the start of dredging. Results to be reviewed by an archaeologist. Where any potential additional heritage sites are identified, these shall be investigated and appropriate management action taken, as advised by the archaeologist. Where an additional heritage site is identified, a report of the findings is to be made available to Heritage Victoria. Conduct survey, excavation and removal of the Unidentified Dromana site (S894) (former Hovell pile light), South Channel. Report to be provided to Heritage Victoria. 	Pre-construction

Marine-based works (all areas)	
<ul style="list-style-type: none"> ▪ Before the start of dredging, the following items will be recorded and removed: <ul style="list-style-type: none"> – Dumped rock and artefacts, Port Melbourne Channel. – Wheels and axle, located at Hovell Pile, South Channel. ▪ Conduct site inspection in vicinity of the <i>HMAS Goorangai</i> (S294) before the start of dredging in that area. ▪ Conduct two inspections of the Edward (S209) before the start of dredging in the Entrance. ▪ Inspection and site works described above to be carried out under the supervision of an archaeologist. 	
<ul style="list-style-type: none"> ▪ The following management measures shall be implemented for the wreck of the <i>HMAS Goorangai</i> (S294): <ul style="list-style-type: none"> – Use of the sweep bar in conjunction with the TSHD in the vicinity of the <i>HMAS Goorangai</i> to minimise overdredge. – Draghead tracking to confirm that all dredging has taken place within the construction zone. ▪ Survey to be carried out under the supervision of an archaeologist and report to be provided to Heritage Victoria. 	Construction
<ul style="list-style-type: none"> ▪ Multibeam survey to be conducted on the bed of Williamstown Channel, Port Melbourne Channel and South Channel within 12 months of completing dredging, to identify whether any more heritage sites have become exposed by batter adjustment. Results to be reviewed by an archaeologist. Where any potential additional heritage sites are identified, these shall be investigated and appropriate management action taken, as advised by or agreed with the archaeologist. ▪ Conduct site inspection within 2 months of completion of dredging in the vicinity of <i>HMAS Goorangai</i> (S294). ▪ South Channel Pile Light (H1519 and H7821-0006) – four inspections of site, scheduled one per season within the first year after completion of dredging, with the aim of recording and recovering artefacts that have become exposed. ▪ Unidentified – Port Melbourne n.2 (787) – eight inspections of the site, scheduled one per season for 2 years following completion of dredging, with the aim of recording erosion processes affecting the site. ▪ Inspections to be carried out under the supervision of an archaeologist and reports to be provided to Heritage Victoria. 	Post- construction

Marine-based works (all areas)	
Environmental limit	Environmental monitoring program
Not applicable to this PDS	Not applicable to this PDS
Contingencies	Not applicable to this PDS

Note: this PDS relates to EPBC Act / NES matters – refer to Annexure 8.

Table 10: Land-based works PDS

Land-based Works		
Objective	To appropriately manage land-based works. To minimise disturbance to, and appropriately manage, Aboriginal heritage sites.	
Target	Conformance with all environmental controls specified in this PDS.	
Application	North of the Bay land-based works: <ul style="list-style-type: none">Swanson Swing Basin, Holden Dock, Newport Park, Swanson Dock, Appleton Dock and Gellibrand Pier South of the Bay land-based works (navigation aid): <ul style="list-style-type: none">Queenscliff	
Environmental controls		Project phase
20. Stormwater and groundwater management <ul style="list-style-type: none">Develop, implement and maintain stormwater and groundwater management plan to appropriately contain and manage discharges in accordance with <i>Environmental Guidelines for Major Construction Sites, EPA Publication 480, SEPP (Groundwaters of Victoria)</i>, and <i>SEPP (Waters of Victoria)</i>.		Construction
21. Contaminated material <ul style="list-style-type: none">Manage and dispose of any land-based contaminated material in accordance with the <i>Environment Protection Act 1970</i>, subordinate legislation and associated guidance and technical notes. This includes <i>Industrial Waste Management Policy (Waste Acid Sulfate Soils)</i>, and <i>SEPP (Prevention and Management of Contaminated Land)</i>		Construction
22. Aboriginal heritage <ul style="list-style-type: none">If a potential heritage or Aboriginal site is identified during construction activities, the process described in Annexure 6 of the EMP will be followed.Monitoring by relevant Aboriginal representatives during construction at the Rocky Point and Narrows PEL Beacon sites in accordance with the Cultural Heritage Management Plan.As far as practicable, and in accordance with the Cultural Heritage Management Plan, avoid excavation on the access track to the Narrows PEL Beacon site at Queenscliff. This will minimise the risk of causing impacts on any undiscovered Aboriginal archaeological sites.		Construction
Environmental limit		Monitoring program
Not applicable to this PDS		Not applicable to this PDS
Contingencies	Not applicable to this PDS	

Table 11: Dredging and plume PDS

Dredging and plume														
Objective	<p>To appropriately manage dredging activities and contaminated sediments.</p> <p>To minimise the area of seabed disturbed and appropriately manage the material removed.</p> <p>To protect assets, beneficial uses and values from long-term adverse effects due to dredging-related water quality effects.</p>													
Target	Conformance with all environmental limits and controls specified in this PDS.													
Application	<ul style="list-style-type: none"> ▪ All dredging activities in Yarra River, Williamstown Channel, Port Melbourne Channel, South Channel and Entrance. ▪ The disposal of dredged material at the PoM DMG and SE DMG. ▪ Use of Trailing Suction Hopper Dredge (TSHD), backhoe dredge, grab dredge and associated equipment. 													
Environmental controls				Project phase										
23. Sands and adjacent coast and beaches monitoring <ul style="list-style-type: none"> ▪ 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. ▪ 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. ▪ Current measurements to be undertaken in South Channel and inside the Entrance after completion of dredging. Measurements to be compared against SEES predictions. ▪ Sediment size analyses to be undertaken in conjunction with refined sediment transport numerical modelling post-construction. 				Pre-construction and post-construction										
24. Dredging <ul style="list-style-type: none"> ▪ 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: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td><td>Great Ship Channel / layby</td><td>South Channel (fairway / channel / Hovell Pile)</td><td>Port Melbourne and Williamstown Channels</td><td>Yarra River Channel</td></tr> <tr> <td>Design depth (m)</td><td>17.3 / 14.3</td><td>16.8 / 15.8 / 16.3</td><td>15.8</td><td>16.1 / 15.8 / 15.2</td></tr> </table>					Great Ship Channel / layby	South Channel (fairway / channel / Hovell Pile)	Port Melbourne and Williamstown Channels	Yarra River Channel	Design depth (m)	17.3 / 14.3	16.8 / 15.8 / 16.3	15.8	16.1 / 15.8 / 15.2	Construction
	Great Ship Channel / layby	South Channel (fairway / channel / Hovell Pile)	Port Melbourne and Williamstown Channels	Yarra River Channel										
Design depth (m)	17.3 / 14.3	16.8 / 15.8 / 16.3	15.8	16.1 / 15.8 / 15.2										

Dredging and plume

- Dredging must remain within the maximum total insitu volume, width constraints and construction depth constraints identified below:
 - Maximum total insitu volume to be dredged is 22.92 million m³ ± 15%, and
 - Maximum insitu volume to be dredged in the Entrance is 0.55 million m³ ± 15%, and
 - 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
 - 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
 - A minimum of 90% of the area to be dredged and within toe lines is to be within 1.8 m of the design depth (19.1 m total depth) as determined following completion of dredging (Entrance only), and
 - 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.
- Construction zone – construction zones have been identified to limit the footprint of dredging activities. Construction areas are identified in drawings listed below.
- 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). 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).
- Dredging equipment and associated support vessels will be required to manoeuvre outside construction areas, including transit between construction areas.
- Toe lines and construction zones are identified on:
 - Drawing 35328 – Channel Deepening Project – Port of Melbourne – Coastal Management Consent Scope of Works
 - Drawing 35329 – Channel Deepening Project – Port of Melbourne – South – Coastal Management Consent Scope of Works
 - Drawing 35330 – Channel Deepening Project – Port of Melbourne – North – Coastal Management Consent Scope of Works
 - Drawing 35331 – Channel Deepening Project – Port Phillip Entrance – South Channel – Coastal Management Consent Scope of Works
 - Drawing 35332 – Channel Deepening Project – Port Phillip Entrance – South

Dredging and plume																																		
<p>Channel – Coastal Management Consent Scope of Works</p> <ul style="list-style-type: none"> – Drawing 35333 – Channel Deepening Project – South Channel – West - Coastal Management Consent Scope of Works – Drawing 35334 – Channel Deepening Project – South Channel – East - Coastal Management Consent Scope of Works – Drawing CDP-ENV-50254 – Construction Areas – Heritage significance <p>(Drawings are included in Annexure 7)</p> <ul style="list-style-type: none"> ▪ Dredging to be undertaken in accordance with EMP Method Statement for Dredging works North – Contaminated (CDP_ALL_MS_408) ▪ Tracking of equipment activity as follows: <table border="1"> <thead> <tr> <th>Equipment</th><th>Time</th><th>Date</th><th>Coordinates</th><th>Other</th></tr> </thead> <tbody> <tr> <td>TSHD</td><td>✓</td><td>✓</td><td>Dredging – x,y,z of dragheads (northing, easting, depth to Chart Datum) Sailing and placement of dredged material – x,y (northing, easting)</td><td>Status of cycle (i.e. dredging, sailing, placement of dredged material)</td></tr> <tr> <td>Backhoe Dredge and Grab Dredge (contaminated material only)</td><td>✓</td><td>✓</td><td>x,y,z bucket (northing, easting, depth to Chart Datum)</td><td>Nil</td></tr> <tr> <td>Split hopper barges</td><td>✓</td><td>✓</td><td>x,y (northing, easting)</td><td>Nil</td></tr> <tr> <td>Spreader pontoon</td><td>✓</td><td>✓</td><td>x,y (northing, easting)</td><td>Nil</td></tr> <tr> <td>Diffuser pontoon</td><td>✓</td><td>✓</td><td>x,y,z of diffuser (northing, easting, depth to Chart Datum)</td><td>Nil</td></tr> </tbody> </table> <ul style="list-style-type: none"> ▪ Use of green valve at all times when using overflow. ▪ The overflow valve of the TSHD will be closed when sailing. 					Equipment	Time	Date	Coordinates	Other	TSHD	✓	✓	Dredging – x,y,z of dragheads (northing, easting, depth to Chart Datum) Sailing and placement of dredged material – x,y (northing, easting)	Status of cycle (i.e. dredging, sailing, placement of dredged material)	Backhoe Dredge and Grab Dredge (contaminated material only)	✓	✓	x,y,z bucket (northing, easting, depth to Chart Datum)	Nil	Split hopper barges	✓	✓	x,y (northing, easting)	Nil	Spreader pontoon	✓	✓	x,y (northing, easting)	Nil	Diffuser pontoon	✓	✓	x,y,z of diffuser (northing, easting, depth to Chart Datum)	Nil
Equipment	Time	Date	Coordinates	Other																														
TSHD	✓	✓	Dredging – x,y,z of dragheads (northing, easting, depth to Chart Datum) Sailing and placement of dredged material – x,y (northing, easting)	Status of cycle (i.e. dredging, sailing, placement of dredged material)																														
Backhoe Dredge and Grab Dredge (contaminated material only)	✓	✓	x,y,z bucket (northing, easting, depth to Chart Datum)	Nil																														
Split hopper barges	✓	✓	x,y (northing, easting)	Nil																														
Spreader pontoon	✓	✓	x,y (northing, easting)	Nil																														
Diffuser pontoon	✓	✓	x,y,z of diffuser (northing, easting, depth to Chart Datum)	Nil																														
<p>25. Management of pipeline between TSHD and spreader or diffuser pontoon during transfer of sediments</p> <ul style="list-style-type: none"> ▪ Pipeline will be lit at night. ▪ Support vessels will maintain a watch for non-project vessels. ▪ Pumping will cease if an unauthorised vessel encroaches within 100 m of the pipeline, or if the integrity of the pipeline is compromised. 				Construction																														
<p>26. Third party infrastructure</p> <ul style="list-style-type: none"> ▪ The process described in Annexure 6 will be followed for the management of sulfides, ammonium, TSS and turbidity in the Newport Power Station cooling water intake. 				Construction																														
<p>27. Dredging of unconsolidated contaminated sediment</p> <ul style="list-style-type: none"> ▪ Contaminated sediment exists in the Yarra River and Williamstown Channels and the southern section of the Port Melbourne Channel. Dredging of contaminated sediment to be conducted with the following equipment: <ul style="list-style-type: none"> – TSHD operating in non-overflow mode with a silt draghead. 				Construction																														

Dredging and plume	
<ul style="list-style-type: none"> – Grab dredge. – Backhoe dredge. 	
<p>28. Dredging of contaminated clays</p> <ul style="list-style-type: none"> ▪ Contaminated clays in the two locations within Appleton Dock and near Webb Dock (identified in Annexure 7, Drawing CDP-Env-50383), and batter walls will be dredged with the following equipment to design depth: <ul style="list-style-type: none"> – TSHD operating in non-overflow mode with a clay draghead. – Grab dredge. – Backhoe dredge. 	Construction
<p>29. Monitoring removal of contaminated sediments – TSHD</p> <ul style="list-style-type: none"> ▪ The following process is to be used to determine the transition from dredging contaminated to uncontaminated material within the Yarra River and Williamstown Channels. This process applies to the TSHD. <ol style="list-style-type: none"> 1. The thickness of the contaminated sediments will be determined based on: <ol style="list-style-type: none"> a. pre-dredge hydrographic survey b. estimated top of underlying uncontaminated clay, based on the combined interpretation of boreholes and seismic investigation. 2. Nominate the number of passes of the TSHD draghead required to dredge the full depth of unconsolidated contaminated sediments. This is to be based on the excavation thickness of a single pass of the TSHD draghead. Part passes will be rounded up to the nearest whole number. 3. Identify areas of similar depth that can be practicably dredged with the same number of passes. This means localised shallower or deeper pockets of contaminated sediment that are too small to practicably be dredged separately will be incorporated into adjoining areas. 4. Apply a grid over each area for comparison of nominated and completed draghead passes. The grid cell size will be determined based on draghead width and draghead position accuracy. 5. Record x,y,z coordinates of draghead tracks while dredging. 6. Calculate the number of draghead passes recorded in each grid cell within an area. 7. Dredging of underlying uncontaminated material will only commence when no fewer than the nominated number of dredging passes (minimum of 1 pass) has been recorded in each grid cell within an area. 	Construction

Dredging and plume		
30. Monitoring removal of contaminated sediments – backhoe and grab dredges <ul style="list-style-type: none"> ▪ The following process is to be used to determine the transition from dredging contaminated to uncontaminated material within the Yarra River and Williamstown Channels. This process applies to the backhoe/grab. <ol style="list-style-type: none"> 1. The thickness of the contaminated sediments will be determined based on: <ol style="list-style-type: none"> a. pre-dredge hydrographic survey b. estimated top of underlying uncontaminated clay, based on known maintained levels. 2. Apply a grid over the area for determination of area coverage. The grid cell size will be determined based on backhoe/grab width and position accuracy. 3. Remove full thickness of contaminated sediments to top of uncontaminated clay. 4. Record x,y,z coordinates of backhoe or grab. 5. Dredging of the underlying uncontaminated material will only commence when removal of contaminated sediment to the full thickness has been recorded in each grid cell within an area. 		Construction
Environmental limit		Monitoring program
Turbidity		Turbidity
Contingencies	Turbidity Contingency Plan	

Note: this PDS relates to EPBC Act / NES matters – refer to Annexure 8.

Table 12: Dredging schedule PDS

Dredging schedule	
Objective	To develop an appropriate dredging schedule, taking into account the seasonal sensitivities of Port Phillip Bay assets, beneficial uses and values.
Target	Conformance with all environmental controls specified in this PDS.
Application	All dredging activities in Yarra River, Williamstown Channel, Port Melbourne Channel, South Channel, Entrance.
Environmental controls	Project phase
31. Dredging schedule <ul style="list-style-type: none"> ▪ The initial dredging schedule to be submitted to DSE before implementation. ▪ Subsequent revisions of the dredging schedule and monthly updates will be submitted to DSE within 2 working days of approval by CDP management. 	Pre-construction
<ul style="list-style-type: none"> ▪ Dredging to take place as summarised in Table 16 'Dredging Summary'. ▪ Dredging schedule to include: <ul style="list-style-type: none"> – dredging technology – dredging configuration (i.e. number and location 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. ▪ Capping will be completed before 31 December 2009. 	Construction
32. Consideration of environmental limits <ul style="list-style-type: none"> ▪ Revisions to the dredging schedule will be assessed to confirm ability to comply with airborne noise and turbidity environmental limits. 	Construction
33. Consideration of seasonal sensitivities <ul style="list-style-type: none"> ▪ 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. ▪ 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. ▪ 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). ▪ dredging using the TSHD in Yarra River between 1 April and 30 July restricted to no more than two calendar months, or equivalent in days to protect Australian grayling larval drift. 	Construction

Dredging schedule	
<ul style="list-style-type: none">▪ In preparing the dredging schedule, consideration will be given to seasonal sensitivities and preferred seasons identified in Table 17 'Key Seasonal Sensitivities and Preferred Seasons'. The decision process, including how seasonal sensitivities were considered, will be documented.	
Environmental limit	Monitoring program
Not applicable to this PDS	Not applicable to this PDS
Contingencies	Not applicable to this PDS

Note: this PDS relates to EPBC Act / NES matters – refer to Annexure 8.

Table 13: Dredged material management PDS

Dredged material management		
Objective	<p>To manage and track the placement of dredged material.</p> <p>To dispose of and manage dredged material appropriately within the DMGs.</p> <p>To construct and manage the PoM DMG to the standard required for long-term containment of contaminated material.</p>	
Target	Conformance with all environmental controls specified in this PDS.	
Application	All dredged material placement and DMG management activities in the PoM DMG and SE DMG.	
Environmental controls		Project phase
<p>34. Dredged material placement</p> <ul style="list-style-type: none"> ▪ DMGs – all dredged material placement activities to take place within the specified DMGs (including associated construction areas) set out in: <ul style="list-style-type: none"> – Drawing CDP-ENV-50253 – Marine Based Construction Areas – North of bay – Drawing CDP-ENV-50254 – Marine Based Construction Areas – South of bay and Entrance. <p>(Drawings are included in Annexure 7)</p> <ul style="list-style-type: none"> ▪ Dredged material placement – All dredged material to be placed in accordance with Table 16 ‘Dredging Summary’. ▪ Dredged material placement including capping – to be undertaken in accordance with EMP Method Statement for material placement in PoM DMG (CDP_ALL_MS_410). ▪ Dredging and disposal locations to be recorded as per tracking of equipment table (refer to Table 11 – Dredging and plume PDS). ▪ Volumes are to be calculated from hydrographic survey data. ▪ 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. 		Construction
<p>35. PoM DMG – bund</p> <ul style="list-style-type: none"> ▪ Bunds to be constructed in accordance with design specifications (Drawings C001, C002 and C003). (Drawings are included in Annexure 7) ▪ Bunds to be constructed using: <ul style="list-style-type: none"> – consolidated sediments (clays) dredged from Port Melbourne Channel – uncontaminated clays dredged from Yarra River and Williamstown Channels (this is due to a deficit of clay from the Port Melbourne Channel) – sand from South Channel used for cleaning the TSHD hopper – contaminated clay from Appleton Dock, near Webb Dock and batter walls. 		Construction

Dredged material management	
<p>The contaminated clays will be covered with uncontaminated clays or by capping, effectively isolating the contaminated clay from the marine environment.</p> <ul style="list-style-type: none"> Once the main bund (Stage 1) is constructed, the remainder of consolidated sediments (clays) will be placed in the DMG extension (Stages 3 and 4). This clay will be used to construct bunds for future maintenance requirements in accordance with design specifications. 	
<p>36. PoM DMG – containment of contaminated material</p> <ul style="list-style-type: none"> 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 bundled DMG. Therefore, before the placement of the contaminated unconsolidated sediments the following information is required: <ul style="list-style-type: none"> Confirmation that the partially constructed bund has been constructed in accordance with design specifications. Confirmation of bund capacity and volume of contaminated unconsolidated sediments to be dredged. Daily during TSHD disposal (weather permitting) and weekly during barge disposal, hydrographic surveys required during placement of contaminated sediments to monitor depth contours and confirm DMG capacity and bund freeboard. 	Construction
<p>37. PoM DMG – capping</p> <ul style="list-style-type: none"> Prior to the placement of cap material the following is required. <ul style="list-style-type: none"> Confirmation by survey that bund has been constructed in accordance with design specifications. All contaminated material removed for all dredging management units as per Table 11 – Dredging and plume PDS. Construction of cap for PoM DMG. <ul style="list-style-type: none"> Cap material to be placed in accordance with design requirements (Refer to drawings C001, C002 and C003). Cap thickness to be confirmed by survey and/or physical testing prior to transfer to PoMC. Bottom water velocity will be measured adjacent to the PoM DMG at -15m CD. This and other data will be used to inform the placement of the capping layer around 140 days after completion of the hydraulic placement of contaminated sediment, in accordance with EMP Method Statement for material placement in PoM DMG (CDP_ALL_MS_410). 	Construction
<p>38. PoM DMG – maintenance and inspection</p> <ul style="list-style-type: none"> Maintenance and inspection procedures to be put in place for the long-term management of the PoM DMG and incorporated into PoMC operations 	Post-construction

Dredged material management	
<p>management system.</p> <ul style="list-style-type: none"> ▪ Inspections and corrective measures to be in accordance with design specifications (Drawing C003). ▪ Post-construction inspections of the bund should be undertaken in general accordance with the following intervals after completion of the construction of the bund. <ul style="list-style-type: none"> – 2 weeks. – 1 month. – 2 months. – 4 months. – 8 months. – 12 months. – At 12-monthly intervals for the first five years after completion. – At 24-monthly intervals thereafter. – Within 2 weeks of a storm event (a 1 in a 100 year event) or seismic event (greater than 4.5ML on the Richter Scale), subject to safety considerations due to weather. ▪ Post construction inspections of representative areas of the capping should be undertaken in general accordance with the following intervals after completion of the capping. <ul style="list-style-type: none"> – 1 month. – 4 months. – 12 months. – At 12-monthly intervals for the first five years after completion. – At 24-monthly intervals thereafter – Within 2 weeks of a storm event (a 1 in a 100 year event) or seismic event (greater than 4.5ML on the Richter Scale), subject to safety considerations due to weather. ▪ Undertake a marine pest survey of PoM DMG within 3 years of completion of project. 	
<p>39. SE DMG</p> <ul style="list-style-type: none"> ▪ Minimum 0.5 m sand material to be placed over Entrance rock material. ▪ Dredged material to be placed to maximum -15 m below Chart Datum. ▪ Once the dredged materials have been placed in DMG, survey to confirm materials have been placed in accordance with requirements prior to transfer to PoMC. 	Construction
Environmental limit	Monitoring program
Not applicable to this PDS	Not applicable to this PDS

Dredged material management	
Contingencies	Not applicable to this PDS

Note: this PDS relates to EPBC Act / NES matters – refer to Annexure 8.

Table 14: Entrance dredging PDS

Entrance dredging	
Objective	To appropriately manage the potential for rockfall in the canyon at Port Phillip Heads.
Target	Conformance with all environmental controls specified in this PDS.
Application	<p>All dredging activities in the Entrance, including use of the following equipment:</p> <ul style="list-style-type: none"> ▪ Trailing Suction Hopper Dredger. ▪ Stonefisher. ▪ Hydrohammer.
Environmental controls	Project phase
<p>40. Draghead design</p> <ul style="list-style-type: none"> ▪ 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. Experimental research program on reduction of spill</i> WL Delft Hydraulics, October 2006. ▪ An independent peer reviewer is to verify: <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. 	Pre-construction
<p>41. Dredging in the Entrance</p> <ul style="list-style-type: none"> ▪ All dredging to be conducted with the ripper draghead. ▪ 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). ▪ When dredging the canyon edge itself, dredging to be conducted from the canyon towards the plateau. 	Construction

Entrance dredging

42. Clean up in the Entrance

- All clean up activities to be conducted with the clean up draghead. This may be either the ripper draghead with the teeth shielded or else a separate draghead.
- 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.
- 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.

Quantity dredged (Q)	Hs predicted < 3m	Hs predicted > 3m
< 10,000 m ³	Continue dredging	Continue dredging
10,000 m ³ < Q < 24,000 m ³	Continue dredging	Clean-up for 8–18 hours depending on quantity dredged
~ 24,000 m ³	Clean-up for at least 18 hours	Clean-up for at least 18 hours

Note: Q= Quantity dredged, Hs = Significant wave height

- In addition to the programmed clean-up events, conduct other clean-up events:
 - 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)
 - once design profile has been achieved
 - in any areas identified at Management Review meetings (e.g. areas identified through towed video survey)
- 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.
 1. Apply a grid over the dredging area for comparison of draghead passes (dredging) and draghead passes (clean up)
 2. The x,y,z coordinates of the draghead tracks will be recorded during dredging and clean up.
 3. 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.

Construction

Entrance dredging			
<ul style="list-style-type: none">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:			
		Spatial extent of clean up	
		≥80%	<80%
Clean up time remaining	≤ 1 hour clean up remaining	No further clean-up required. Dredging may recommence when metocean conditions permit	Clean up is to resume when metocean conditions permit until the clean up requirements described above are achieved.
	>1 hour clean up remaining	Clean up is to resume when metocean conditions permit until the clean up requirements described above are achieved.	Clean up is to resume when metocean conditions permit until the clean up requirements described above are achieved.
43. North-west side of Nepean Bank			
<ul style="list-style-type: none">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)The north-west edge of Nepean Bank to be dredged last in the dredging schedule for Nepean Bank.			
44. Fish modelling			
<ul style="list-style-type: none">Modelling of dispersal of King George whiting larvae in the RL -22 m scenario. Report to be prepared summarising the modelling outcomes and comparison with the existing model.			
45. Pre-construction plateau inspection			
<ul style="list-style-type: none">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.			

Entrance dredging	
<p>46. Construction plateau inspection</p> <ul style="list-style-type: none"> ▪ 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. ▪ 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. 	Construction
<p>47. Post-construction plateau inspection</p> <ul style="list-style-type: none"> ▪ 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. 	Post-construction
<p>48. Pre and post-construction bathymetric survey</p> <ul style="list-style-type: none"> ▪ Bathymetric survey of the Entrance to be undertaken to identify bathymetric changes at following intervals: <ul style="list-style-type: none"> – Prior to commencement of dredging in the Entrance – 3, 6, 9, 12 months post-dredging – 2 years post-dredging – 4 years post-dredging – 10 years post-dredging – prior to programmed major maintenance dredging campaign (towed video survey also to be conducted at this time) ▪ 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 identifying 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. 	Pre-construction and Post-construction

Entrance dredging	
<p>49. Post-construction deep reef habitat – impact & recovery assessment</p> <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 vehicle to describe the nature and distribution of impacts on the deep reef habitats. Surveys will be along standardised isobaths ▪ Surveys 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. ▪ Locations will include areas at Rip Bank and Nepean Bank and within the Port Phillip Heads Marine National Park impacted by rockfall, plus control areas both within and remote from the general area of rockfall. ▪ Timing will be: <ul style="list-style-type: none"> – within 3 months following completion of dredging in the Entrance – approximately four and ten years after completion of dredging 	Post–construction
<p>50. Post-construction tide monitoring report</p> <ul style="list-style-type: none"> ▪ Collect tide gauge data at Queenscliff (296000N 5761900E), Hovell Pile (316325N 5755800E), West Channel Pile (303538N 5770405E), Williamstown (Breakwater Pier) (316790N 5807170E), 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 of the project. 	Post–construction
Environmental limit	Monitoring program
Not applicable to this PDS	Not applicable to this PDS
Contingencies	Not applicable to this PDS

Note: this PDS relates to EPBC Act / NES matters – refer to Annexure 8.

Table 15: Hydrohammer use and marine-based pile driving PDS

Hydrohammer use and marine-based pile driving	
Objective	To protect assets, beneficial uses and values from long-term or irreversible change due to underwater noise from use of the hydrohammer and marine-based pile driving during the CDP.
Target	Conformance with all environmental controls specified in this PDS.
Application	<ul style="list-style-type: none"> ▪ Use of the hydrohammer in the Entrance and/or South of the Bay. ▪ Marine-based pile driving in all Project Areas.
Environmental controls	Project phase
51. Minimise use of hydrohammer <ul style="list-style-type: none"> ▪ 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. 	Construction
52. Hours of operation <ul style="list-style-type: none"> ▪ 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). ▪ Hydrohammer only to be used Monday to Friday, excluding public holidays. 	Construction
53. Start procedure <ul style="list-style-type: none"> ▪ 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. 	Construction
54. Hydrohammer – noise assessment <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> – Underwater noise monitoring of the hydrohammer by marine biology acoustic specialist. – Hydrohammer operations only to continue for as long as necessary to obtain sufficient data to confirm 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. – 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. 	Initial use of the equipment

Hydrohammer use and marine-based pile driving	
<ul style="list-style-type: none"> – 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. 	
<p>55. Hydrohammer – cetaceans</p> <ul style="list-style-type: none"> ▪ 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). ▪ A minimum of 15 minutes of active cetacean spotting required before hydrohammer operations commence. ▪ Vessel master to confirm ‘all clear’ for cetaceans within a 600 m radius of the hydrohammer before the commencement of hydrohammer operations. ▪ Hydrohammer vessel master will advise other CDP vessels in the vicinity that hydrohammer operations are scheduled. Crews of these vessels will then also keep a watch for cetaceans before and during hydrohammer operations. <ul style="list-style-type: none"> – 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. ▪ Any break in hydrohammer operations that results in a break in observations will require the 15 minutes pre-startup observation to be redone before hydrohammer operations can resume. 	Construction
<p>56. Hydrohammer – no-dive zone</p> <ul style="list-style-type: none"> ▪ 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 of shore. 	Construction
<p>57. Marine-based pile driving – noise assessment</p> <ul style="list-style-type: none"> ▪ An initial check of marine-based pile driving equipment, confirming actual noise emissions against the modelling used to evaluate underwater noise impacts from the CDP will be undertaken as described in the Underwater Noise Monitoring Program (Annexure 5). 	Before use of the equipment

Hydrohammer use and marine-based pile driving		
58. Marine-based pile driving – cetaceans <ul style="list-style-type: none"> ▪ ‘All clear’ for cetaceans within a 300 m radius of the pile driving unit to be confirmed before the commencement of pile driving operations. ▪ Maintain a watch for cetaceans when operating in Williamstown Channel, North of bay and South of bay and berths. ▪ If a cetacean is spotted with 300 m of equipment, the following actions shall be taken: <ul style="list-style-type: none"> – Pile driving unit to suspend operations immediately. – If cetaceans are not seen to move beyond 300 m, operations cannot restart until no cetacean has been sighted for at least 15 minutes. – If cetaceans are seen to move beyond 300 m, operations can recommence immediately. 		Construction
Environmental limit		Monitoring program
Not applicable to this PDS		Underwater noise
Contingencies	Underwater Noise Contingency Plan	

Note: this PDS relates to EPBC Act / NES matters- refer to Annexure 8.

Table 16: Dredging summary

Project area	Dredging location	Indicative dredging technology	Indicative dredging volumes (in situ)*	Material description	Dredged material ground (DMG)	Management requirements	Disposal method
Yarra River and Hobsons Bay	Yarra River and Williamstown Channels	Jumbo TSHD (hopper capacity c. 22,000 – 35,000 m ³) or Mid-sized TSHD (hopper capacity c. 5,000 – 15,000 m ³) operating in non-overflow with a silt draghead or backhoe dredge, or grab dredge	1.67 million m ³	Soft silts that are potentially contaminated (unconsolidated contaminated sediments)	PoM DMG	Require bunding and capping.	Diffuser (for material dredged with TSHD) and directly from barge (for material dredged with backhoe dredge, or grab dredge).
		Mid-sized TSHD (hopper capacity c. 5,000 – 15,000 m ³) operating in non-overflow with a clay draghead or backhoe dredge, or grab dredge	0.40 million m ³	Contaminated clays	PoM DMG and extension	To be used in the core of the bund (including construction of future maintenance dredging bunds), or, within the DMG or the inside face of the capped side of the bund.	Directly from hopper or directly from barge (for material dredged with backhoe dredge, or grab dredge).
		Jumbo TSHD (hopper capacity c. 22,000 – 35,000 m ³) or Mid-sized TSHD (hopper capacity c. 5,000 – 15,000 m ³) backhoe dredge, or grab dredge	3.30 million m ³	Clays (consolidated sediments)	PoM DMG and extension	To be used for the construction of the bund (including construction of future maintenance dredging bunds).	Directly from hopper.
North of the Bay	Port Melbourne Channel	Jumbo TSHD (hopper capacity c. 22,000 – 35,000 m ³) or Mid-sized TSHD (hopper capacity c. 5,000 – 15,000 m ³) operating in non overflow with a silt draghead or backhoe dredge, or grab dredge	45,000 m ³	Soft silts that are potentially contaminated (unconsolidated contaminated sediments)	PoM DMG	Require bunding and capping.	Diffuser (for material dredged with TSHD) and directly from barge (for material dredged with backhoe dredge, or grab dredge).

Project area	Dredging location	Indicative dredging technology	Indicative dredging volumes (in situ)*	Material description	Dredged material ground (DMG)	Management requirements	Disposal method
		Jumbo TSHD (hopper capacity c. 22,000 – 35,000 m³) or Mid-sized TSHD (hopper capacity c. 5,000 – 15,000 m³)	2.36 million m³	Stiff to very stiff clays (consolidated sediments)	PoM DMG and extension	To be used for the construction of the bund.	Directly from hopper.
South of the Bay	South Channel	Jumbo TSHD (hopper capacity c. 22,000 – 35,000 m³) or Mid-sized TSHD (hopper capacity c. 5,000 – 15,000 m³)	14.59 million m³	Medium-fine silty sand with some clay and cemented sand at irregular locations	PoM DMG	Capping in PoM DMG.	Spreader (using raining technique).
						Cleaning hopper, to be used for the construction of the bund. Sand loads not to be contiguous.	Directly from hopper.
					SE DMG	Part of the sand will be used for capping of Entrance rock. Other material to be disposed of in SE DMG.	Directly from hopper.
The Entrance	The Entrance	Jumbo TSHD (hopper capacity c. 22,000 – 35,000 m³) with hydrohammer and stonefisher (if required)	0.55 million m³	Very weak rock	SE DMG	Cover with South Channel sand.	Directly from hopper.
			TOTAL 22.92 million m³				

Note – dredging volumes ± 15%

Table 17: Key seasonal sensitivities and preferred seasons

Project area	Key seasonal sensitivities	Preferred seasons
Yarra River and Hobsons Bay	Denitrification, algal blooms, seabirds, MPB, little penguins, fish (in particular anchovy and Australian grayling and mudfish), eels, commercial fishing, recreational fishing (the Warmies), yachting, boating, beach use.	Winter is ranked the most preferred season for dredging to occur. Autumn and summer are ranked as second and third preference respectively. Spring is considered least preferred in this project area primarily due to the Australian grayling.
North of the Bay	Denitrification, algal blooms, seabirds, MPB, seagrass, little penguins, dolphins, fish (in particular anchovy), commercial fishing, recreational fishing, swimming, boating, yachting, beach use.	Winter is ranked the most preferred season for dredging to occur in this project area. Autumn and spring are ranked as equally preferred, while summer is considered the least preferred season for dredging in the North of the Bay Project Area.
South of the Bay	Algal blooms, nutrient cycling, denitrification, seagrass, macroalgae, seaweed, MPB, seabirds, little penguins, dolphins, whales, fish, commercial fishing (including abalone), aquaculture, tourism, recreational fishing, swimming, boating, yachting, beach use.	Winter is ranked the most preferred season for dredging to occur in this project area. Autumn is ranked as second preference and spring as third preference. Summer is the least preferred season for dredging to occur in the project area.
The Entrance	Seabirds, little penguins, whales, fish, commercial fishing (including abalone), tourism, recreational diving, beach use.	Winter is ranked the most preferred season for dredging to occur in this project area. Autumn and spring are ranked as second and third preference respectively, while summer is considered the least preferred season for dredging the Entrance.

Annexure 5 Environmental Monitoring Programs and Contingency Plans

Summary

Table 18 contains a summary of the Environmental Monitoring Programs for the CDP including the rationale, procedure and indicator, monitoring location and frequency of monitoring for each program.

Table 19 contains a summary of the contingency plans for the CDP including their associated environmental monitoring program and PDS.

Airborne noise monitoring locations are identified in Figure 8 and Figure 9.

Indicative turbidity conformance monitoring locations are shown in Figure 12.

The underwater fixed noise monitoring location is shown in Figure 14.

Table 18: Summary of environmental monitoring programs

Program	Rationale	Procedure and indicator	Monitoring location	Frequency
Airborne noise	To comply with SEPP N-1 and to monitor conformance with airborne noise environmental limit.	An initial daytime compliance noise check and evening/night-time compliance noise check using the standard indicator for airborne noise measurement of 'A' weighted equivalent noise level measured in decibels: dB(A).	Yarra River and Hobsons Bay, South of bay.	Over the first three days of CDP activities in Yarra River and Hobsons Bay; and on occasions when identified high noise level equipment is to be used in the evening or night. If required, in response to a noise complaint.
Turbidity	To monitor conformance with turbidity environmental limit.	Turbidity monitoring using subsurface turbidity meters suspended from buoys. Turbidity measured in NTU.	Yarra River and Hobsons Bay, North of bay, South of bay.	During dredging activities and for the period after dredging has ceased that turbidity remains above background concentrations (likely to be in the order of weeks after completion of dredging).
Underwater noise	To confirm hydrohammer and marine-based pile driving unit underwater noise levels.	Fixed Site measurement of underwater noise variations during initial use of hydrohammer. Measured in dB re 1μPa RMS.	Entrance.	Initial use of hydrohammer.
		Noise level sampling at set distances from nominated equipment and at key asset locations during initial use of hydrohammer and marine-based pile driving unit. Measured in dB re 1μPa RMS.	Entrance and Project Area where marine-based piling first conducted.	Initial use of hydrohammer and marine-based pile driving unit.

Table 19: Summary of environmental monitoring program and associated contingency plan and PDS

Contingency plan	Associated environmental monitoring program	Associated Project Delivery Standard
Airborne Noise <ul style="list-style-type: none">– Main– New equipment	Airborne Noise	Construction management (all activities)
Turbidity	Turbidity	Dredging and plume
Underwater noise	Underwater noise	Hydrohammer use and marine-based pile driving

Airborne noise

Context

This environmental monitoring program relates to airborne noise resulting from CDP construction activities.

Environmental Monitoring Program

The main aspect of this environmental monitoring program is the use of the standard indicator for airborne noise measurement of 'A' weighted equivalent noise level (L_{aeq}) measured in decibels (dB) – as is used within *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1)*.

Airborne noise will be monitored:

1. As an initial daytime compliance noise check at key monitoring location(s) nearest to equipment/work activity over the first three days of CDP activities occurring in Yarra River and Hobsons Bay.
2. Where evening or night-time works involving equipment working in areas identified with the potential to exceed SEPP N-1 requirements is proposed, the day measurement will be compared to the evening or night limits. Evening/night works will not take place until potential SEPP N-1 exceedence has been evaluated from field measurements at conformance monitoring locations. An initial evening/night-time compliance noise check at the conformance monitoring location(s) will be undertaken to confirm SEPP N-1 evening and night-time compliance.

This is required for:

a. Yarra River and Hobsons Bay

- dredging with the grab or backhoe dredge and the TSHD when working closer to the key locations of Port Melbourne and Williamstown North
- pile driving activities associated with berth works and navigation aid works.

The five conformance monitoring locations adjacent to the Yarra River and Hobsons Bay are shown in Figure 8.

b. South of bay

- pile driving activities associated with navigation aid works
- TSHD when working closer to key locations of Queenscliff and McCrae/Dromana/ Rye.

The four conformance monitoring locations in the South of the Bay and at the Entrance are shown in Figure 9.

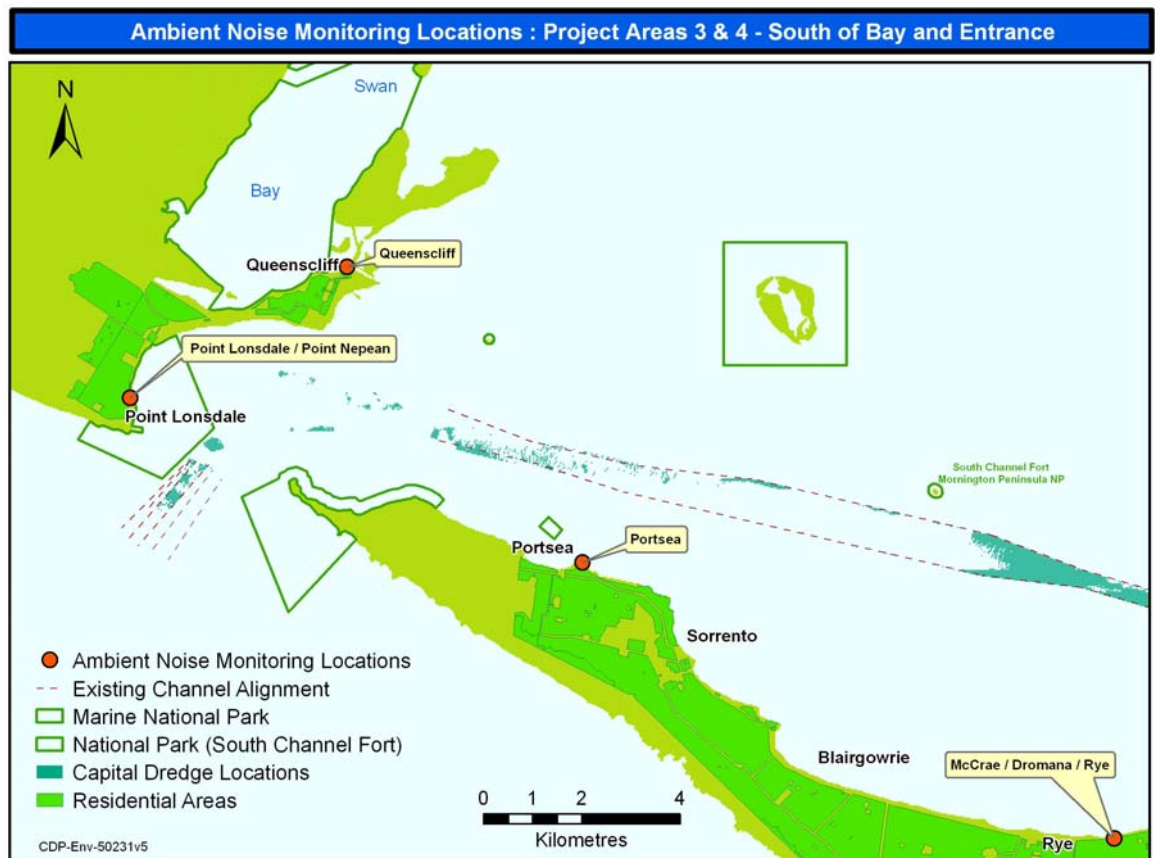
3. If required, in response to a noise complaint that has been received within a distance from dredging operations that audible levels of noise disturbance are possible.

Details of the monitoring program are included in the Airborne Noise Detailed Design (CDP_ENV_MD_026).

Figure 8: Airborne noise monitoring locations Yarra River and Hobsons Bay.



Figure 9: Airborne noise monitoring locations South of bay and Entrance



Environmental limit

The airborne noise environmental limit relates to the legislative requirements for noise under the State Environment Protection Policy (SEPP) N-1. The airborne noise environmental limit is based on calculated SEPP N-1 limits determined from sampled ambient noise levels at key locations (Table 20). Table 21 shows the SEPP N-1 time period classification, to which different limit levels apply.

Table 20: SEPP N-1 noise limits for key locations of noise sensitive areas close to the CDP

Key location/region	Diameter circle (m)	Approximate(1) area zoned type (%)			Calculated SEPP N-1 noise limit dB(A)		
		1 Residential	2 Commercial or mixed	3 Industrial	Day	Evening	Night
(A) Docklands	140		100		63	57	56
	400		100				
(B) Footscray/Yarraville	140	50	50		60	53	50
	400	50	50				
I Port Melbourne	140	100			53	48	40
	400	100					
(D) Williamstown North	140	100			57	52	39
	400	100					
(E) Williamstown South	140	100			50	44	40
	400	100					
(F) Queenscliff	140	100			50	44	39
	400	100					
(G) Portsea	140	100			50	44	41
	400	100					
(H) McCrae/Dromana/Rye	140	100			52	44	39
	400	100					
(I) Point Lonsdale	140	100			50	44	45
	400	100					

Note: Zoning is calculated on approximate worst case residential location. The zoning is based on the land zoning in accordance with SEPP N-1 and associated documentation.

Table 21: SEPP N-1 time period classifications

SEPP N-1 time period classification	
Day	7am to 6pm weekdays 7am to 1pm Saturdays
Evening	6pm to 10pm weekdays 1pm to 6pm Saturdays 7am to 6pm Sundays 7am to 6pm public holidays
Night	10pm to 7am weekdays 6pm to 7am weekends 6pm to 7am public holidays

Response level

Two events that will trigger contingency actions to appropriately manage airborne noise emissions of the CDP are defined by either:

- airborne noise measurement at a key monitoring location (during the Day time period) preceding the more stringent evening and night- time periods (if evening or night-time work planned), is evaluated as likely to exceed SEPP N-1 Evening or Night time period limits unless management contingencies are taken; or
- a noise complaint has been received from an area represented by a key monitoring location within a distance from CDP activities that audible levels of noise disturbance are possible.

Airborne Noise Contingency Plan

This Airborne Noise Contingency Plan relates to a potential or actual exceedence of the noise environmental limit from project activities. Refer to Figure 10 and Figure 11 for contingency flowchart. Management actions are provided in Table 22.

Noise complaints will be managed via the complaint response process described in Annexure 6.

For significant project changes refer to CDP IMS Change Management Procedure (CDP_IMS_PR_007).

Management actions

Table 22: Management actions – airborne noise

Management actions
<p>Management actions if activity does not meet/not likely to meet SEPP N-1:</p> <p>If noise monitoring results and/or assessment of model predict SEPP N-1 limits have been exceeded or may be exceeded unless appropriate management action is taken, then the following options for action may be taken.</p> <ul style="list-style-type: none"> ▪ Rescheduling high noise equipment to operate for daytime works only, or control locations of evening or night-time use to greater distances from key locations sensitive to noise. ▪ Evaluate ways to reduce equipment noise emissions if required e.g. decreasing operating energy, installing additional acoustic dampening covers and mufflers etc.
<p>New vessel or equipment management actions:</p> <p>Where the assessment of vessels or equipment indicates it may not conform to SEPP N-1, appropriate action to be taken. Management options include:</p> <ul style="list-style-type: none"> ▪ Selection of alternative vessel/equipment. ▪ Modification to vessel/equipment. ▪ Restrictions on use of vessel/equipment.

Figure 10: Airborne noise – existing equipment contingency flowchart

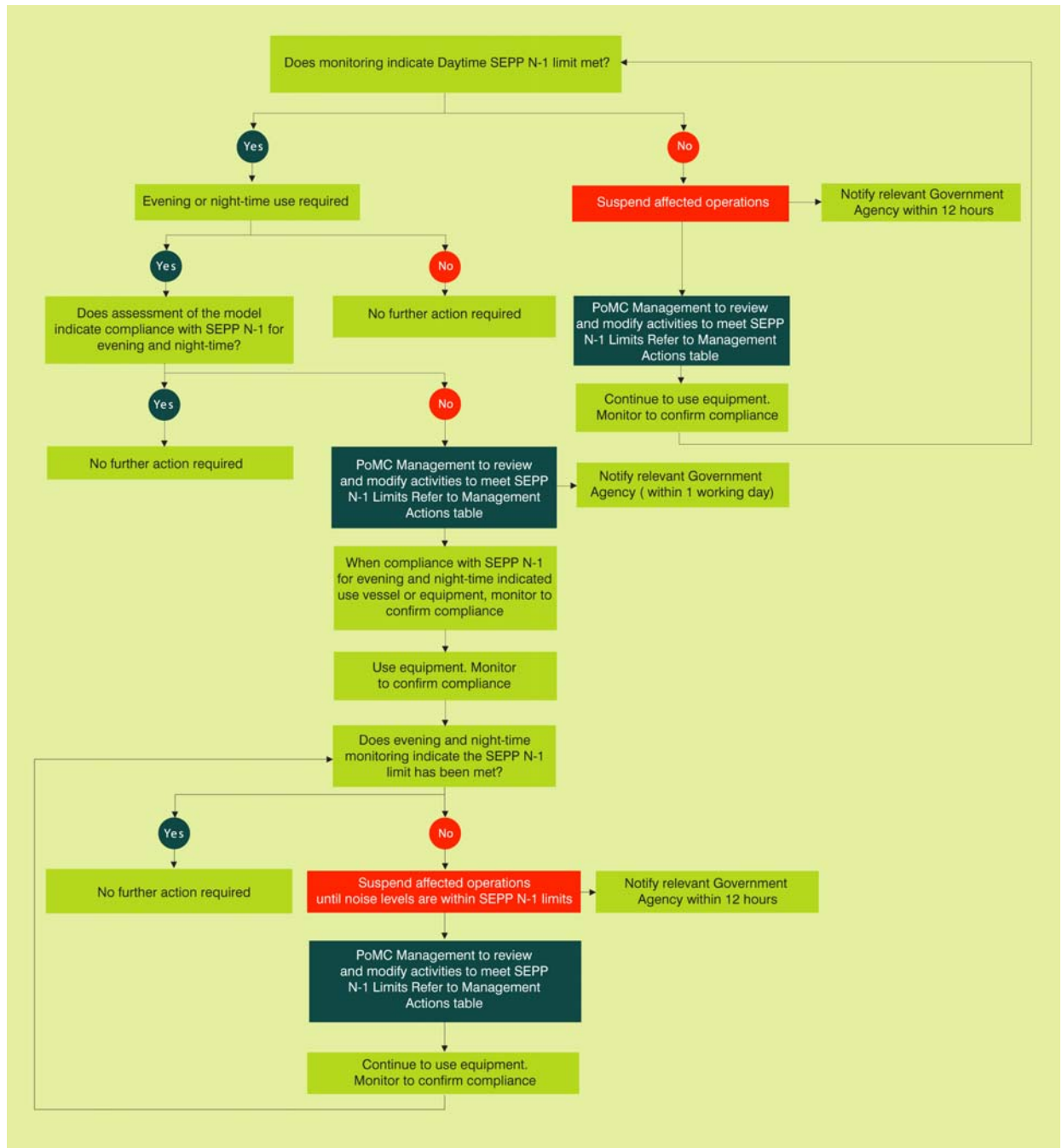
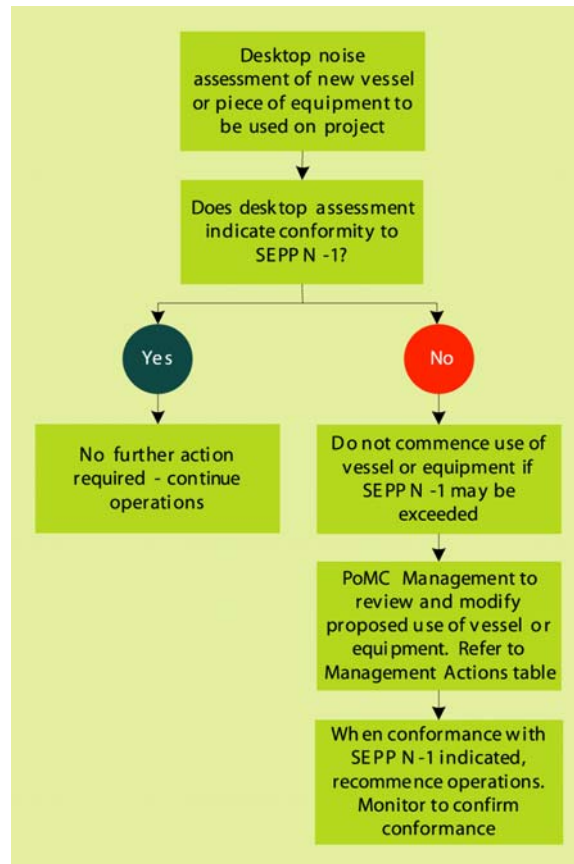


Figure 11: Airborne noise – new equipment contingency flowchart



Turbidity

Context

The turbidity environmental limit relates to the increased suspended sediments resulting from dredging and dredged material placement.

Environmental monitoring program

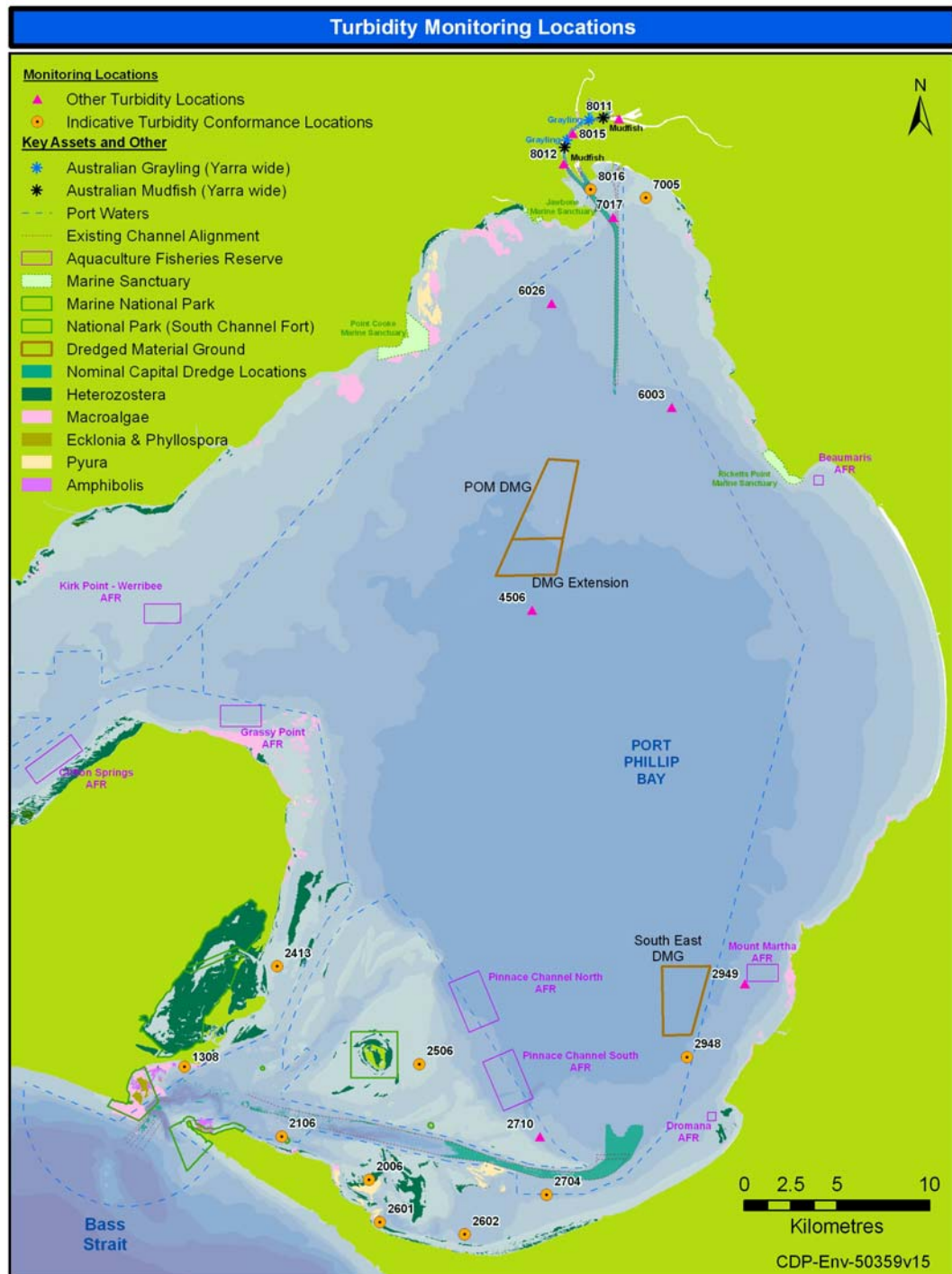
The main aspects of the turbidity monitoring program are:

- continuous monitoring of turbidity at conformance locations
- monitoring during dredging activities and for the period after dredging has ceased that turbidity remains above background concentrations (likely to be in the order of weeks after completion of dredging)
- monitoring of turbidity at key sites between assets and dredge operations to provide additional data on the turbidity plume
- monitoring of major inputs of turbidity not related to the project (e.g. upstream of the project in the Yarra River).

Consequently, fixed site (subsurface) turbidity loggers (attached to buoys or structures such as pylons) will be located at conformance locations and additional sites during relevant dredging and disposal operations.

Indicative monitoring locations are illustrated in Figure 12.

Figure 12: Indicative turbidity monitoring locations



Environmental limit

The turbidity environmental limit adopts an asset-based approach and as such, the environmental limit is dependent on the tolerances of the most sensitive asset at each conformance location. The environmental limit is based on water column turbidity as measured by continuous loggers (attached to buoys or structures such as pylons). Conformance locations and associated environmental limits are provided in Table 23.

Table 23: Conformance locations for turbidity and associated environmental limits

Conformance location	Assets represented					Environmental limit
	Migratory Fish– Australian grayling, mudfish ¹	Fish ²	Benthic Invertebrates ³	Seabirds ⁴	Seagrass ⁵	
Project Area: Yarra River and Hobsons Bay						
7005 Hobsons Bay mud		✓				70 NTU ⁶
8016 Mouth of Yarra River (conformance location only applicable 15 October to 30 November)*	✓					25 NTU ⁶ above background during spring to a maximum of 45 NTU ⁶ including background. Limit applicable 15 October to 30 November only*
Project Area: South of the Bay						
2006 Sorrento Bank		✓	✓		✓	15 NTU not to be exceeded as a 2 week moving average, and 25 NTU ⁶ not to be exceeded as a 6 hourly average
2106 Portsea Hole D		✓	✓			35 NTU ⁶
2413 Swan Bay – Coles Channel*					✓	15 NTU not to be exceeded as a 2 week moving average, and 25 NTU ⁶ not to be exceeded as a 6 hourly average
2506 Mud Islands East C*		✓	✓		✓	15 NTU not to be exceeded as a 2 week moving average, and 25 NTU ⁶ not to be exceeded as a 6 hourly average

Conformance location	Assets represented					Environmental limit
	Migratory Fish– Australian grayling, mudfish ¹	Fish ²	Benthic Invertebrates ³	Seabirds ⁴	Seagrass ⁵	
2601 Camerons Bight					✓	15 NTU not to be exceeded as a 2 week moving average, and 25 NTU ⁶ not to be exceeded as a 6 hourly average
2602 Rye Jetty				✓	✓	15 NTU not to be exceeded as a 2 week moving average, and 17 NTU ⁶ not to be exceeded as a 6 hourly average
2704 Capel Sound			✓			35 NTU ⁶
2948 South of SE DMG				✓		17 NTU ⁶
1308 Lonsdale Bight					✓	15 NTU not to be exceeded as a 2 week moving average, and 25 NTU ⁶ not to be exceeded as a 6 hourly average

** relates to EPBC Act / NES- refer to Annexure 8*

1 Similar species to the listed freshwater fish in the Yarra River have been shown to avoid conditions where turbidity is 25 NTU above background.

2 Suspended sediment concentrations of greater than approximately 100 mg/L have been shown to increase fish egg hatching times, reduce hatching success and decrease larval fish survival.

3 Based on the tolerance of Pyura stolonifera (sea squirt) of 50 mg/L for more than 8 hours.

4 25 mg/L based on observations of cormorants.

5 To achieve at least 15% surface irradiance at 3m depth for at least 50% of the time over a moving 2 week period (note this involves two limits over two different timeframes).

6 To be expressed as an exponentially weighted moving average.

Data from the turbidity loggers will be relayed via telemetry to a secure server at PoMC project offices. The data will be analysed automatically and displayed graphically as an exponential weighted moving average (EWMA) in real time. Conformance with the turbidity environmental limit and trends in turbidity will be able to be seen on the graph.

The results will be reviewed daily in addition to automatic notifications set in the system.

Response levels

Numerical response levels are specified in the Turbidity detailed design (CDP_ENV_MD_024).

Response Level 1 results in the instigation of additional monitoring and collection of external data (e.g. wind, rainfall) to assist in the prediction of the plume. Management actions will also be taken where appropriate.

Response Level 2 results in management actions to reduce the intensity and/or extent of the turbid plume.

Turbidity Contingency Plan

Refer to Figure 13 for contingency flowchart. Management actions are provided in Table 24.

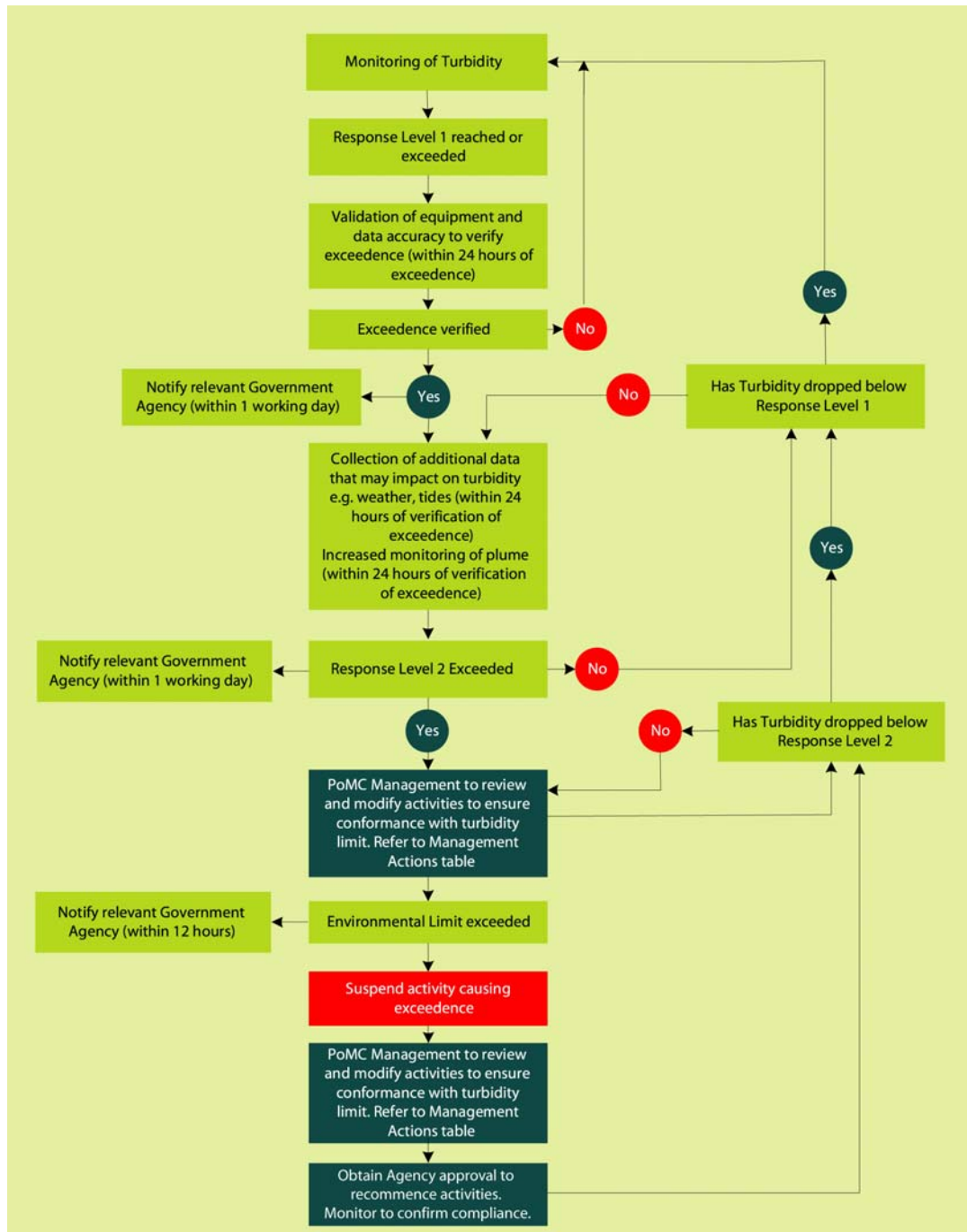
For significant Project changes refer to CDP IMS Change Management Procedure (CDP_IMS_PR_007).

Management Actions

Table 24: Management actions – turbidity

Management actions
<p>If there is an exceedence of Response Level 1, appropriate management actions will be taken. Potential options for action include:</p> <ul style="list-style-type: none">▪ review of the forecast for the location and intensity of the plume and expected turbidity levels to inform management actions
<p>If there is an exceedence of Response Level 2, appropriate management actions will be taken. Potential options for action include:</p> <ul style="list-style-type: none">▪ suspending dredging in the area impacted for a period of time▪ relocation of the dredge (within the same project area or to a different project area)▪ interval dredging▪ operate in non-overflow mode, or combination of overflow and non-overflow modes.
<p>If there is an exceedence of a limit, any relocation of the dredge within either the same or different project area must not prolong or exacerbate the exceedence.</p>

Figure 13: Turbidity contingency flowchart



Underwater noise

Context

This monitoring program relates to the creation of underwater noise resulting from the use of:

- the hydrohammer (with possible use in the Entrance)
- marine-based pile driving equipment (with planned use in Project Areas: Yarra River and Hobsons Bay; North of bay; and South of bay).

Monitoring program

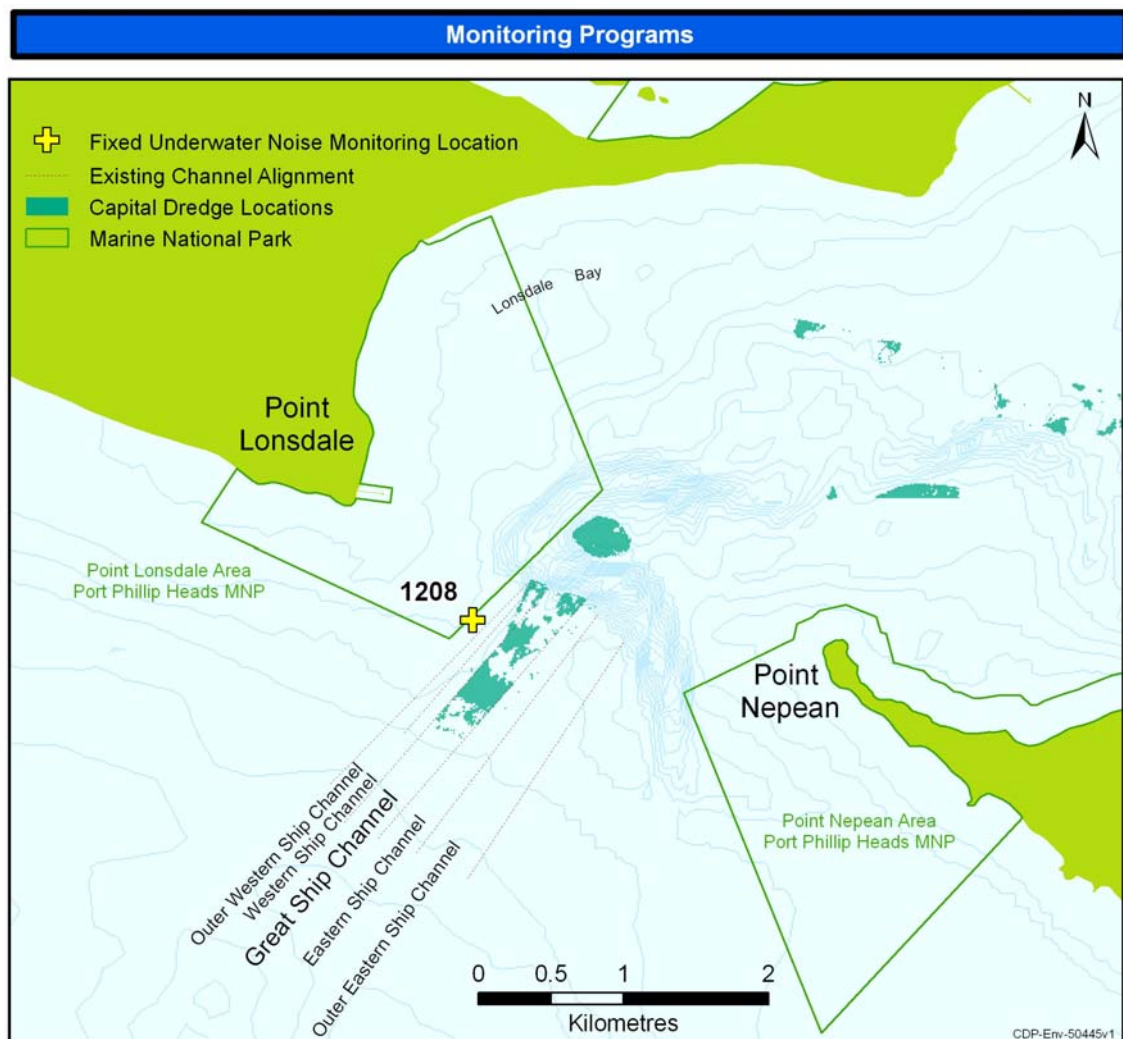
This monitoring program is relevant during the initial use of equipment. The main aspects of this monitoring program are:

- fixed site, continuous measurement of underwater noise variations during initial period of hydrohammer and operation within the Entrance (i.e. collecting data on ambient and hydrohammer related noise).
- noise level sampling from hydrohammer and marine-based pile driving unit with a hydrophone array at set depth and distances from target equipment and at key asset locations.

Fixed site monitoring locations are illustrated in Figure 14.

Details of the monitoring program are included in the Underwater Noise Detailed Design (CDP_ENV_MD_027).

Figure 14: Underwater noise monitoring location



Response level

A response level is defined here as a trigger to undertake appropriate contingency actions if measured underwater noise levels differ (more or less) from those expected (as described in Curtin University for Marine Science and Technology (2006b)).

The response level used to trigger contingency actions to manage underwater noise emissions of the CDP is defined by:

- the measured underwater noise emissions generated from targeted equipment within a work location is significantly different from that modelled (i.e. greater in overall sound level and/or greater in sound level within the receptive frequency ranges of sensitive species).

Underwater Noise Contingency Plan

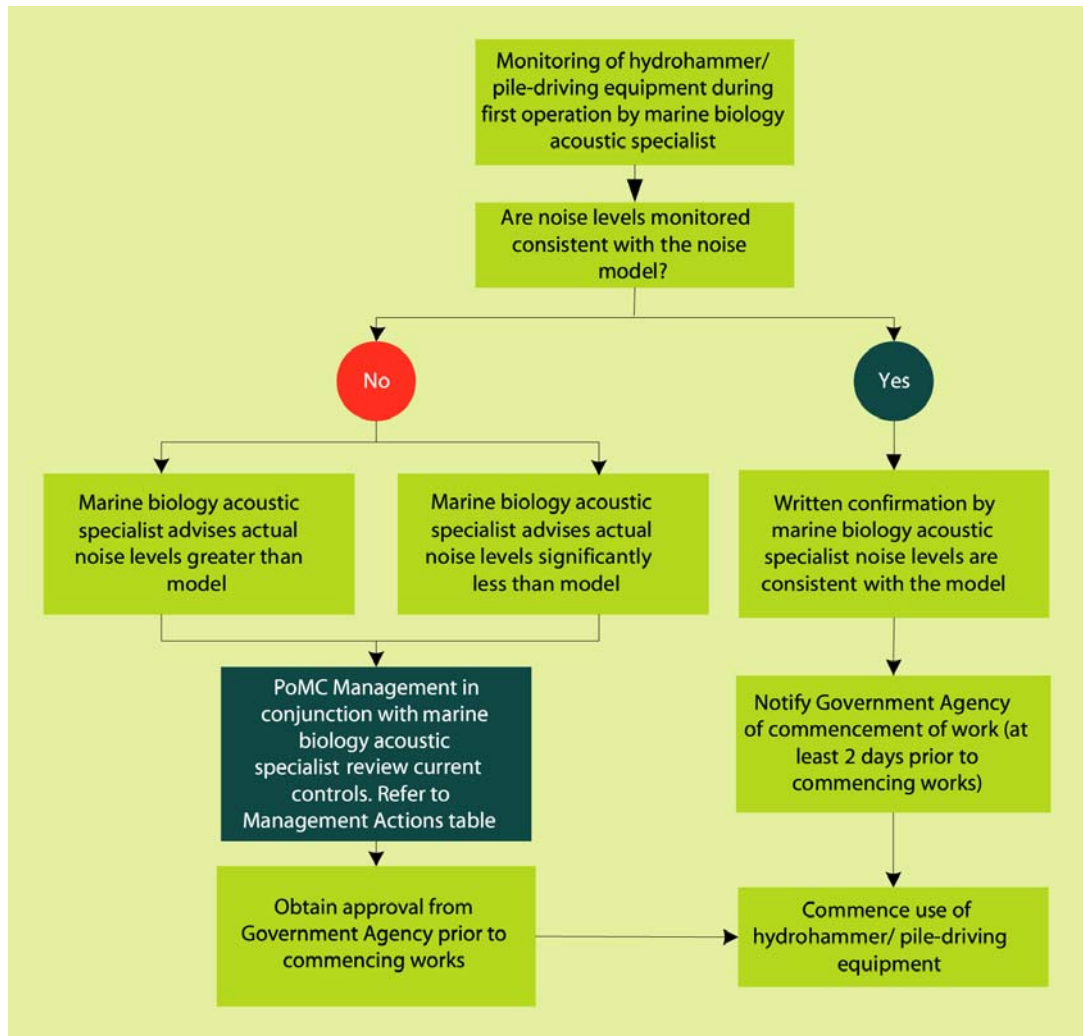
Refer to Figure 15 for contingency flowchart. For significant project changes refer to CDP IMS Change Management Procedure CDP_IMS_PR_007. Management actions are provided in Table 25.

Management actions

Table 25: Management actions – underwater noise

Management actions
<p>If it is identified that the noise monitoring results are significantly different to the underwater noise model, then appropriate management action will be taken. Potential options for action include:</p> <ul style="list-style-type: none">▪ refining 'safe zones' for divers, swimmers, cetaceans. This may result in a revision of distances identified in EMP Standards 55, 56 and/or 58▪ shorten work periods of equipment (create 'lull' noise periods)▪ reduce 'blow rate' and/or energy per blow of hydrohammer/pile driver▪ reschedule high noise emission equipment to operate at times less disruptive to migration of key species▪ undertake additional field measurements at key asset locations (including boundary of 'no-dive zone')▪ review requirement for use of the hydrohammer and/or pile driver and ensure that its use is minimised.

Figure 15: Underwater noise contingency flowchart



Note: Government Agency includes the relevant Victorian and Commonwealth regulatory agencies identified in Table 6 as requiring notification that the underwater noise response level has been reached.

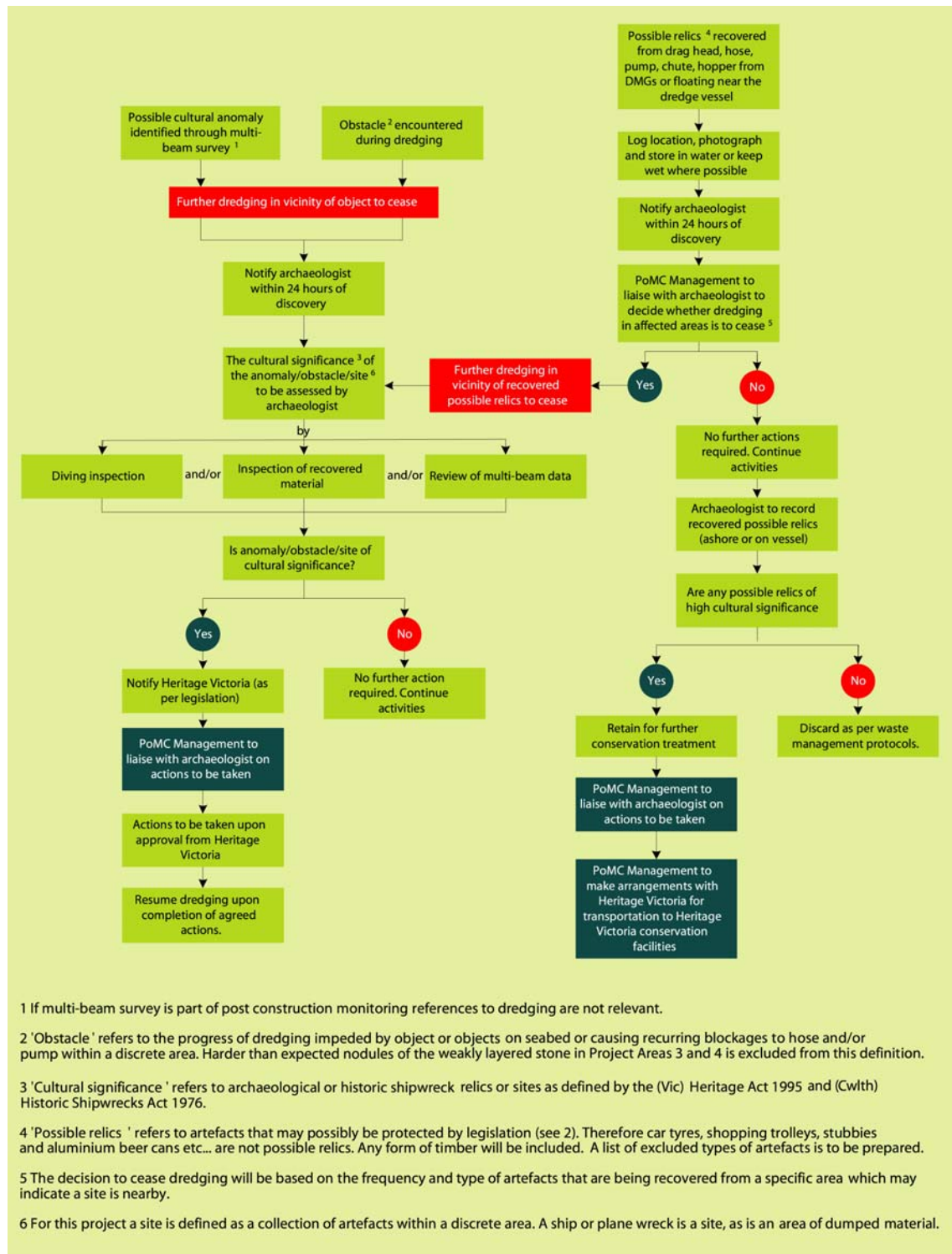
Annexure 6 Response Processes

Heritage (marine-based) response process

This Heritage (marine-based) response process relates to the potential for previously unidentified heritage items or sites to be identified during the CDP.

Refer to Figure 16 for response process flowchart.

Figure 16: Heritage (marine-based) response process flowchart

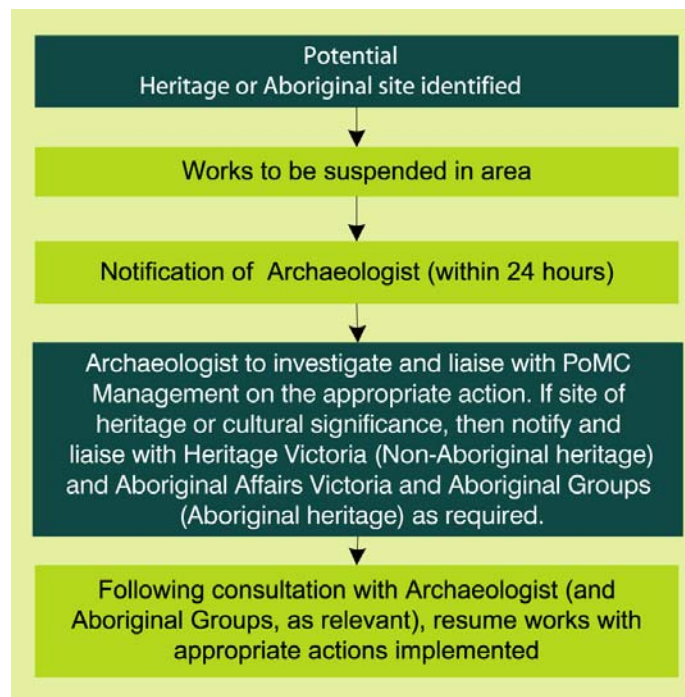


Heritage (land-based) response process

During the berth upgrade, navigational aids works and other land-based activities there is the potential for previously unidentified heritage and/or Aboriginal items or sites to be identified (e.g. through native vegetation clearance or through excavation).

Refer to Figure 17 for response process flowchart.

Figure 17: Heritage (land-based) response process flowchart



Newport Power Station response process

Operation of the TSHD in the Yarra River may affect the cooling water intake and operations of the Newport Power Station. Sulfides, ammonium and total suspended solids (TSS) have been identified as parameters that are important to the Newport Power Station cooling water processes.

In addition to the general description of response processes relating to the Power Station referred to below, it is noted that PoMC has entered into a detailed agreement with Ecogen Energy Pty Ltd, the owner/operator of the Power Station. This agreement is separate from the EMP.

Refer to Figure 18 for the response process flowchart. Control levels are based on operational requirements at the Newport Power Station (refer to Table 27).

If any of the control levels are exceeded for Newport Power Station, Newport Power Station will be notified and the need for additional monitoring, surveillance and modifications to dredging operations to lower parameters below the control levels determined. Refer to Table 26 for management actions.

Table 26: Management actions – Newport Power Station

Management actions
<p>If there is an exceedence of the control level, appropriate management actions will be taken. Potential options for action include:</p> <ul style="list-style-type: none"> ▪ investigation to determine if related to dredging (within 24 hours) ▪ suspending dredging in the area affecting Newport Power Station for a period of time ▪ relocation of the dredger to another area ▪ reduced overflow rate (i.e. intermittent use of overflow and non-overflow dredging) ▪ interval dredging (movement of the TSHD between project areas on a more frequent basis) ▪ modify dredging in the Yarra River for a period of time ▪ modifications to inspection, maintenance and operation of Newport Power Station cooling water system.

Table 27: Newport Power Station water intake control levels

Parameter	Newport Power Station water intake control levels
Sulfides	0.01 mg/L (no more than one exceedence on a 7-day rolling basis)
Ammonium	5 mg/L (no more than one exceedence on a 7-day rolling basis)
TSS (mg/L)	No more than 5 mg/L of solids greater than 100 µm during power station operation.
Turbidity (NTU)	No control level. Monitoring only.

Fixed site continuous monitoring of the cooling water intake for the power station will be undertaken while there are TSHD dredging operations in the Yarra River.

The Newport Power Station cooling water intake monitoring location is illustrated in Figure 19.

Figure 18: Newport Power Station contingency flowchart

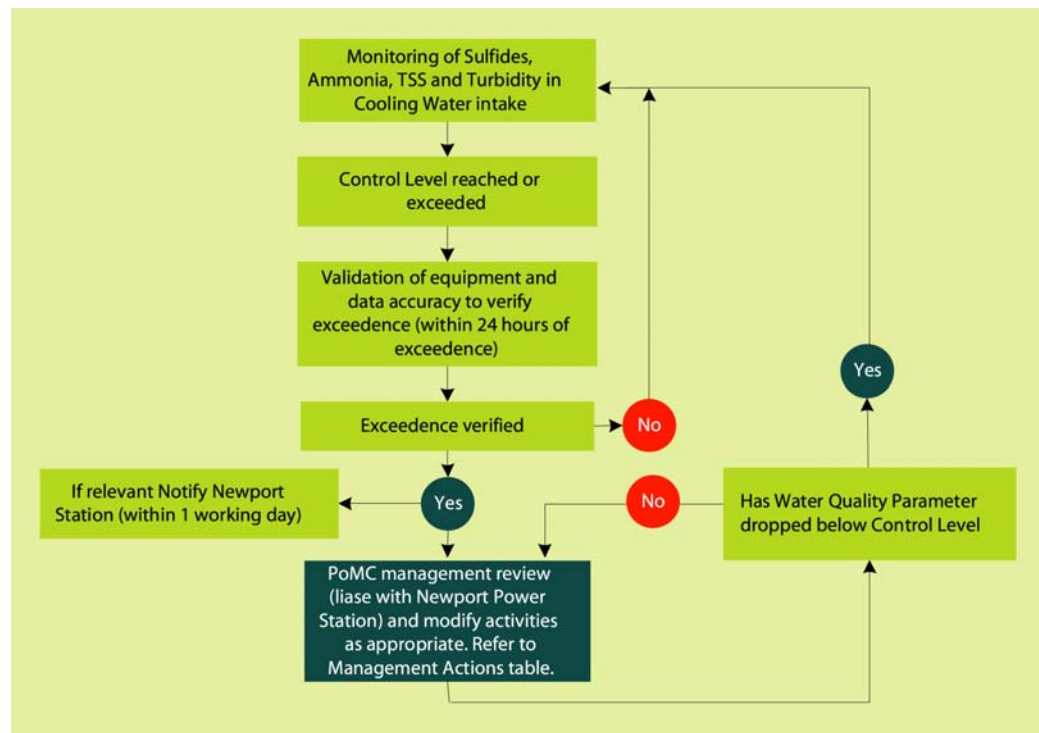
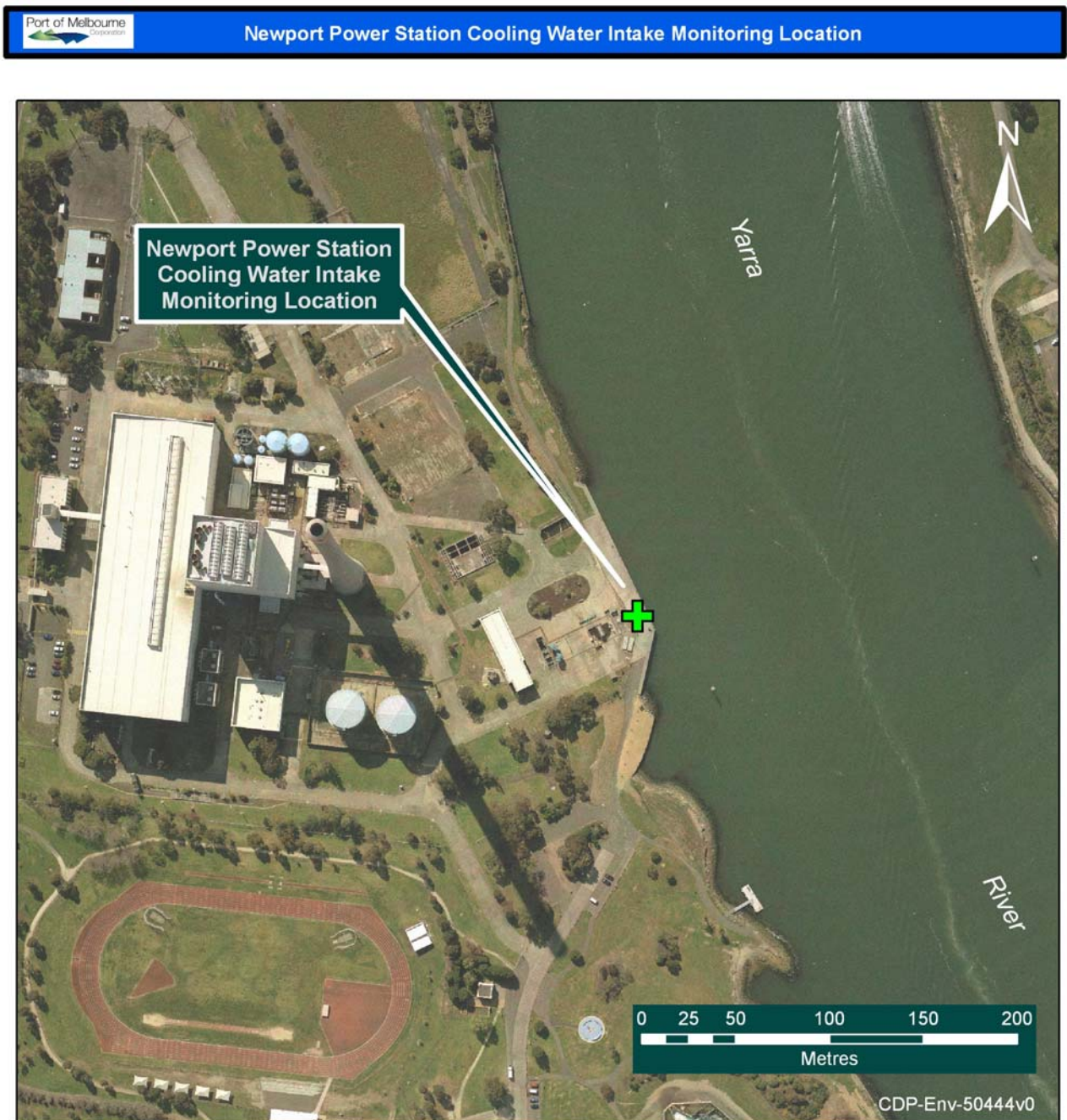


Figure 19: Newport Power Station cooling water intake monitoring locations



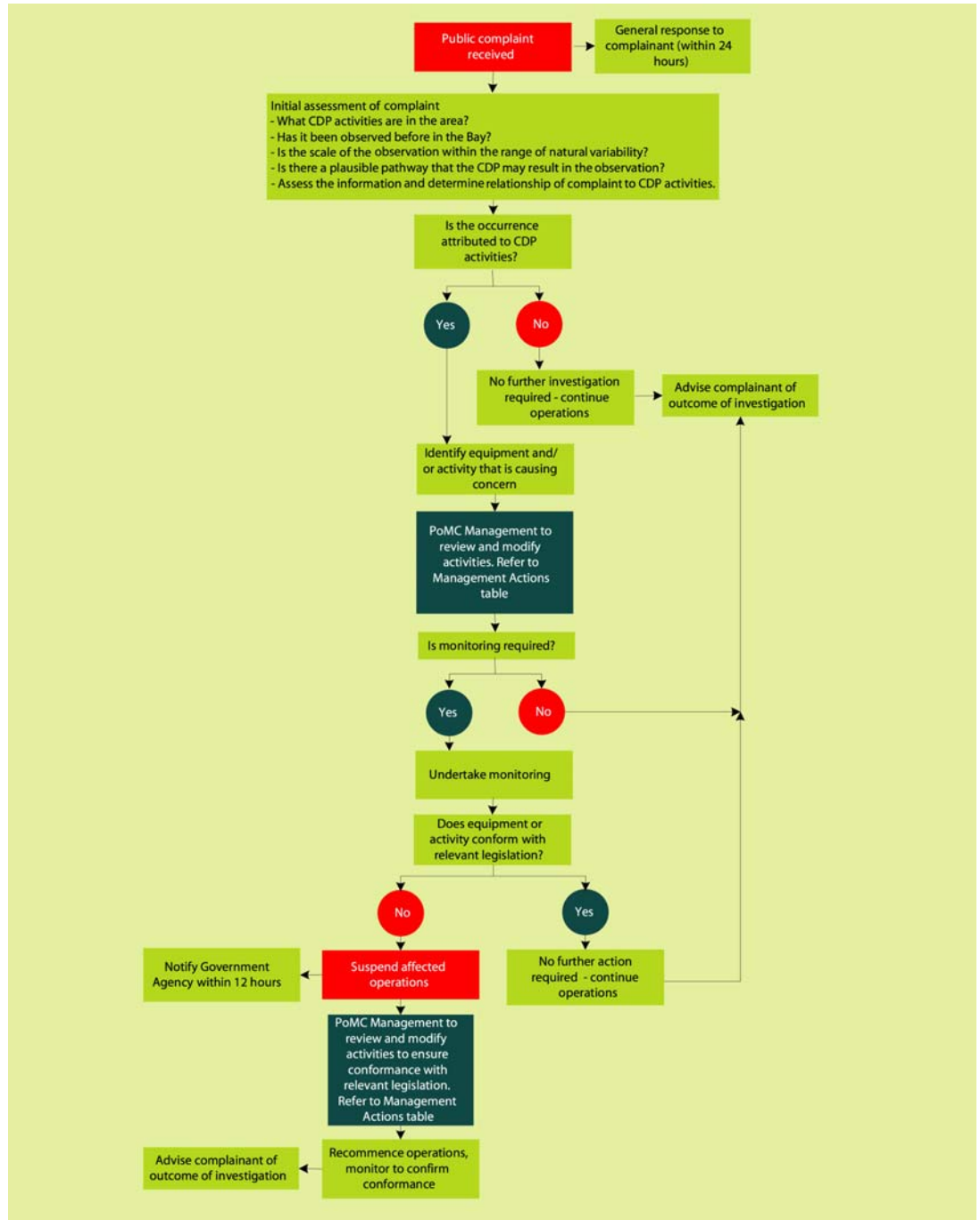
Complaints response process

Refer to Figure 20 for complaints response process flowchart and Table 28 for management actions.

Table 28: Management actions – complaints response

Management actions
<p>Management actions if a complaint is received:</p> <p>If a complaint is received, a general response will be given to the complainant within 24 hours. The timeframe for a response to a complaint (aside from the initial response) is dependent on the nature of the complaint and the scale of investigation (if required). It is expected that there will be management action within 24 hours of the initial assessment of the complaint. The follow options for action may be taken:</p> <ul style="list-style-type: none"> ▪ If the complaint is a single event then no monitoring may be required if cause cannot be determined. ▪ If there are a number of complaints relating to same the issue then monitoring will be considered as part of the investigation. <p>Where the assessment of vessels, equipment or activity indicates that it may not conform to relevant legislation, appropriate action to be taken. Management options include:</p> <ul style="list-style-type: none"> ▪ Selection of alternative vessel/equipment. ▪ Modification to vessel/equipment. ▪ Restrictions on use of vessel/equipment. ▪ Other actions as deemed appropriate.

Figure 20: Complaints response process flowchart



Management review process

Refer to Figure 21 for the management review process flowchart, and Table 29 for Management Actions.

The scope of each management review will be determined based on project schedule and requirements and environmental performance.

Figure 21: Management review process

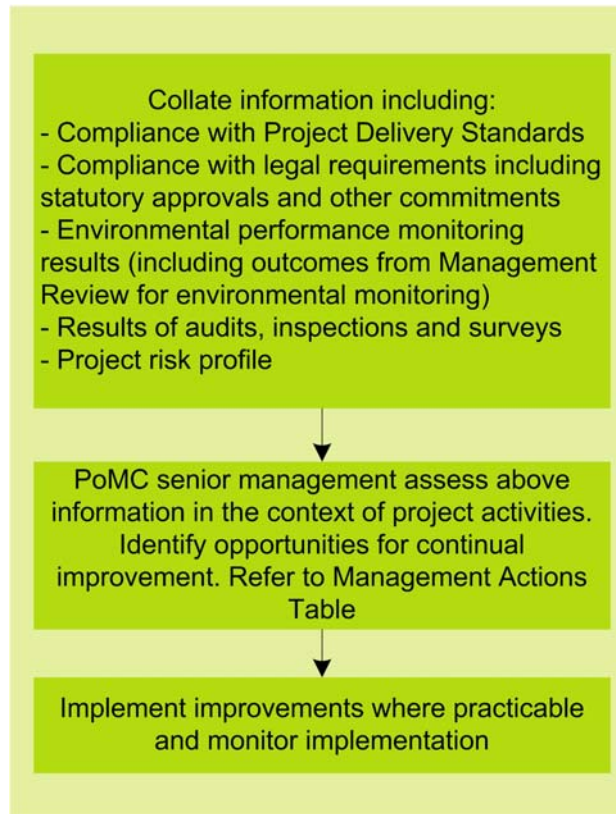


Table 29: Management actions – management review

Management actions
<p>Where an opportunity for continual improvement has been identified as part of the management review process, the following actions may be considered:</p> <ul style="list-style-type: none">▪ Development of new procedures.▪ Modification of existing procedures.▪ Modification to project schedule.▪ Modification to communications strategy.▪ Modification to training schedule and/or programs.▪ Modifications to internal audit schedule.▪ Review of risk register.▪ Seek input from relevant specialists.▪ Consideration of further investigations▪ Requirement for additional or alternate capping material for PoM DMG.

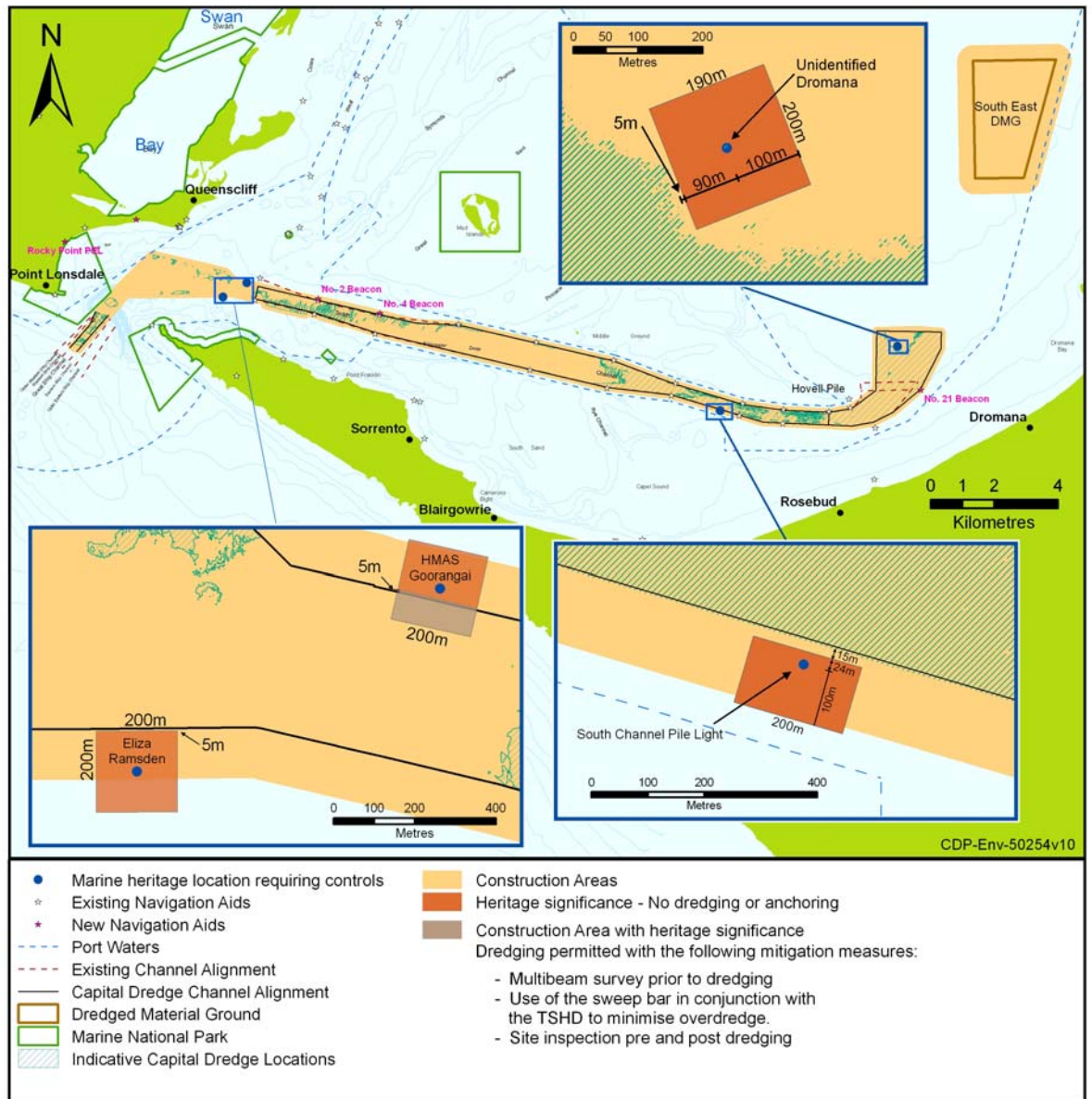
Annexure 7 Drawings

CDP-Env-50228	CDP Project Areas
CDP-Env-50254	Construction Areas – Heritage significance
CDP-Env-50383	Location of contaminated clays within Appleton Dock and near Webb Dock
C001	Port of Melbourne DMG Location Plan
C002	Port of Melbourne DMG Main Bund and Stub Wall construction sequence
C003	Port of Melbourne DMG Typical anticipated bund cross sections and bund and cap monitoring and maintenance requirements
CDP-Env-50439	Nepean Bank ridge
Drawing 35328	Channel Deepening Project – Port of Melbourne – Coastal Management Consent Scope of Works
Drawing 35329	Channel Deepening Project – Port of Melbourne – South – Coastal Management Consent Scope of Works
Drawing 35330	Channel Deepening Project – Port of Melbourne – North – Coastal Management Consent Scope of Works
Drawing 35331	Channel Deepening Project – Port Phillip Entrance – South Channel – Coastal Management Consent Scope of Works
Drawing 35332	Channel Deepening Project – Port Phillip Entrance – South Channel – Coastal Management Consent Scope of Works
Drawing 35333	Channel Deepening Project – South Channel – West – Coastal Management Consent Scope of Works
Drawing 35334	Channel Deepening Project – South Channel – East – Coastal Management Consent Scope of Works

CDP-Env-50228 CDP Project Areas



CDP-Env-50254 Construction Areas – Heritage significance



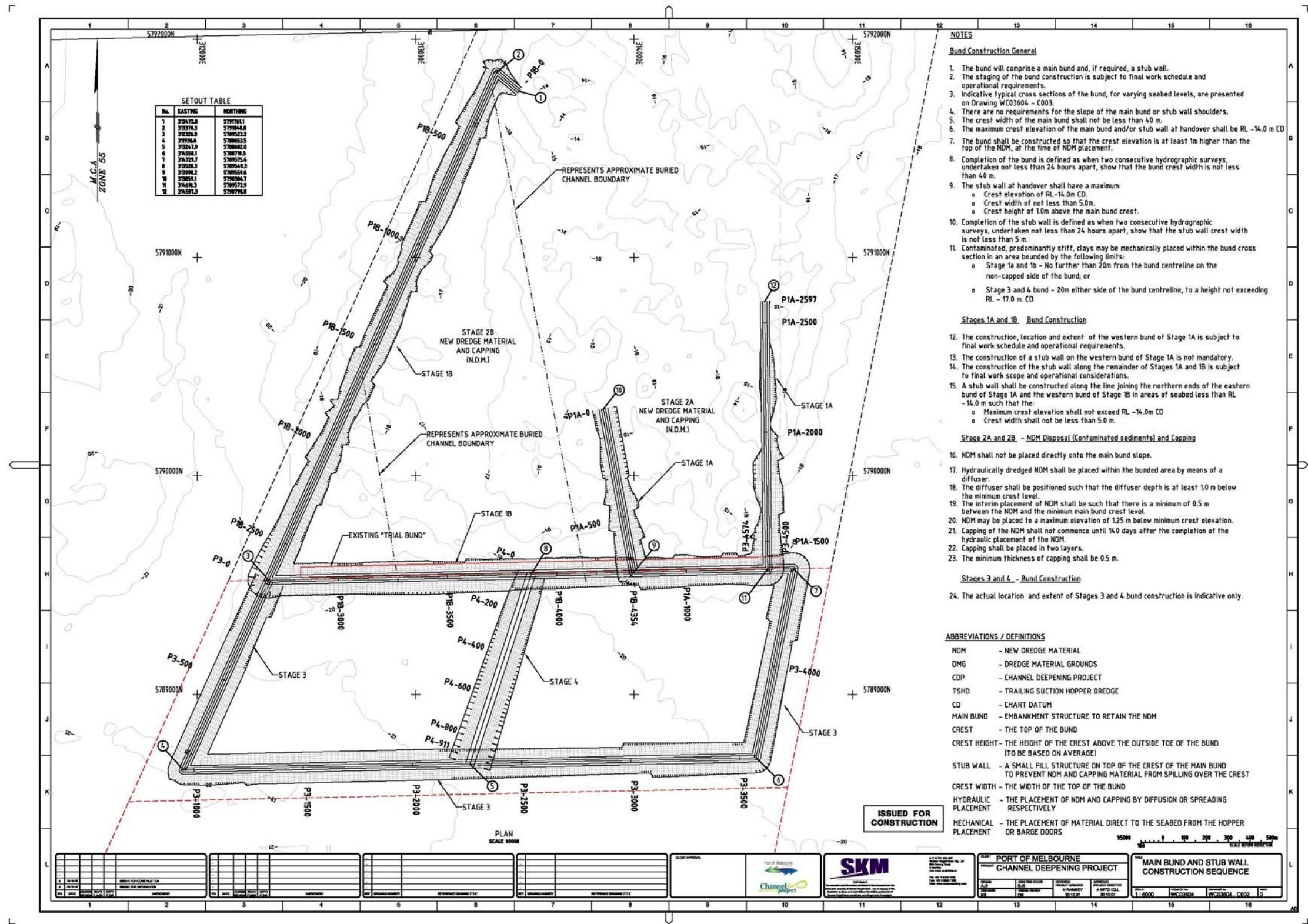
CDP-Env-50383 Location of contaminated clays within Appleton Dock and near Webb Dock



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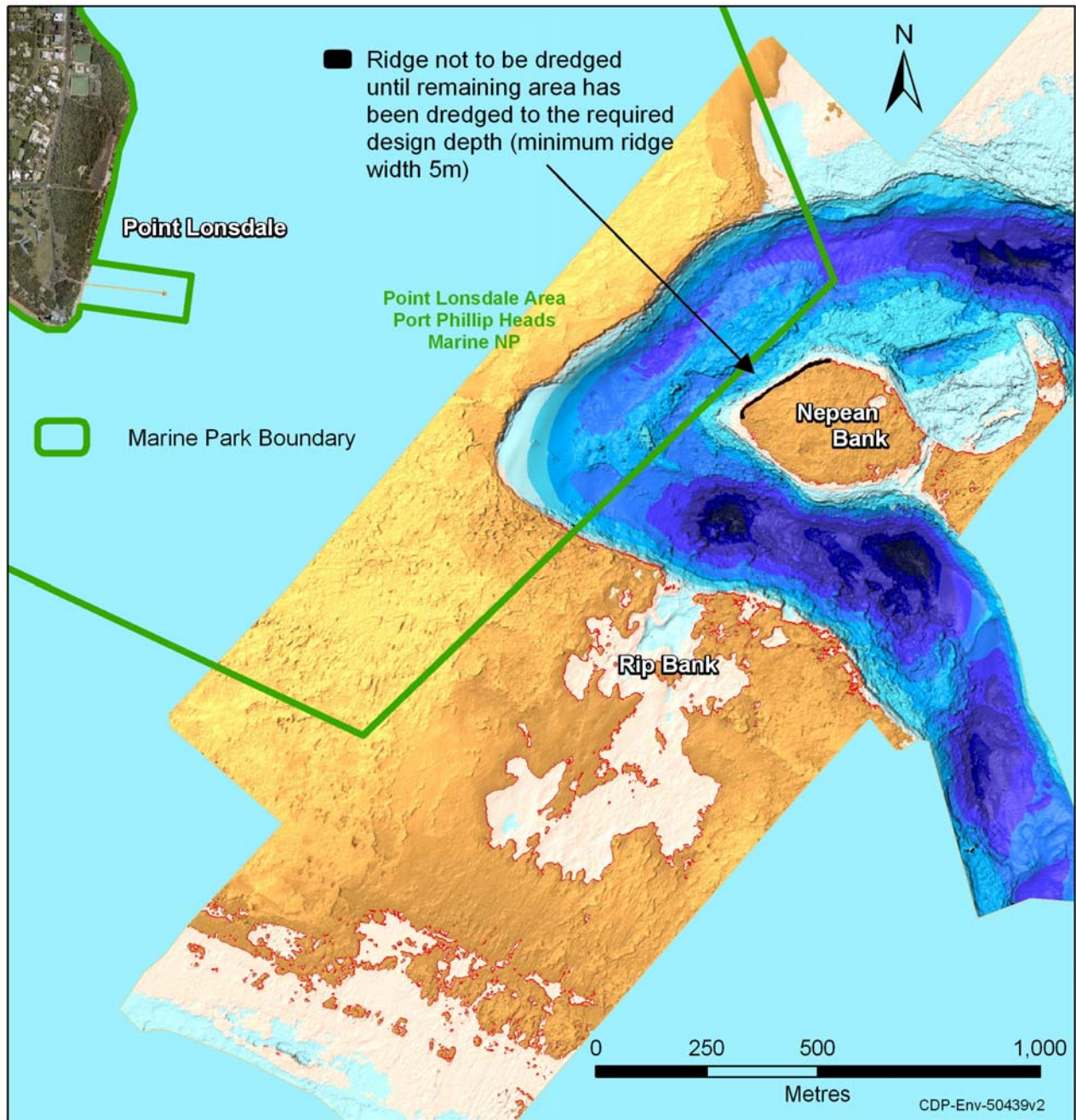
C002 Port of Melbourne DMG Main Bund and Stub Wall construction sequence.



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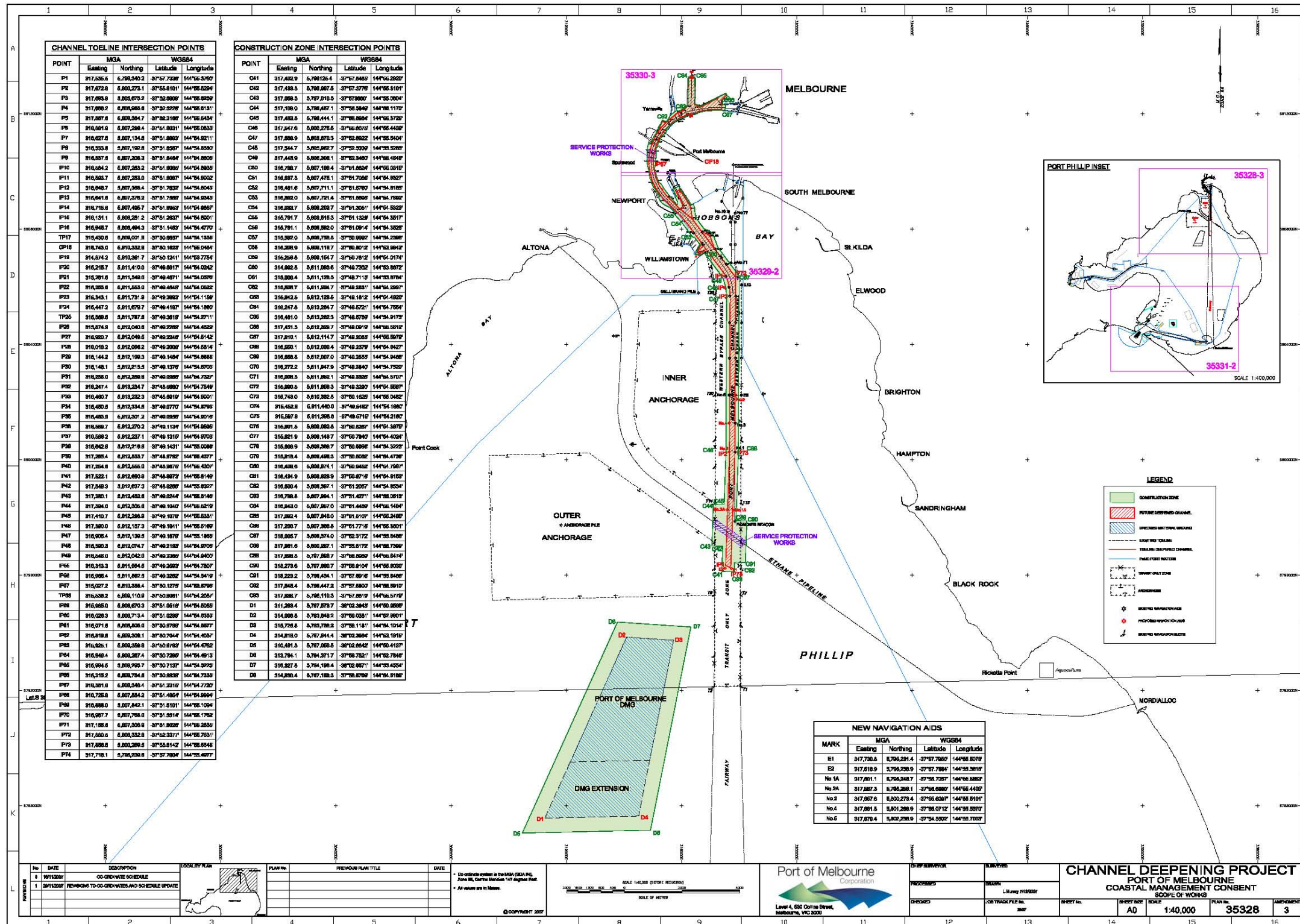
CDP_IMS_PL_004 Environmental Management Plan Rev 1Page 115 of 127

CDP-Env-50439 Nepean Bank ridge



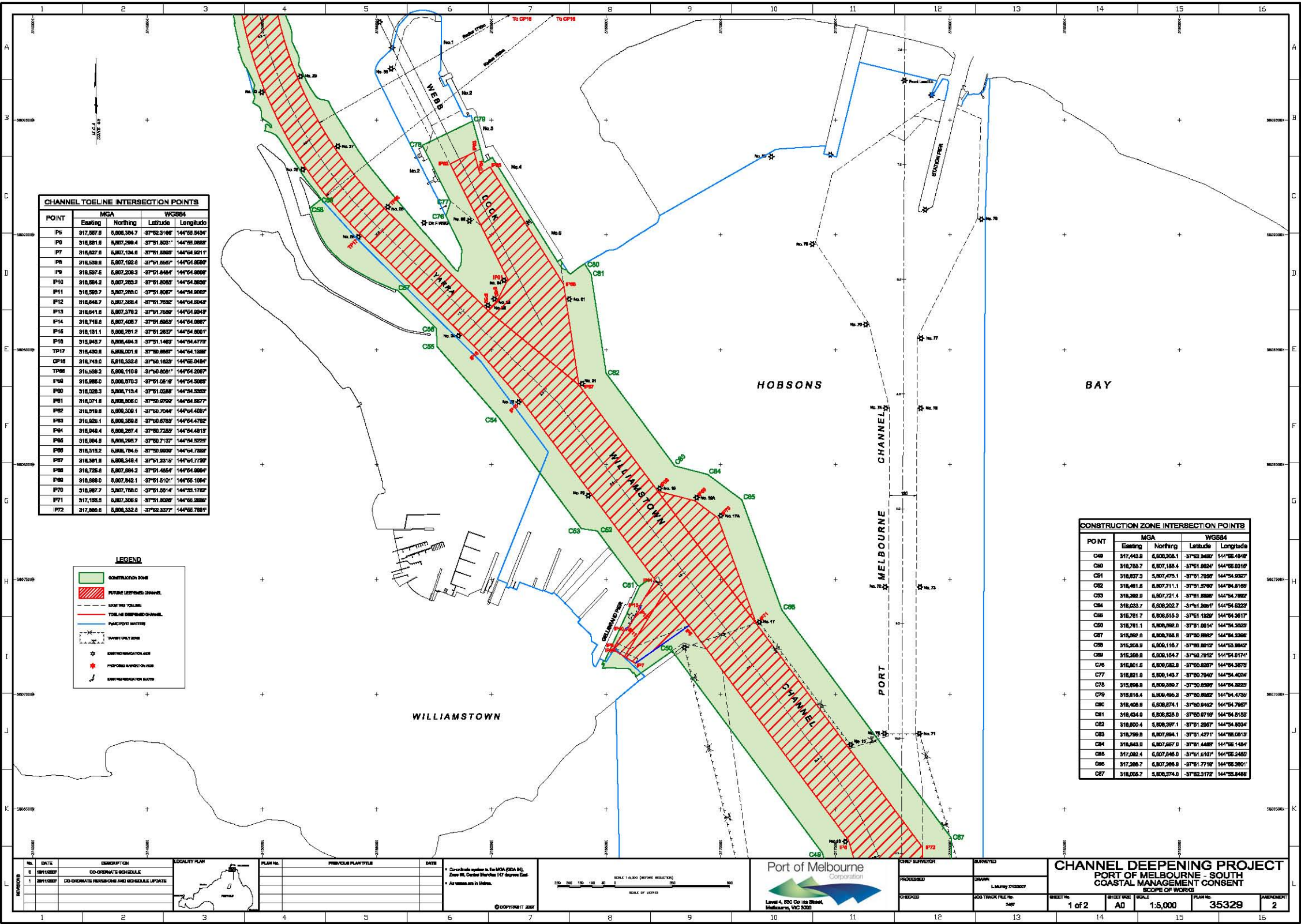
Drawing 35328

Channel Deepening Project – Port of Melbourne – Coastal Management Consent Scope of Works



Drawing 35329

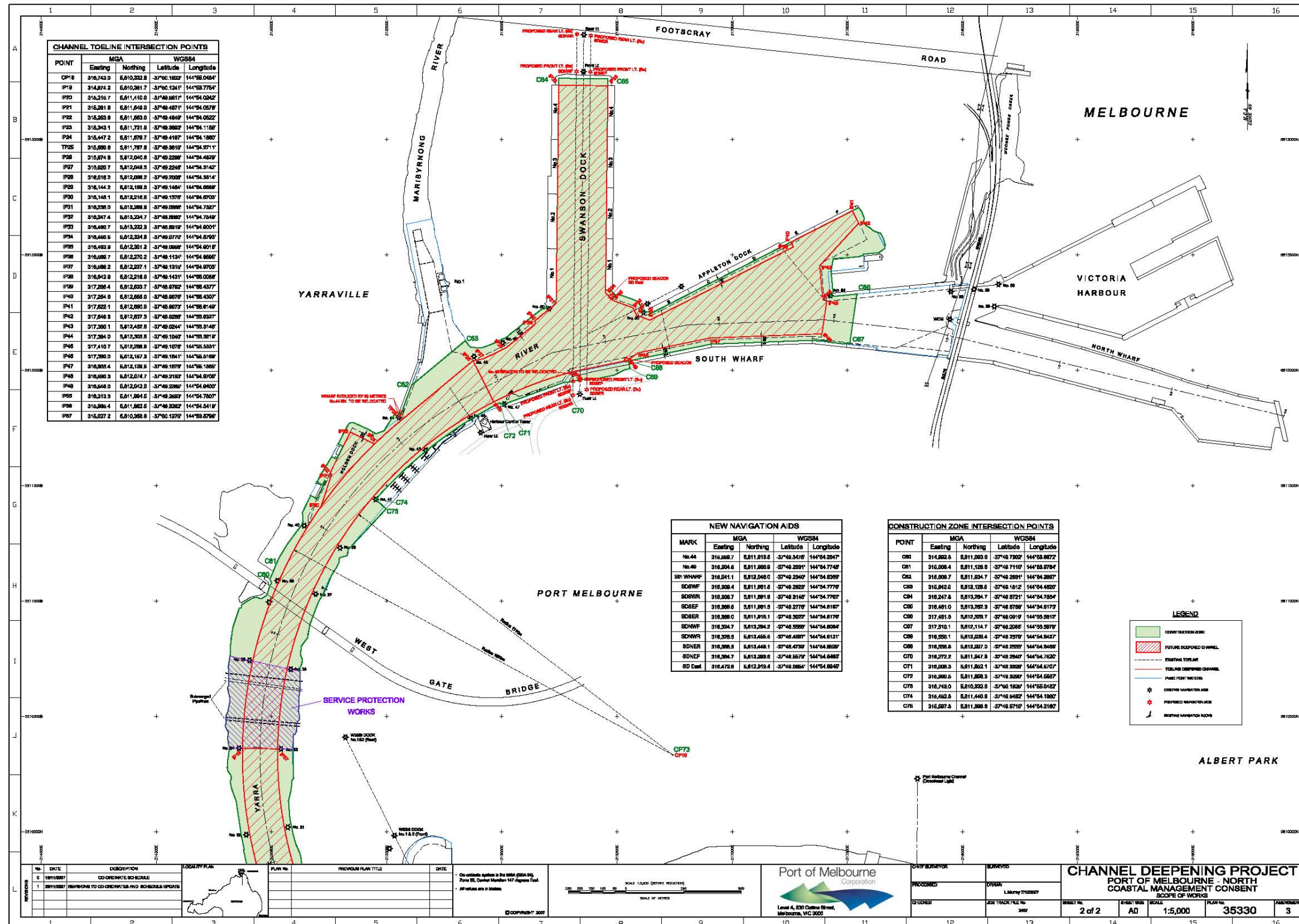
Channel Deepening Project – Port of Melbourne – South – Coastal Management Consent Scope of Works



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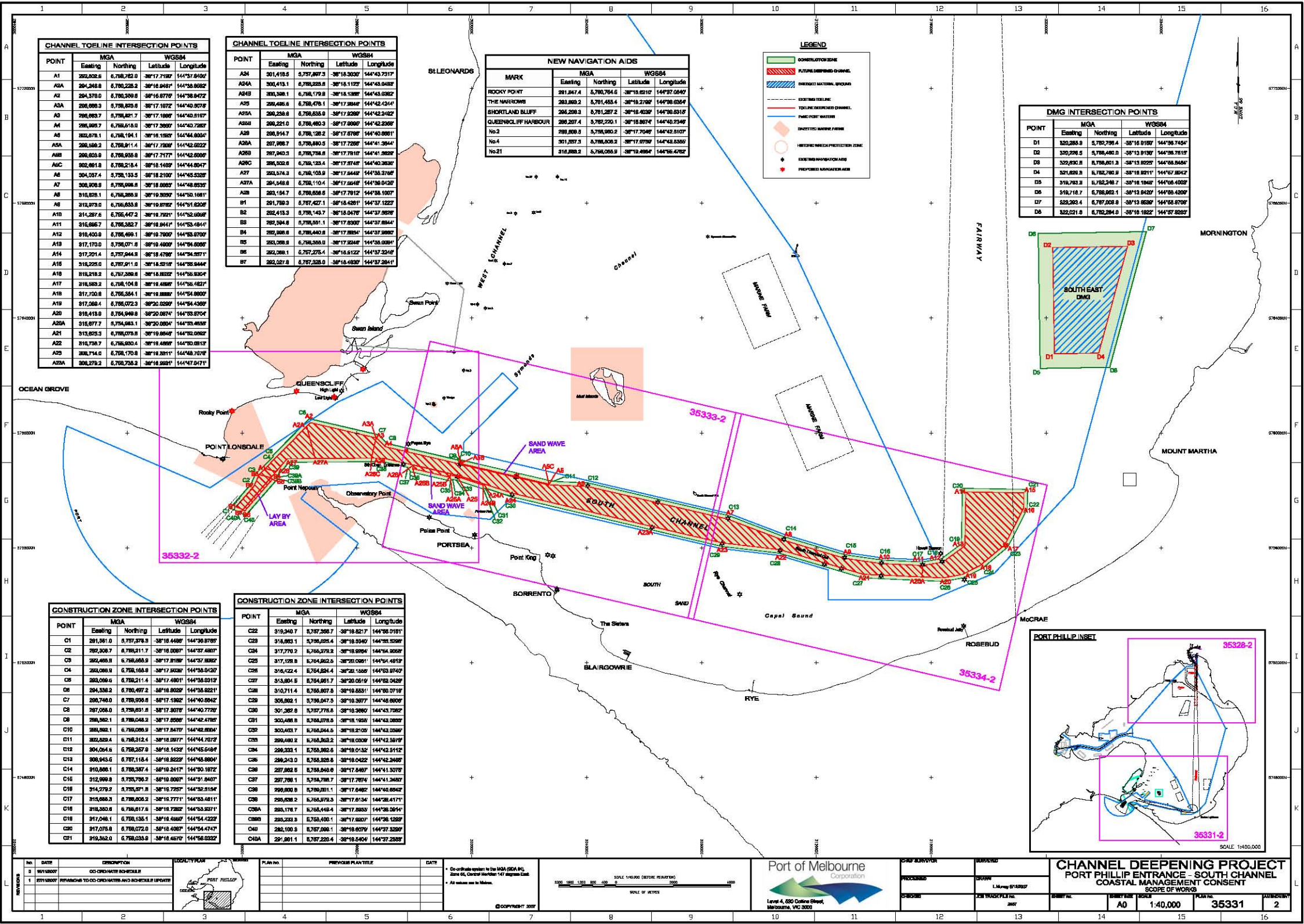
Drawing 35330

Channel Deepening Project – Port of Melbourne – North – Coastal Management Consent Scope of Works

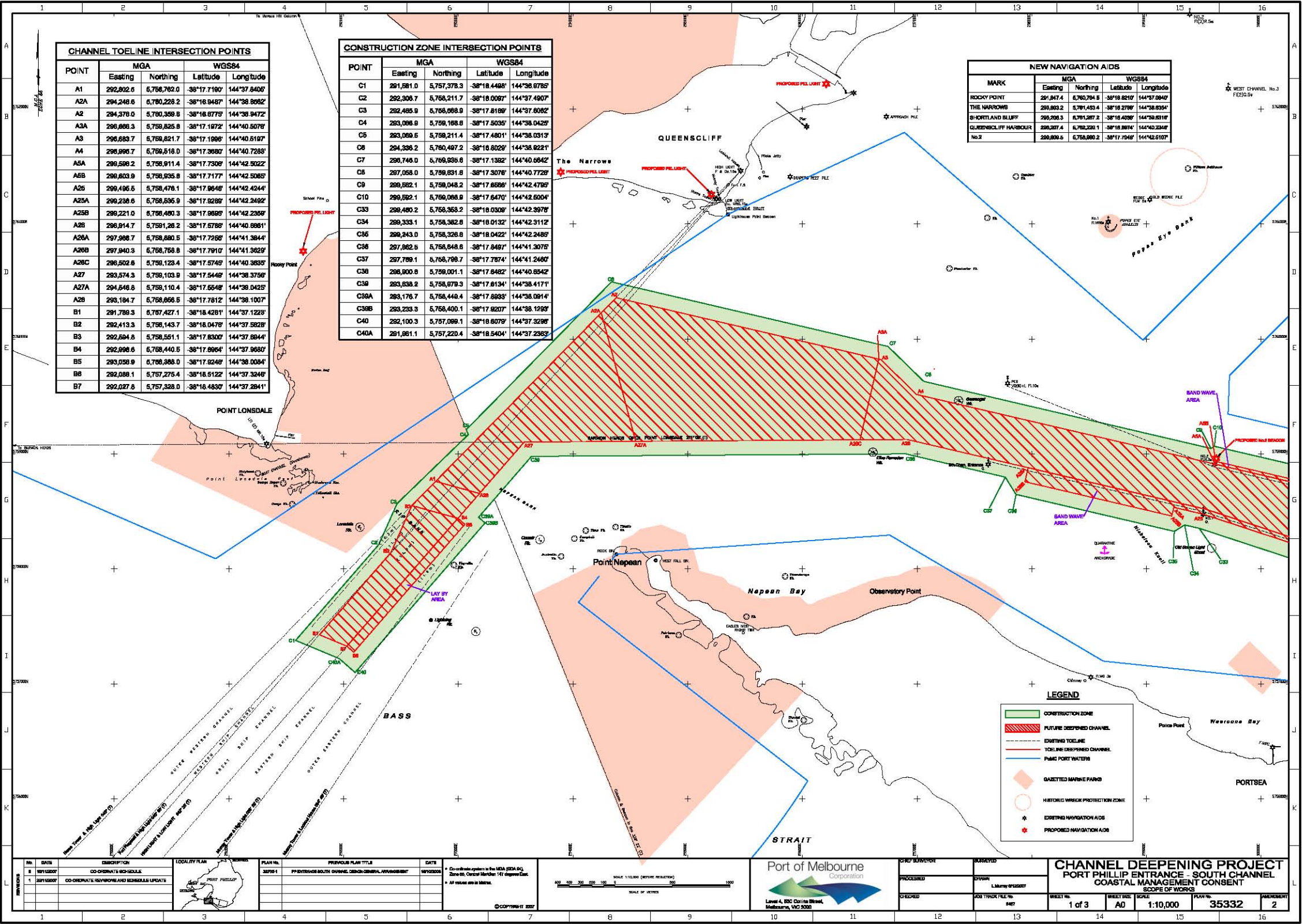


Drawing 35331

Channel Deepening Project – Port Phillip Entrance – South Channel – Coastal Management Consent Scope of Works

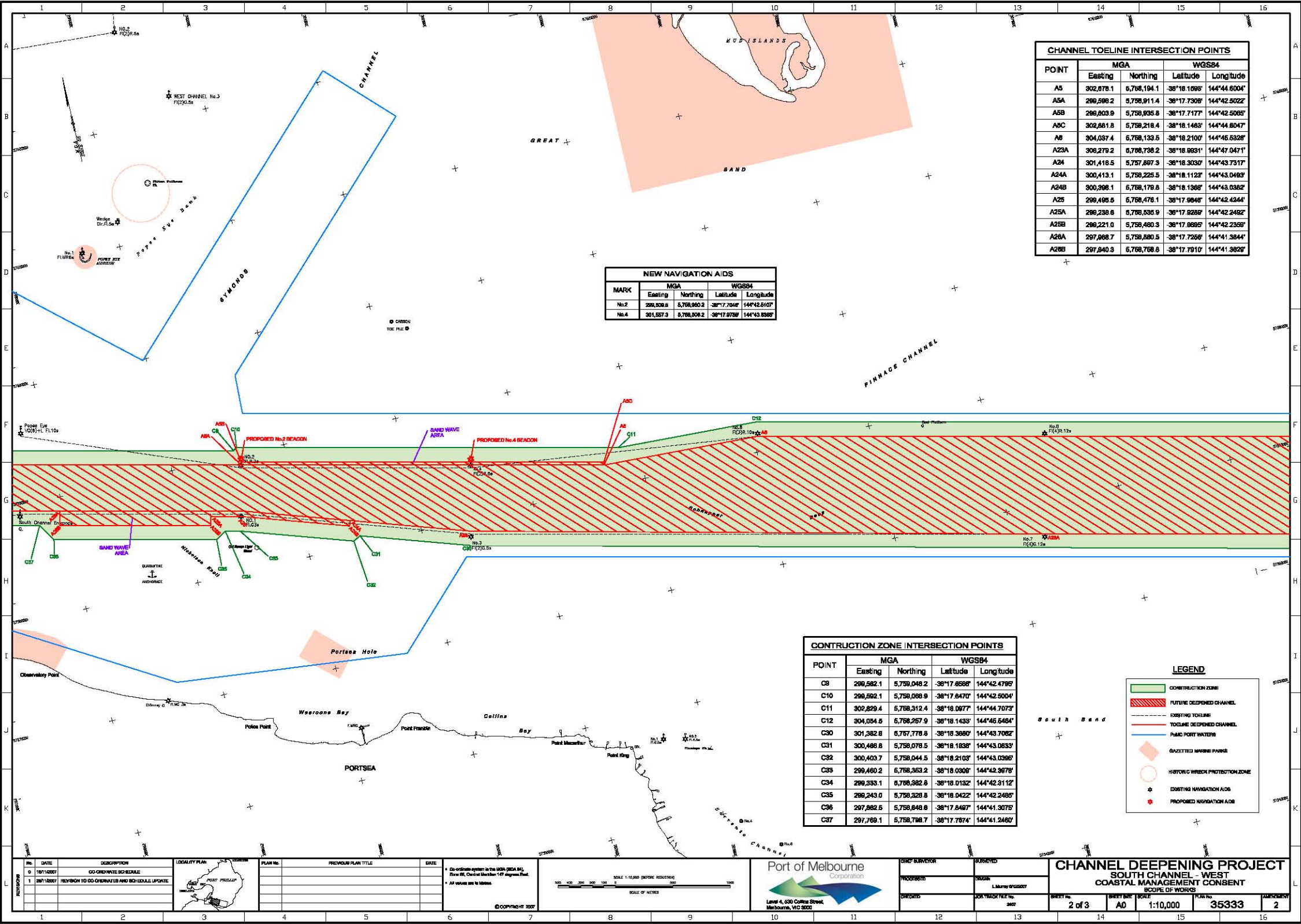


Drawing 35332 Channel Deepening Project – Port Phillip Entrance – South Channel – Coastal Management Consent Scope of Works



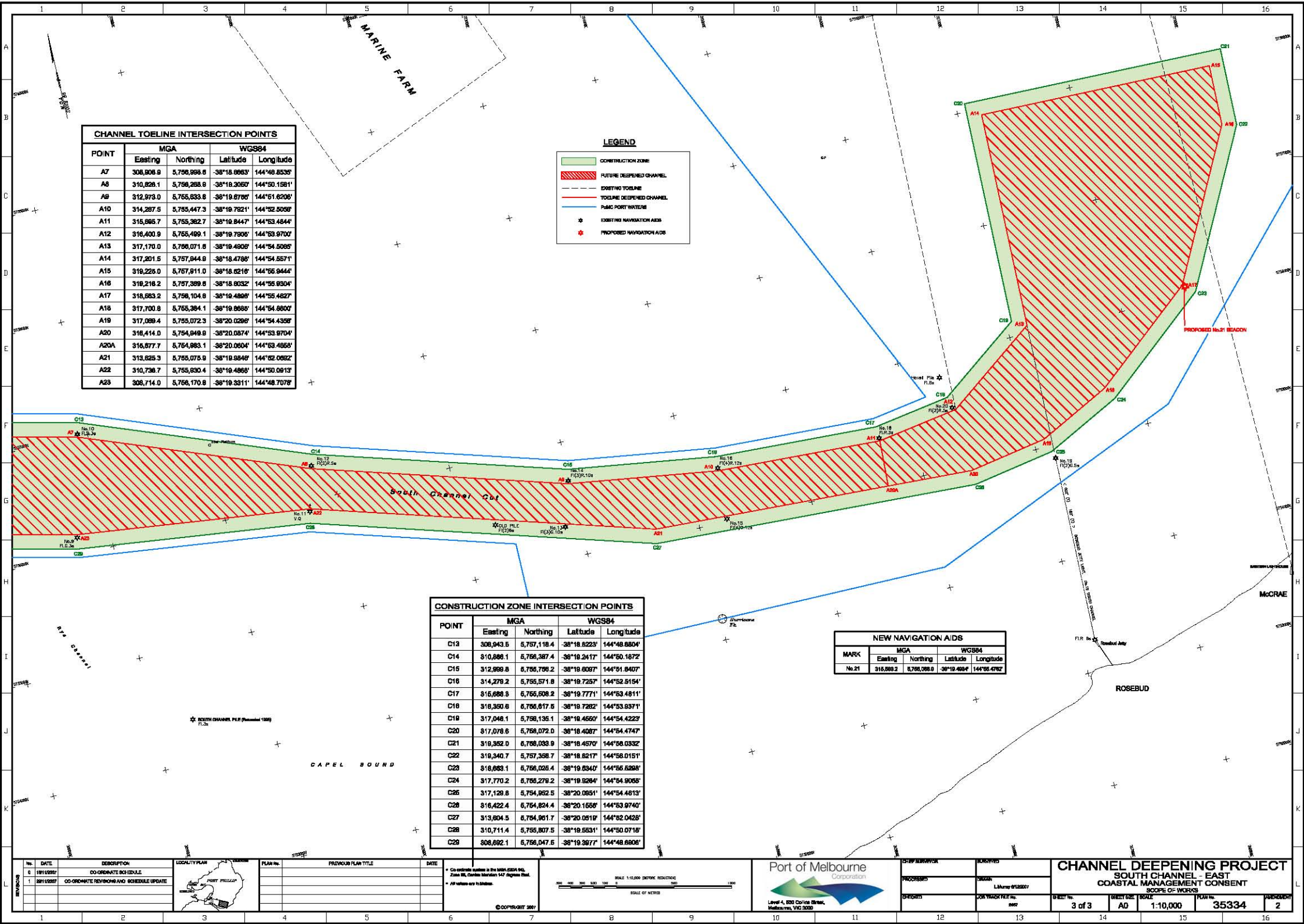
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Drawing 35333 Channel Deepening Project – South Channel – West – Coastal Management Consent Scope of Works



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Drawing 35334 Channel Deepening Project – South Channel – East – Coastal Management Consent Scope of Works



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Annexure 8 EPBC Act / NES matters

Table 30: EPBC Act / NES matters and EMP control or monitoring reference

EPBC Act / NES matter	EMP control or monitoring	EMP reference
Listed threatened species and communities & listed migratory species		
Australian Grayling	No dredging using the TSHD in the Yarra River or Williamstown Channels between 15 October to 30 November	Annexure 4, Table 12 Dredging schedule PDS (Standard 33)
	Turbidity limit (migratory fish) applicable 15 October to 30 November	Annexure 5 Environmental monitoring and contingency plans – Turbidity. Table 23: Conformance locations for turbidity and associated environmental limits
Cetaceans	Underwater noise monitoring, comparison with underwater noise model and contingency plan	Annexure 4, Table 15: Hydrohammer use and marine-based pile driving PDS (Standards 54 & 57) Annexure 5 Environmental monitoring and contingency plans – Underwater noise. Table 25: Management actions - Underwater noise
	Underwater noise control – minimise use of hydrohammer	Annexure 4, Table 15: Hydrohammer use and marine-based pile driving PDS (Standard 51)
	Underwater noise control – start procedure	Annexure 4, Table 15: Hydrohammer use and marine-based pile driving PDS (Standard 53)
	Underwater noise control – hydrohammer	Annexure 4, Table 15: Hydrohammer use and marine-based pile driving PDS (Standard 55)

EPBC Act / NES matter	EMP control or monitoring	EMP reference
	Underwater noise control – marine based pile driving	Annexure 4, Table 15: Hydrohammer use and marine-based pile driving PDS (Standard 58)
	Cetaceans – vessel manoeuvring	Annexure 4, Table 9: Marine-based works (all areas) PDS (Standard 13)
	Cetacean sightings and log	Annexure 4, Table 9: Marine-based works (all areas) PDS (Standard 14)
Wetlands of international importance		
Ramsar wetlands	Sands and adjacent coast and beaches monitoring	Annexure 4, Table 11: Dredging and plume PDS (Standard 23)
	Post-construction tide monitoring report	Annexure 4, Table 14: Entrance dredging PDS (Standard 50)
	Turbidity limits (seagrass, seabirds, benthic invertebrates) and contingency plan	Annexure 5 Environmental monitoring and contingency plans – Turbidity. Table 23: Conformance locations for turbidity and associated environmental limits Table 24: Management actions - turbidity
	Baywide monitoring programs: <ul style="list-style-type: none"> ▪ Key coastal and intertidal vegetation community monitoring ▪ Seagrass monitoring ▪ Plume intensity and extent ▪ Water quality monitoring ▪ Nutrients 	Section 3.8 Baywide monitoring programs
	Dredging of contaminated sediment	Annexure 4, Table 11: Dredging and plume PDS (Standards 27-30)
	Placement and capping of contaminated sediment	Annexure 4, Table 13: Dredged material management PDS (Standards 34-37)

EPBC Act / NES matter	EMP control or monitoring	EMP reference
	Maintenance and inspection of PoM DMG	Annexure 4, Table 13: Dredged material management PDS (Standard 38)
	Pre and post-construction bathymetric survey (Entrance)	Annexure 4, Table 14: Entrance dredging PDS (Standard 48)
Commonwealth land		
Swan Island	Sands and adjacent coast and beaches monitoring	Annexure 4, Table 11: Dredging and plume PDS (Standard 23)
Marine Pests		
	Vessel inspections and ballast water management	Annexure 4, Table 9: Marine-based works (all areas) PDS (Standard 10)
CDP EMP Approval, reporting and notification		
	CDP EMP approval	Section 1.7 EMP approval and independent environmental monitor, Table 2: EMP approval requirements
	DEWHA notification and reporting requirements: <ul style="list-style-type: none"> ▪ Response level reached (turbidity and underwater noise) ▪ Environmental limit exceeded (turbidity) ▪ Pollution event or imminent environmental hazard ▪ Completion of dredging of contaminated sediments within an area ▪ Underwater noise assessment of hydrohammer ▪ Provision of reports: <ul style="list-style-type: none"> – Audit of PoMC implementation of the EMP by external auditor – quarterly project report – annual report 	Section 2.3 External notification and reporting requirements, Table 6: notification and reporting requirements

EPBC Act / NES matter	EMP control or monitoring	EMP reference
	<ul style="list-style-type: none">– project close-out report– sands and adjacent coast and beaches monitoring– entrance bathymetry survey– tide monitoring report– Baywide monitoring – algal blooms– PoM DMG marine pest post-construction inspection program	