

---

---

*Environment Effects Act 1978*

**PORT PHILLIP BAY CHANNEL DEEPENING**  
**SUPPLEMENTARY ENVIRONMENT**  
**EFFECTS STATEMENT**

**Report of the Inquiry**

**Inquiry:**

**Dr Allan Hawke**

**Ms Kathryn Mitchell**

**Dr Mike Lisle-Williams**

**1 October 2007**

---

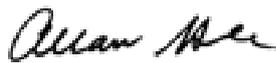
---

The Hon Justin Madden MLC  
Minister for Planning  
Level 17  
8 Nicholson Street  
**EAST MELBOURNE 3002**

Dear Minister

We report to you following upon the Inquiry under Section 9(1) of the *Environment Effects Act 1978* following our Inquiry into the Port Phillip Bay Channel Deepening Project – Supplementary Environment Effects Statement – in accordance with your Terms of Reference.

We take this opportunity to thank the proponent and submitters for the way in which they conducted themselves during the hearings and for their contribution to our report and findings. We also appreciate the assistance of those who provided advice and administrative support to the Inquiry.



**Dr Allan Hawke**



**Ms Kathryn Mitchell**



**Dr Mike Lisle-Williams**

**1 October 2007**

**TABLE OF CONTENTS** **PAGE NO.**

---

**EXECUTIVE SUMMARY.....4**

**1. BACKGROUND.....5**

**2. TERM OF REFERENCE 1.....8**

2.1 CHANNEL DESIGN.....8

2.2 DREDGING TECHNOLOGY SELECTION.....9

2.3 DREDGING STRATEGY.....9

2.4 DREDGED MATERIAL MANAGEMENT.....10

2.5 INQUIRY FINDING.....12

**3. TERM OF REFERENCE 2.....13**

3.1 ENVIRONMENTAL.....13

3.2 ECONOMIC.....17

3.3 SOCIAL.....18

3.4 INQUIRY FINDING.....18

**4. TERM OF REFERENCE 3.....19**

4.1 ENVIRONMENTAL MANAGEMENT FRAMEWORK.....20

4.2 EXTERNAL PROJECT GOVERNANCE.....21

4.3 INQUIRY FINDING.....21

**5. TERM OF REFERENCE 4.....22**

5.1 STATE CONSIDERATIONS.....22

5.2 COMMONWEALTH CONSIDERATIONS.....23

5.2 INQUIRY FINDING.....27

**6. SUMMARY OF FINDINGS AND RECOMMENDATIONS .....28**

**APPENDIX 1 – ENVIRONMENTAL ASSESSMENT REPORT**

## EXECUTIVE SUMMARY

---

*The Inquiry supports the Supplementary Environment Effects Statement case that the Port Phillip Bay Channel Deepening Project (CDP) can be delivered with low to medium risk, and moderate impact.*

*All major projects entail risk, and the Channel Deepening Project is no exception.*

*In summary, the Inquiry finds that:*

- (i) proposed CDP design (including for the channels, dredged material grounds and navigational aids) is safe, suitable and technically feasible to implement using the proposed dredging technologies;*
- (ii) likely environmental effects of the proposed CDP dredging activities and the subsequent operation of the deepened shipping channels have been addressed in the Supplementary Environmental Effects Statement, and the material presented to the Inquiry;*
- (iii) proposed project design and approach to project implementation (including technologies and work methods), are suitable to ensure acceptable environmental outcomes are achieved, having regard to relevant legislation and policy, as well as costs, benefits and operational efficiency in delivering the project, with modifications (including Independent Expert Group (IEG) recommendations) to the revised Environmental Management Plan to the satisfaction of Government prior to the CDP proceeding; and*
- (iv) considerations relevant to the Assessment that will inform decisions whether or not to approve the CDP under the Coastal Management Act 1995 (Victoria) and under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) have been satisfied.*

## 1. BACKGROUND

---

The 2004 Victorian Ports Strategic Framework identified deepening the channel access to the Port of Melbourne as a key aspect of improving Victoria's container shipping trade. The aim is to enable new generation deeper draught container ships, which are assuming a greater role in global trade, to access the Port fully laden.

The Port of Melbourne Corporation (PoMC) is the proponent and it proposes to deepen sections of the shipping channels through Port Phillip Bay to cater for vessels with a draught of up to 14 metres. The project design is based on:

- dredging existing shipping channels including the Yarra River Channel from Williamstown into the Port's berths and swing basins, Port of Melbourne Channel north from about Fawkner Beacon, South Channel up to Hovell Pile and the Great Ship Channel at the entrance through Port Phillip Heads;
- dredging berth pockets at Appleton Dock, Swanson Dock, Holden Dock and Gellibrand Pier;
- placement of dredged material into two dredged material grounds (DMG), one in the north of the Bay and one in the south of the Bay; and
- modifications to existing infrastructure, including berth works, river works, protection of services, upgrades to existing navigational aids and installation of new navigation aids.

The Victorian Government has given in-principle support for the Channel Deepening Project (CDP), subject to satisfaction of Victoria's environmental assessment and approval processes and resolution of technical and financing aspects.

On 9 May 2002, the then Minister for Planning declared the CDP to be public works under the *Environment Effects Act 1978*. PoMC prepared the required Environment Effects Statement (EES), and exhibited it for public comment for six weeks between 5 July and 16 August 2004.

In July 2004, the Minister for Planning appointed a Panel under Section 9(1) of the Act to consider the EES and public submissions. The Panel held public hearings in September - December 2004, and reported to the Minister on 11 February 2005. In March 2005, the Minister released the EES Panel report. The Minister's accompanying Statement directed that:

- PoMC consider a trial dredge program to inform the development of a Supplementary Environment Effects Statement (SEES);
- the then Minister for Transport consider a high-level Project Management Group to advise and support PoMC in taking forward its program of investigations for the Project; and
- an Independent Expert Group (IEG) be appointed to provide high level scientific and technical advice during the further stages of the assessment process, including to inform the SEES development.

The Minister for Planning confirmed the need to address certain matters and issued a Statement of the objectives, approach and process for the SEES in July 2005. SEES Assessment Guidelines were released as a draft for public comment and finalised in October 2005 following consideration of submissions and completion of the trial dredge program in September 2005. These guidelines reflect a definition of environment, for the purpose of environmental assessment, which includes physical, biological, cultural, social and economic aspects.

The Secretary, Department of Sustainability and Environment (DSE), appointed the IEG to advise on the SEES preparation and adequacy.

The SEES was prepared over two years, after which it was exhibited for public comment for six weeks until 7 May 2007. The Minister for Planning appointed the current Inquiry to evaluate the SEES and submissions made in response to it. The scope of the Inquiry was set by its Terms of Reference. Public hearings were held over a six week period, from 18 June to 31 July 2007. The Minister required the Inquiry to submit its report by 1 October 2007. The Inquiry referred issues and questions to the IEG during the course of the Inquiry process, responses to which were made public.

This Inquiry Report assists the Minister for Planning to prepare an Assessment under the *Environment Effects Act 1978* for consideration by relevant decision-makers before deciding whether the CDP should be approved. The primary Victorian decision-maker is the Minister for Environment who will decide whether to grant approval under the *Coastal Management Act 1995* for the project.

As the CDP is a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, it requires approval under that Act. The EES process for this project has been accredited as the required assessment process to inform the Australian Minister for the Environment and Water Resources' decision whether to approve the CDP.

The Inquiry sets out its findings, conclusions and recommendations in response to its Terms of Reference in this report. The Inquiry has also prepared an Appendix Report, which contains the detailed analysis of the key issues, including relevant background and other information.

The Inquiry's Task was set out in the Terms of Reference as follows:

*The Inquiry is to provide a written report to the Minister for Planning setting out information and advice in relation to the following matters only:*

- 1. Whether the proposed design for the CDP (including for the channels, dredged material grounds and navigational aids) is safe, suitable and technically feasible to implement using the proposed dredging technologies?*
- 2. The likely environmental effects of the proposed CDP dredging activities and the subsequent operation of the deepened shipping channels.*
- 3. Whether the proposed project design and approach to project implementation (including technologies and work methods), with or without modification, are suitable to ensure the achievement of acceptable environmental outcomes, having regard to relevant legislation and policy, as well as costs, benefits and operational efficiency in delivering the project?*
- 4. The considerations relevant to the Assessment that will inform decisions whether or not to approve the CDP under the Coastal Management Act 1995 and under the Environment Protection and Biodiversity Conservation Act 1999 (Cth).*

The Inquiry took particular note of the word only in the introductory sentence to its Tasks, concluding that it was there to ensure focus only on the four matters specified above (see further discussion in Chapter 1 of the Appendix).

The Inquiry's findings and key conclusions in response to each of the above tasks required by the Terms of Reference are set out in the following four chapters. The final chapter presents the Inquiry's recommendations to the Minister.

## 2. TERM OF REFERENCE 1

---

*“Whether the proposed design for the CDP (including for the Channels, dredged material grounds and navigational aids) is safe, suitable and technically feasible to implement using the proposed dredging technologies”.*

Chapters 5, 6, 7 and 8 of the Appendix Report deal with this Term of Reference.

Relevant policy and guidance includes:

- *Marine Act 1988;*
- *Environment Protection Act 1970* and subordinate legislation and policy guidance;
- *National Ocean Disposal Guidelines for Dredged Material;*
- *PIANC & IAPH Approach Channels - A Guide for Design;*
- *International Regulations for the Preventing Collisions at Sea; and*
- *International Association of Marine Aids to Navigation and Lighthouse Authorities.*

### 2.1 Channel Design

Channel design affects the amount and duration of dredging operations, and therefore has implications for turbidity and dredged material management. Environmental design features proposed by PoMC include:

- use of existing channel alignments;
- retention of the existing one-way and two-way channel configuration; and
- access in all tides (but not all severe ocean conditions) through the Great Ship Channel.

The channel design consists of two key elements:

- design for navigation; and
- design for construction.

To cater for CDP changes, some navigation aids will be modified, additional aids installed and Port Operating Guidelines will be updated. The Inquiry is satisfied that the proposed deepened channels can be constructed safely to guarantee access by 14m deep draught vessels and will not result in a risk to navigation, including at the Entrance.

The Inquiry is satisfied that construction design, including selection of channel routes, minimises dredging volumes and that proposed changes meet PIANC and IPAH guidelines, and CDP objectives. PoMC has a statutory obligation to maintain declared depths of the channels. The Inquiry notes that the Director for Marine Safety, who also has a statutory responsibility for marine safety, has advised the deepened channel can be constructed safely, and changes to sea floor shape will not affect navigation risk.

Modifications to port and river infrastructure and associated river works can be accommodated adequately through the CDP process.

Mr Gobbo QC, on behalf of PoMC, submitted *“the design is safe, not in an absolute sense, because that can never be guaranteed, but in the sense of complying with relevant safety standards expressed in international guidelines”*. The Inquiry concurs.

## **2.2 Dredging Technology Selection**

The selection of technology for the CDP is based on international best practice. In the Trial Dredge Program (TDP) of 2005, the *Queen of the Netherlands*, a trailing suction hopper dredge (TSHD) demonstrated highly rated manoeuvrability and power in the Great Ship Channel. The TDP confirmed the ability of the ripper draghead to remove rock in this channel.

The IEG advised that the dredging technology and dredging method options selected to implement the channel design are suitable for executing the CDP. The Inquiry supports the Victorian Government Departments' position that the CDP is technically feasible, but further attention may be required during project implementation to ensure that the proposed 'spill' reduction measures are operationally effective.

The Inquiry is satisfied that the dredging technology is best practice and fit for purpose. It will provide an effective means to manage contaminants, minimise turbidity and dredge rock at the Entrance.

In reaching these conclusions, the Inquiry notes that the IEG did not share submitters' concerns about the TSHD and supported the technology's use as part of the CDP.

## **2.3 Dredging Strategy**

The SEES dredge strategy aimed to weigh up implications for environmental and social effects, project cost and timing of project completion. The most significant implication for the dredge schedule was the decision over whether to protect the

peak spawning period of protected fish species (Australian Grayling) in spring or the needs of Ecogen Energy. The schedule presented in the SEES included dredging the Yarra River in summer to avoid the peak spawning period, recognising that the interests of Bayside users in the area would be affected.

Ecogen Energy submitted that this dredge schedule conflicted with its operations, arguing it preferred 2008 spring season dredging to coincide with its long planned plant shut down for major maintenance.

The Inquiry initially asked PoMC to prepare a new schedule to accommodate Ecogen's concerns. Following review, and on balance, the Inquiry recommends that the revised schedule be adopted. Although the listed Australian Grayling is predicted to be impacted, the Inquiry considers these impacts can be offset, consistent with protective legislation provisions.

## **2.4 Dredged Material Management**

The Inquiry considers that the risks of dredging the Bay sediments have been characterised adequately against relevant guidelines.

The contamination risks and potential bioaccumulation, stemming from the Yarra River arises principally from unconsolidated silts carried in runoff from the catchment into the Bay, affecting it and users. This runoff, often associated with flooding events, will continue, irrespective of whether the CDP goes ahead.

Accordingly, the Inquiry finds implications for bioavailability and bioaccumulation in Port Phillip Bay are generally low at present although evidence indicates some issues of concern (such as eels). The additional risks due to the CDP will therefore be minimal. Management of these materials should aim to minimise the risk. The decision to contain unconsolidated material (assumed to be unsuitable for unconfined marine disposal based on the National Ocean Disposal Guidelines (NODG) classification), and localised consolidated sediment volumes classified as unsuitable, is endorsed by the Inquiry. Moreover, the IEG advised that the technology used to manage these sediments is best practice.

To provide assurance to the community, the IEG advised that the EMP should monitor the additional risks to human consumption of disturbing sediment during dredging. The Inquiry concurs with this advice.

Placement of dredge material in the Bay for potential reuse represents the management option most consistent with legislation and policy taking into account practicality, necessity and cost. Consideration of the possible use of dredged material for beach renourishment concluded that at this stage it is more economical

to utilise either land-based or near-shore sand.

The Inquiry confirms that:

- disposal of contaminated material to land is not practicable;
- there are no immediately practicable options for the reuse of uncontaminated material on land; and
- disposal of material in Bass Strait is not a preferred option relative to placement in the Bay.

The Inquiry accepts the south east of the Bay DMG is the optimal site for storing South Channel and Entrance dredging material, acknowledging the social implications. The Inquiry is also satisfied arrangements for the Port of Melbourne DMG will provide the required level of environment performance, and that the contaminated material can be confined as proposed.

Placement of contaminated material and construction of the bund and cap must be effective to manage the associated risks. The Inquiry considers that detailed placement process specification and proposed monitoring of bund and cap integrity are warranted.

The NODG are recognised best practice for classifying sediment chemical and toxicological characteristics, while Best Practice Environmental Management Guidelines apply to dredge material management and other matters. For reasons set out in Chapter 8 of the Appendix Report, the Inquiry concludes that the SEES, in relation to dredged material management, applies these guidelines, appropriately.

The Inquiry came to this conclusion after considering the following issues:

- volume of material to be dredged;
- use of best practice guidelines;
- sediment chemistry and characterisation;
- treatment and management of unconsolidated and localised consolidated material classified as unsuitable for unconfined marine disposal;
- ability to detect hotspots;
- bioavailability and bioaccumulation;
- human health issues (ingestion of fish, swimming);
- community concerns(dioxins, radionuclides);
- consideration of land and marine based disposal options; and
- location of DMGs including selection of the SE option for the southern DMG.

## 2.5 Inquiry Finding

The Inquiry is satisfied that based on the SEES, peer reviews and IEG advice, the proposed design complies with relevant policy. The Inquiry concludes the proposed CDP design (including for the Channels, dredged material grounds and navigational aids) is safe, suitable and technically feasible to implement using the proposed dredging technologies. The Inquiry supports inclusion of design and implementation details in approvals granted pursuant to the *Coastal Management Act 1995*.

### 3. TERM OF REFERENCE 2

---

*“The likely environmental effects of the proposed CDP dredging activities and the subsequent operation of the deepened shipping channels”.*

Chapters 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19 of the Appendix Report deal with this Term of Reference, which directs the Inquiry’s attention specifically to the CDP’s likely environmental effects. The policy setting requires judgement to determine acceptability. It also requires consideration of environmental, social and economic implications as outlined, for example, in the *Victorian Coastal Strategy* and the *Environment Protection Act 1970*.

#### 3.1 Environmental

The environmental impacts are grouped under the headings that follow below:

##### (i) Hydrodynamics

If CDP causes sea level rises, as expected by submitters and these add to predicted changes due to natural forces, implications may arise for low lying land. However, the CDP is expected to have minimal net impact.

The small change in water depths resulting from CDP will also cause small tidal current changes in all four project areas. The greatest effects will occur at the Entrance where tidal currents dominate water movements and depth allows greater water flow.

As a result of scour modelling, the most significant implication was an upgraded prediction of a 14% change in flushing rates for the Bay. The IEG advised this worst case scenario is unlikely to eventuate, but flagged uncertainty about the physical effects, the rate of scour stabilisation and extent of rockfall, which creates unpredictability about the biological effects.

##### (ii) Sediment transport and coastal processes

Bayside beaches are currently subject to sediment transport characteristics which require ongoing management through beach renourishment. The predicted changes to sediment transport from the CDP are within natural variability.

The SEES predicts few changes within the Great Sands, with most confined to the eastern end of South Channel and adjacent areas. Based on the scoured case, the IEG advised these predictions would not change substantially.

The significant impact of the CDP on sediment transport relates to wave action which may lead to shoreline and sand coverage changes in Lonsdale Bight.

A monitoring program to confirm CDP implications will respond to concerns about modelling predictions of the Great Sands in the long-term and future maintenance dredging, including the southern Bay side beaches.

**(iii) Light, productivity, turbidity, sedimentation**

The plume characteristics predicted in the SEES were based on improvements to the turbidity model, following calibrations from the TDP. The Inquiry considers that the characteristics of the turbidity plume can be determined adequately.

In managing the effects of the plume on ecological assets, the Inquiry notes that while the approach proposed by the PoMC is state-of-the-art and has strong potential, further confirmation of this approach is necessary as has been proposed during the early implementation of the EMP.

The Inquiry notes that the generation of a turbidity plume during the CDP will be considerably greater in duration than any previous dredge campaigns, however the risks to ecological assets can be managed through the EMP.

**(iv) Nutrient cycling**

The additional nitrogen load from CDP is well within the Bay's natural variation, so it does not pose a significant risk and may not even have a detectable effect.

Indirect effects on the nitrogen cycling are addressed effectively through the risk assessment and measures outlined in the EMP.

The Inquiry notes scientific debate over the use of models versus a risk assessment approach which is commonly used to deal with impact assessment, particularly where the scope is broad and there is high and variable uncertainty.

Some submitters argued the CSIRO nutrient cycling model should have been used to predict CDP outcomes, whereas PoMC utilised a broad risk assessment methodology supported by peer review. The Inquiry notes that the CSIRO nutrient cycling model outputs has in fact been used to inform the risk assessment.

The Inquiry supports IEG conclusions that:

- the assessment's overall analysis and approach is robust and conservative;
- effective loads are small compared with existing loads, and effects are likely to be temporary, providing a substantial buffer against any underestimation of impact; and
- CDP is unlikely to trigger nonlinear or threshold changes in the Bay nutrient cycle.

Algal blooms, which currently occur in the Bay, may appear during the dredging program. The additional CDP risk is minimal as dredging in the north will take place principally in non-overflow mode for unconsolidated silts. Algal blooms resulting from dredging activities will be restricted in space and time. The Inquiry notes that the plume monitoring program will identify bloom incidences and that the Victorian Shellfish Quality Assurance Program should ensure no risks to humans from eating aquaculture mussels.

#### **(v) Penguins**

Ecology, behaviour and observations of Little Penguins swimming through both Yarra and dredge plumes during the TDP, suggests that the dredge plume would not be a barrier to them.

The Inquiry notes concerns about the risk of bioaccumulation and toxic bloom effects on penguins, but concludes that these risks are low and that both colonies will be resilient to CDP activities.

#### **(vi) Fish and fisheries**

The Inquiry adopts IEG advice that the dredging schedule minimises impacts on fish of conservation significance. In doing so, it recognises that there may be consequences for recruitment of other fish species, including commercial and recreational fish stocks.

Anchovy have a critical role in food chains and the Inquiry supports EMP measures to minimise dredging effects on them.

Minimisation of turbidity remains a key element of the strategy to limit dredging impacts on fish populations.

The Inquiry recognises the potential short-term CDP impact on commercial fishing, reinforcing PoMC proposals to provide fishers with adequate notice of work schedules and advice about alternative Bay fishing grounds.

Where impacts are demonstrated, the Inquiry supports offsets to improve fish stocks. These could include improvement of key habitat sites or reduction of threats within the range of affected species. However, it will be necessary to show that impacts are attributable to CDP rather than natural forces.

**(vii) Listed aquatic species**

Certain components of the protected species' life cycle may be affected by the CDP. Dredging in spring during the sensitive period for juveniles migrating upstream through the Yarra River is now proposed. The Inquiry notes this schedule is likely to have greater implications for the listed Australian Grayling and recommends offset provisions under the EPBC Act be utilised to improve habitat and support recovery of this species within its range including the Maribyrnong River.

**(viii) Terrestrial ecology**

Small tidal variation changes will not reduce terrestrial saltmarsh around the Bay. The Inquiry notes short term effects on prey for bird species will be minimal due to their ability to forage widely within the Bay. The EMP includes measures to minimise turbidity plume effects on gannets and crested terns.

**(ix) The Entrance**

The Inquiry notes the intended rock removal from the Entrance will result in rockspill and rockfall into the canyon as experienced during the TDP.

While the Inquiry is satisfied with IEG advice that rockfall into the canyon will not affect the Entrance ecology permanently, the incidence of rockfall has emerged as a substantial concern, due to uncertainty about the scouring process.

The SEES predicted the scouring process is likely to lead to continuing rockfall for some 30 years at a logarithmic rate and would be likely to cease at RL-22m. The IEG advised this prediction was a worst case scenario and the scouring effect will cease within the ten year period suggested by PoMC.

In their final submission, PoMC advised that any further clean-up work associated with rockfall at the Entrance will be an additional cost. Noting the commercial incentive to minimise cleanup and continue dredging, the Inquiry considers the EMP is capable of managing this impact, through clearly defined control measures to ensure maximum clean-up.

An area of the Point Lonsdale section of the Port Phillip Heads Marine National Park will be affected by rockfall. The *National Park Act* provides for the management of development and effects within Parks. The Inquiry endorses the additional protection of the Marine National Park through the use of a five metre ridge to minimise rockfall during dredging.

To counter this major impact, the Inquiry endorses the PoMC proposal to contribute to knowledge about recovery of deep reef ecology in temperate waters as a scientific contribution and recommends that an offset be provided to the Bay to compensate for the impact. Offsets to be considered should include recovery of marine habitats that drive Bay ecology (such as habitat supporting fish recruitment, upgrading or establishing wetlands to reduce nutrients, and improvements to water quality management within the Bay's catchment such as revegetation of riparian zones).

### 3.2 Economic

Economic considerations include:

- the strategic context for the proposal;
- benefit cost analysis including project benefits and costs;
- appropriateness of economic modelling, including sensitivities and externalities; and
- distribution of benefits.

The Inquiry finds the strategic argument for CDP compelling, noting the significance of Melbourne for national trade, trends in container ship size, costs associated with constraints on loading and port access, and case histories of ports that have been slow to deepen channels. Sensitivity analyses provide confidence that under a wide range of normal circumstances, investment in channel deepening and in associated port infrastructure is supported economically.

PoMC relied upon the best available economic analysis to build a set of broadly credible projections to evaluate the benefits of CDP. The Inquiry tested these projections and the sensitivity of the variables and was satisfied about their robust and positive nature. The Inquiry considered alternative views, and found no reasonable economic case against CDP, even after taking predicted environmental impacts into account.

Port access benefits principally flow via container shipping to a range of interests, most Australian based, and will be distributed to consumers and business over 20 years after CDP completion. Some submitters claimed that benefits to Victorians would be minuscule if measured per person, but that is equally true of any other collective or community benefit, whether it be environmental improvement,

upgraded highways, or national broadband. The Inquiry is satisfied that Victoria will benefit economically from CDP.

The Inquiry considers that the strategic and economic case for CDP has been established by PoMC and the Victorian Government Departments' submission. Moreover, the benefit-cost ratio is robust enough to absorb the effects of adverse deviations from key assumptions, including as yet unquantified costs of environmental effects.

### 3.3 Social

The assessment of social impacts by the Inquiry included:

- adequacy of social impact research;
- recreation and tourism impacts;
- community fears and perceptions;
- proposed dredge schedule changes; and
- employment (and loss of business) opportunities.

PoMC's conclusions relied heavily on the case that all risks could be managed, and social impacts would largely be minimal. However, the Inquiry found a deep and unrelenting concern by community participants about the CDP, and is disappointed that the social impact assessment was not more thorough and conclusive.

### 3.4 Inquiry Finding

**The Inquiry is satisfied that the likely environmental effects (including economic and social) of the proposed CDP dredging activities and the subsequent operation of the deepened shipping channels have been addressed and are acceptable. While the Inquiry is satisfied with PoMC and IEG advice that rockfall into the canyon will not permanently affect the Entrance ecology, rock scour remains an issue of concern to the Inquiry due to continuing uncertainties surrounding the processes involved. The Inquiry believes this issue should be carefully observed and monitored.**

#### 4. TERM OF REFERENCE 3

---

*“Whether the proposed project design and approach to project implementation (including technologies and work methods) with or without modifications, are suitable to ensure the achievement of acceptable environmental outcomes, having regard to relevant legislation and policy, as well as costs, benefits and operational efficiency in delivering the project”.*

Chapters 21 and 22 of the Appendix Report deal with this Term of Reference.

Evaluation of the EMP and governance are critical to this task. PoMC responded extensively to the Inquiry’s questions about the EMP, and in particular whether its measures are cost effective and ensure *“operational efficiency in delivering the project”*.

The Inquiry assessed whether:

- best practice has been adopted;
- effects have been minimised to the extent practical through design;
- measures in the EMP are cost effective and operationally efficient to manage risk and uncertainties;
- management arrangements are practical, workable and effective; and
- possible ongoing effects of the CDP can be managed within the EMP.

Relevant legislation and policy guidance includes:

- EPBC Act;
- *Environment Protection Act 1970* and subordinate legislation;
- *Our Environment Our Future: Victoria’s Environmental Sustainability Framework*;
- *Fisheries Act 1995*;
- *Flora and Fauna Guarantee Act 1988*;
- *Heritage Act 1995*;
- *Aboriginal Heritage Act 2006*;
- *Marine Act 1988*;
- *Coastal Management Act 1995*; and
- *Victorian Coastal Strategy*.

The Minister for Planning’s Assessment and subsequent Government decisions, pursuant to the *Coastal Management Act 1995*, specify and formalise management requirements, (eg auditing or monitoring arrangements), to ensure the agreed environmental outcomes are practically effective and fully adhered with.

The Inquiry was guided by a considerable body of policy, strategy, legislation, regulation, and custom and practice in determining the CDP's acceptability.

Environmental outcomes are principally determined by channel design, choice of equipment, and dredging strategy. PoMC established a 'rule-based' system to determine its dredging strategy (including scheduling and production rates resulting from the extent of overflow). While PoMC has provided "*triple bottom line*" assessment of scheduling and production options, the Inquiry went to considerable lengths to satisfy itself that the full set of risk abatement options are covered through the EMP in order to inform Government of the acceptability of the risks and effects.

The IEG is generally satisfied with the overall approach to the EMP. The Inquiry, the Departments and the IEG identified several areas in which the EMP requires further development, including:

- technical matters regarding seagrass protection;
- environmental limits based on the relationship between NTU and light attenuation coefficients ( $K^d$ );
- detailing Baywide programs to provide the basis for environmental review; and
- supplementary indicators in order to respond to residual uncertainty, where the consequences may be substantial.

During CDP implementation, EMP administration will require continuous monitoring of data, analysis of day-to-day events that may be reported by the community, as well as consideration of issues arising from periodic environmental performance reviews. Determining whether the changes are caused by the CDP rather than seasonal or other natural events will require fine judgements.

To provide the community with a high level of confidence in the environmental management of CDP implementation, the Inquiry considered various options to ensure the EMP is fully adhered to and practically effective.

Final CDP approval depends on a rigorous EMP, and related implementation arrangements following appropriate State and Commonwealth administrative processes.

#### **4.1 Environmental Management Framework**

The Inquiry accepts that the EMP, as part of an overall environmental framework, is the controlling mechanism for dealing with risk and uncertainties associated with the CDP. In this context, the Inquiry concludes that:

- (i) the risk assessment process is adequate, noting that an internal and external peer review process was undertaken to the IEG's satisfaction;
- (ii) predicted environmental performance is acceptable subject to amendments to the EMP;
- (iii) the environmental management framework includes the appropriate elements, but requires further strengthening as the guidance document for environmental protection purposes; and
- (iv) the EMP is appropriate and effective, but needs revision in accordance with the Inquiry recommendations and IEG advice before CDP proceeds.

## 4.2 External Project Governance

The Inquiry examined key governance elements, including:

- identification of an authorising regime through legislation;
- decision making during EMP implementation, including internal management reviews;
- the need for external assurance, including an independent monitor;
- the compliance framework, including internal and external audits; and
- responses to compliance breaches, including penalties and use of an environmental performance bond.

The Inquiry concluded governance will be strengthened through:

- flexibility in the timing and purpose of internal management reviews;
- appointment of an independent monitor;
- complementing internal audits with external audits; and
- the requirement for an environmental performance bond.

## 4.3 Inquiry Finding

**The Inquiry concludes that the proposed project design and approach to project implementation (including technologies and work methods) with modifications, is suitable to ensure achievement of acceptable environmental outcomes, having regard to relevant legislation and policy, as well as costs, benefits and operational efficiency in delivering the project.**

## 5. TERM OF REFERENCE 4

---

*“The considerations relevant to the Assessment that will inform decisions whether or not to approve the CDP under the Coastal Management Act 1995 and under the Environment Protection and Biodiversity Conservation Act 1999 (Cth)”.*

Chapters 3, 14, 15 and 23 of the Appendix Report deal with this Term of Reference.

The PoMC confirmed the two primary statutory approvals are:

- *Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act);*  
and
- *Coastal Management Act 1995 (Vic).*

Other relevant legislation include:

- *Flora and Fauna Guarantee Act 1988;*
- *Fisheries Act 1995;*
- *Heritage Act 1995;* and
- *National Parks Act 1975.*

PoMC has commenced preparation of a cultural heritage management plan pursuant to the *Aboriginal Heritage Act 2006*.

PoMC has also applied for approval under the *EPBC Act* and notes that the assessment process under the *Environment Effects Act* has been accredited to meet assessment requirements under the *EPBC Act*.

The Inquiry was advised that at the Victorian level, PoMC has not yet applied for consent to undertake the Project, as it was awaiting completion of the SEES hearing process.

Chapters 3 and 23 of the Appendix Report deal with legislation matters relevant to this Term of Reference.

### 5.1 State Considerations

The *Coastal Management Act 1995* provides a coordinated approach to approvals for the use and development of Victorian Coastal Crown land, Section 3(1) of the Act specifying:

- any land reserved under the *Crown Land (Reserves) Act 1978* for the protection of the coastlines;
- Crown land within 200 metres of the high water mark of the coastal waters;
- any sea within the limits of Victoria; and
- the seabed of the coastal waters and sea of Victoria.

Section 37 of the Act provides that a person must not use or develop coastal Crown land unless they have obtained the written consent of the Minister administering the Act, who must have regard to:

- the Victorian Coastal Strategy;
- any Coastal Action Plan applying to the land;
- any recommendation of the Land Conservation Council for land in respect of which notice has been given under section 10(3) of the *Land Conservation Act 1970*; and
- the purposes for which land was reserved, in the case of land reserved or deemed to be reserved under the *Crown Land (Reserves) Act 1978*.

CDP is consistent with relevant provisions and intent of the *Coastal Management Act*.

## 5.2 Commonwealth Considerations

The EPBC Act is administered by the Commonwealth Department of Environment and Water Resources. It provides a legislative framework for the protection of the environment and conservation of biodiversity; especially those aspects that are matters of national environmental significance. The Act provides that actions that are likely to have a significant impact on a matter of national environmental significance are subject to an assessment and approvals process.

The EPBC Act enacts legislation for the implementation of international agreements relating to the protection of flora and fauna species and communities, including:

- the Ramsar Convention on Wetlands;
- the International Convention on Biological Diversity;
- International Migratory Bird Agreements (Japan – Australia JAMBA and China – Australia CAMBA); and
- the Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention).

The Commonwealth Minister for the Environment and Water Resources decided on 20 March 2002 that the CDP was a ‘*controlled action*’ under the provisions of the EPBC Act. The Commonwealth in turn accredited the Victorian assessment process. The controlling provisions of the EPBC Act relevant to the CDP are:

- Sections 16 and 17B (wetlands of international importance);
- Sections 18 and 18A (listed threatened species and communities);
- Sections 20 and 20A (listed migratory species); and
- Sections 26 and 27A (protection of the environment from actions involving Commonwealth land).

The Commonwealth Minister provided a Statement of Reasons for the decision and controlling provisions which outline the matters of national environmental significance that could be affected by the project.

The Inquiry identified the following key issues relating to Commonwealth matters:

- ecological issues;
- listed threatened species and communities;
- listed migratory species; and
- protection of the environment of Commonwealth land.

Wetlands of international importance listed in the Ramsar Convention are protected under the EPBC Act.

Sediment transport modelling indicates no likely tidal current induced change in the vicinity of Mud Islands, Swan Island and Swan Bay as a consequence of the CDP.

Modelling predicts that changes in tidal variation and currents will not cause net loss of saltmarsh communities located at The Spit, Swan Bay and Mud Islands. Small decreases in the height of low tide may result in slightly more inter-tidal mudflat being exposed. The effects on inter-tidal mudflats in these Ramsar areas due to predicted changes in tide levels are not anticipated to be significant

Key findings relating to the Bay and Bellarine Peninsula Ramsar site follow:

- turbidity modelling assesses sedimentation effects as negligible because changes will be within expected natural variability;
- suspended sediments at these sites are predicted to be within natural variation and will not affect biota;
- impacts on seabird feeding will be minor. Due to the extensiveness of alternative feeding areas, any consequential impacts on the ecological character of the Ramsar wetlands are not considered significant;
- effects of light reduction on photosynthesis of benthic plants in the Ramsar areas are assessed as negligible due to very low concentrations of the turbidity plume;
- effects from mobilised contaminants at the Spit are negligible,

- effects from mobilised contaminants on Swan Bay and Mud Islands are negligible because South Channel dredged materials contain low contaminant levels; and
- as the CDP will have negligible effects on Bay-wide nutrient loads and nutrient cycling, it is unlikely there will be any flow-on effects to Ramsar areas from mobilisation of nutrients .

Effects on seagrass from changes in waves and tidal currents causing shoreline instability and erosion are relevant only to Swan Bay and Mud Island. Hydrodynamic modelling indicates no measurable changes to waves or wave energy in these areas, so resulting erosion or shoreline instability is not expected. The CDP will not impact wetland ecology, and changes to waves and tidal currents will not have an effect on the seagrass beds at Mud Islands and Swan Bay.

Hydrodynamic and sediment transport processes or changes in water quality will have insignificant indirect effects on salt-marshes, inter-tidal mudflats and seagrass beds at Swan Islands, Mud Islands and The Spit.

Effects relating to the ecology of relevant areas of Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site will be minimal as few CDP activities will occur at or in their immediate vicinity.

The EPBC Act contains two categories of listing for species:

- (i) threatened species and communities (extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation depending); and
- (ii) listed migratory species.

The likely impact on the Grayling and Mudfish is discussed in Chapter 15 of the Appendix Report. Certain components of the protected species' life cycle could be affected by the CDP and their potential for direct effects from the dredge itself. The dredge schedule changed following exhibition, and is now intended in Spring during the sensitive period for juveniles migrating upstream through the Yarra River.

The Inquiry notes that migration routes may be affected by noise generated by the TSHD – particularly in the Yarra River as dredging is scheduled during sensitive periods for listed species such as Grayling and Mudfish.

In relation to potential impacts on fish and cetaceans, the Inquiry accepts the observations set out in the PoMC's closing submission:

*The following issues should be taken into account in the Inquiry's consideration of the risk to the Grayling:*

*The Yarra is a highly modified environment that is subject to high background levels of turbidity and natural events causing turbid plumes. It has also been subject to periodic dredging over time.*

*Dr Jenkins predicts recovery of breeding for the Grayling within 1-2 years noting the high fertility of the species.*

*Ultimately, it is submitted that significant impacts are unlikely, with or without dredging the Yarra River in September.*

*It is noted that the Mudfish is not listed under the EPBC Act.*

The Inquiry notes that the EPBC Act now provides for offsets where a listed species is impacted.

For other species, the Inquiry concludes that:

- great white and grey nurse sharks are not dependent upon the Bay;
- blue, southern right and humpback whales are unlikely to be affected by activities associated with the CDP;
- leatherback turtle will not be affected;
- threatened seabird species will not be affected; and
- other listed bird species will not be affected.

Further, no listed seabird species will be affected by the CDP.

In 2004, the EPBC Act was amended to include provision for indigenous and non-indigenous cultural sites of national importance. Under this law, an application for actions likely to have a negative impact upon sites or places listed on the National or Commonwealth Heritage Lists must be made to the Commonwealth Minister for the Environment and Water Resources.

The Commonwealth Heritage list consists of sites owned or controlled (leased) by the Commonwealth Government, including defence, communications and customs. The CDP has the potential to affect a number of such sites, including:

- Swan Island Defence Precinct, Queenscliff;
- Swan Island and Naval Waters, Queenscliff (including six shipwrecks); and
- Point Nepean Commonwealth area, Portsea.

The Inquiry accepts that there will be no impacts on buildings and other infrastructure from the predicted changes to hydrodynamic and coastal processes resulting from the CDP.

## 5.2 Inquiry Finding

**The Inquiry concludes that the considerations relevant to the Assessment that will inform decisions whether or not to approve the CDP under the *Coastal Management Act 1995* and under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* have been satisfied.**

## 6. SUMMARY OF FINDINGS AND RECOMMENDATIONS

---

For the reasons expressed in this Report and supported by the analysis in the Appendix Report, the Inquiry provides the following findings:

1. The Inquiry is satisfied that based on the SEES, peer reviews and IEG advice, the proposed design complies with relevant policy. The Inquiry concludes the proposed CDP design (including for the Channels, dredged material grounds and navigational aids) is safe, suitable and technically feasible to implement using the proposed dredging technologies. The Inquiry supports inclusion of design and implementation details in approvals granted pursuant to the *Coastal Management Act 1995*.
2. The Inquiry is satisfied that the likely environmental effects (including economic and social) of the proposed CDP dredging activities and the subsequent operation of the deepened shipping channels have been addressed and are acceptable. While the Inquiry is satisfied with PoMC and IEG advice that rockfall into the canyon will not permanently affect the Entrance ecology, rock scour remains an issue of concern to the Inquiry due to continuing uncertainties surrounding the processes involved. The Inquiry believes this issue should be carefully observed and monitored.
3. The Inquiry concludes that the proposed project design and approach to project implementation (including technologies and work methods) with modifications, is suitable to ensure achievement of acceptable environmental outcomes, having regard to relevant legislation and policy, as well as costs, benefits and operational efficiency in delivering the project.
4. The Inquiry concludes that the considerations relevant to the Assessment that will inform decisions whether or not to approve the CDP under the *Coastal Management Act 1995* and under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) have been satisfied.

To support these findings, the Inquiry provides the following recommendations to Government and the PoMC:

1. PoMC amend Version C of the EMP to:
  - 1.1 Include detailed channel design, construction depths and dredging tolerances, defined as control measures.

- 1.2 Adopt the revised CDP schedule that includes Yarra River dredging in spring 2008.
- 1.3 Provide for proportionate offset impacts on protected species (such as Australian Grayling) including improvements to their habitats in other parts of their range (eg. Maribyrnong River).
- 1.4 Deploy alternative noise producing devices to deter marine fauna from approaching the hydrohammer prior to its use in the Entrance, if it cannot be used at lower power for this purpose.
- 1.5 Evaluate opportunities for potential reuse of dredged materials for beach renourishment in the CDP and future maintenance dredging programs.
- 1.6 Mount an information campaign to inform the public of the implications of any dredging programs and other sources of influence on the marine environment, particularly with regard to sediment contamination risk in the Yarra River and other estuarine and marine ecosystems.
- 1.7 Undertake a monitoring program for placing and capping contaminated material to:
  - ensure that the final location and surface bathymetry of contaminated material placed in the northern DMG extension are as predicted; and
  - confirm that there are no failures of capping, turbidity plumes beyond those predicted, or reduction in water quality in the vicinity of the DMG extension.
- 1.8 Strengthen governance arrangements to ensure the PoMC is accountable for bund structure and effectiveness. Include additional monitoring for possible bioaccumulation and biomagnification up the food chain before and after the capping is put in place.
- 1.9 Log all maintenance dredging to update existing data to assist ongoing assessments of the Great Sands.
- 1.10 Ensure a fit-for-purpose program that can detect long-term changes to sediment transport in the Great Sands. Include monitoring surveys to be conducted during and after the CDP, and link these to scheduling of future maintenance dredging campaigns.
- 1.11 Increase the accuracy of sediment transport predictions in the Great Sands by calibrating SEES modelling against LIDAR and multi-beam

surveys, maintenance dredging volumes and channel infilling rates.

- 1.12 Expand the monitoring of water quality to provide a reference and a back up to the automatic turbidity monitoring by adding PAR measurements to the suite of indicators.
- 1.13 Apply the IEG recommended Fox approach, based on quality control statistics to assessment of appropriate Bay-wide monitoring programs.
- 1.14 Strengthen relevant clauses to ensure that the health status of the Little Penguin colony at St Kilda is monitored during and post dredging.
- 1.15 Provide offsets to improve fish stocks, including improvement of key habitat sites or reduction of threats within the affected species range.
- 1.16 Monitor fish subsequent to the CDP, while existing fishing advisories and limitations are in place, using these data to review advisories.
- 1.17 Ensure PoMC is accountable for CDP impacts on fish populations.
- 1.18 Include the following measures to improve Entrance management:
  - increase the frequency and extent of cleaning runs, both inside and outside the dredging zones;
  - increase the frequency of bathymetric sounding surveys both inside and outside the dredging zones;
  - reduce ripper teeth length as the final depth is approached or consider use of a more conventional, lighter draghead;
  - use methods other than trailing to remove any stubborn high spots;
  - use the trawl net to remove specific caprock pieces;
  - carry out all dredging runs when swell heights are at a relatively low level; and
  - further cleanup after completion of dredging to deal with loose rocks that are found.
- 1.19 Ensure control measures are clearly defined to ensure maximum clean up of rockfall in the Entrance.
- 1.20 Include control measures to ensure maximum capture of rock prior to removal of ridges along the canyon wall.
- 1.21 Refer each collaborative monitoring program, including review timeframes to the IEG prior to project approval, for confirmation that it is 'fit-for-purpose' for timely consideration of data and addresses an

appropriate package of potential flow on effects. In doing so, the IEG should confirm that Bay-wide monitoring programs are appropriately designed to measure changes against natural variation so that CDP management may take account of these during and after dredging.

- 1.22 Include post-dredging investigations of major risk events to confirm the extent of changes relative to predictions.
- 1.23 Consider appropriate mechanisms for ensuring the project stops if a significant or unexpected impact occurs.
- 1.24 Provide additional monitoring to address Commonwealth issues:
  - Commonwealth of Australia lands and Ramsar sites;
  - Seagrass in Ramsar areas such as Swan Bay;
  - Gannets and terns; and
  - Grayling.
2. Following revision of (1) above, PoMC seek IEG endorsement that the EMP satisfies acceptable standards of scientific and statistical definition.
3. The Government appoint an independent monitor to advise Government on unexpected or significant changes to schedule and dredging strategies and associated timetables; responses to significant environmental exceedences; compliance with the EMP (including where a response level is triggered); and adverse outcomes identified by monitoring programs.
4. The Government consider whether the Alliance should deposit an environmental performance bond linked to safe and effective CDP delivery, and post recovery.
5. PoMC develop a strong and effective communication strategy for the duration and post recovery of CDP. This should include:
  - 5.1 Appointing a professional of sufficient seniority and capability as "*Community Liaison Officer*" to respond to community inquiries.
  - 5.2 Establishing a "*Community Liaison Group*", including representatives from the existing Project Stakeholder Advisory Committee, for an initial period of three years. It should meet regularly while the project is being undertaken, and continue during the recovery process.
  - 5.3 Maintaining effective communication with relevant community groups interested in Bay use and conditions, as well as commercial fisheries.

5.4 Consulting the community during and after the CDP to raise awareness of potential for future use of dredged material.

The Appendix Report also contains a significant number of proposals and advice from the Inquiry and IEG to strengthen the EMP further. PoMC will need to work these through in undertaking the EMP revision.