



Port of Melbourne Channel Deepening Project: Achievement of Objectives



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Port of Melbourne Channel Deepening Project: Achievement of Objectives

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Victorian Auditor-General's Office
Auditing in the Public Interest

The Hon. Bruce Atkinson MLC
President
Legislative Council
Parliament House
Melbourne

The Hon. Ken Smith MP
Speaker
Legislative Assembly
Parliament House
Melbourne

Dear Presiding Officers

Under the provisions of section 16AB of the *Audit Act 1994*, I transmit my report on the audit *Port of Melbourne Channel Deepening Project: Achievement of Objectives*.

Yours faithfully



D D R PEARSON
Auditor-General

14 November 2012

Contents

Audit summary	vii
Introduction	vii
Conclusions	viii
Findings	ix
Recommendations	xiii
Submissions and comments received	xiii
1. Background	1
1.1 The Port of Melbourne	1
1.2 The Channel Deepening Project	2
1.3 Previous audit of the Channel Deepening Project	3
1.4 Audit objectives, scope and cost	8
1.5 Structure of the report	8
2. Improving the Port of Melbourne's efficiency and competitiveness	9
2.1 Introduction	10
2.2 Conclusion	10
2.3 Increasing port calls by larger vessels	11
2.4 Reducing delays for restricted vessels	16
2.5 Stimulating private sector investment	17
2.6 Reducing shipping costs relative to competing ports	19
3. Facilitating trade through the Port of Melbourne	27
3.1 Introduction	28
3.2 Conclusion	28
3.3 Facilitating cargo trade through the port	29
4. Delivering the project	33
4.1 Introduction	34
4.2 Conclusion	34
4.3 Delivering all Channel Deepening Project components on time	34

5. Complying with environmental approval conditions	37
5.1 Introduction	38
5.2 Conclusion	39
5.3 Monitoring compliance with the environmental management plan	39
5.4 Responding to environmental incidents	43
5.5 The health of Port Phillip Bay	45
Appendix A. <i>Audit Act 1994</i> section 16—submissions and comments.....	47

Audit summary

Introduction

The Port of Melbourne is Australia's busiest container port, and a pivotal hub in the nation's logistics network. It is therefore a key contributor to the economic wellbeing of Victoria and Australia.

The Port of Melbourne Corporation (the corporation) is responsible for managing the Port of Melbourne. It is required to provide safe and efficient movement of shipping through the channels and the port, and facilitate trade growth through the integrated management and development of land and maritime functions.

The corporation identified the deepening of the shipping channels as a necessary and strategically important project based on the expected strong future growth in container trade and vessel size.

The 2007 business case for the Channel Deepening Project (CDP) proposed that, in the long term, it would deliver tangible benefits in the form of efficiencies and improved competitiveness of the port, and significant cost savings to shipping companies through the use of larger, more operationally efficient vessels with greater loads. The business case also indicated this outcome would be dependent on the implementation of significant landside investment.

CDP was the Port of Melbourne's largest ever marine infrastructure development comprising dredging works, landside improvements, protection of underwater utilities, enhanced navigational aids for ships, and environmental monitoring and management. The project faced significant technical, procurement and environmental risks which created strong public interest in safeguarding the bay environment.

The project was subject to extensive and rigorous assessment under the *Environment Effects Act 1978* between early 2002 and late 2007 to assure the state and Commonwealth governments and the community that the corporation could effectively manage the project's environmental impact on Port Phillip Bay.

CDP's delivery phase commenced in February 2008 under close scrutiny by the regulators, interest groups and the public. The project's delivery occurred within a strict set of environmental rules and conditions, complemented by a range of monitoring programs designed to monitor its compliance with approval conditions, and the health of Port Phillip Bay.

The construction phase was publicly announced as completed on 25 November 2009, about a month ahead of schedule. The baywide monitoring programs continued for another two years as required and were completed by June 2012.

Our 2009 audit of CDP examined the corporation's development and implementation of the project up to that time. It found the corporation was effectively delivering CDP in compliance with the approval conditions.

Three years after completion of the project, this audit examined how effective the corporation has been in achieving CDP's objectives of:

- improving the Port of Melbourne's efficiency and competitiveness
- increasing trade through the Port of Melbourne compared to the situation without the project
- delivering the project on time, on budget, and to the required quality standards
- complying with the environmental approval conditions.

Conclusions

The corporation has successfully delivered the construction phase of CDP ahead of time, under budget and, except for three minor nonconformances, in compliance with the environmental approval conditions. This is a significant achievement given the importance, scale and environmental risks associated with the project.

However, CDP has since been affected by the events of the 2008 global financial crisis (GFC). The significant downturn in global manufacturing and exports post-GFC has resulted in much lower demand for global trade and an oversupply of shipping capacity that has affected the financial viability of the global shipping industry.

As it is only three years into the 25-year life of CDP, its full benefits cannot yet be determined. However, early CDP performance data highlight the recent effects of the GFC on global trade and shipping companies. Specifically, it indicates:

- slower than originally projected growth in visits by larger vessels—around 1 560 such visits occurred over 2010 and 2011 compared to the forecast of 1 668
- that the current oversupply in shipping capacity is resulting in less than expected use of the extra draught capacity of these vessels
- that adverse market conditions for ship owners and operators are currently precluding any practical realisation of cost savings as a result of CDP and the use of larger ships
- lower growth in trade volume post CDP than was originally forecast.

These developments are beyond the corporation's direct control and could not have reasonably been envisaged at the time it developed the CDP business case. While it should be noted that these early results do not preclude achievement of the CDP's objectives in the long run, their significance however warrants a review of the assumptions underpinning current projections of long-term economic benefits from CDP.

Such a review is justified given the project's significant costs, value and importance to Victoria's economy. It could also offer valuable and up-to-date insights into whether the existing assumptions need to be recalibrated in light of changes to the global economy, and whether new/additional strategies are now required to optimise achievement of future benefits and guide associated decision-making.

Assessing the impact of the changed global economic conditions on CDP is a highly challenging and complex task. However, it would improve accountability and transparency for CDP's performance, and would substantially enhance the corporation's ability to manage and optimise the realisation of future benefits.

Findings

Improving the Port of Melbourne's efficiency and competitiveness

Improving competitiveness by enabling visits by bigger ships

A greater number of larger vessels are now visiting the Port of Melbourne but at a slower rate than was projected in the 2007 CDP business case. This is consistent with the decline in new vessel builds, including global demand for containerised shipping, evident following the GFC.

Both pre-and post-CDP, Melbourne has remained the dominant port in terms of visits by larger vessels compared to Sydney and Brisbane. However, these larger ships are sailing well below their full load capacity and, consequently, in most cases are not yet utilising the expanded draught capacity of the port. The business case anticipated that full utilisation of larger vessels would not immediately occur post-CDP as it would take time for trade volumes to catch up with the expected step increase in ship capacity.

However, the current global oversupply of ship capacity caused by the GFC has exacerbated this situation. The corporation acknowledges it will take a number of years for the increased capacity to be utilised, consistent with the growth in trade volumes forecast in the business case.

The 2007 CDP business case indicated that the imposition of the CDP cost recovery fee would decrease Melbourne's price competitiveness but that it would still remain competitive with other Australian ports—this has occurred.

Reducing vessel delays

A desired outcome of CDP was to reduce delays for vessels with an operating draught of more than 11.6 metres that previously had restricted port access. However, the corporation does not know whether CDP has achieved this as it advised that it does not collect such data.

Facilitating private sector investment

The CDP business case identified the level of investment commitments in port facilities by private operators as a key measure of the project's success as it reflects the environment created by CDP.

While it is evident that some private sector investment in port facilities has occurred, the corporation is unable to demonstrate how this was influenced by CDP. The corporation has not measured the actual value of investment achieved to date compared to its 2007 business case forecast. The corporation advised that it discontinued this corporate performance measure from 2008–09 due to the difficulty in obtaining accurate and timely private sector investment data.

Realisation of cost savings to shipping companies

During this audit, the corporation updated its estimates of the cost savings realised by shipping companies to date as a result of CDP. The revised estimates were derived using the 2007 business case economic model, and by:

- substituting the original business case forecast of the size of vessels expected to visit Melbourne following CDP, with the actual profile of vessels that visited the port in 2010 and 2011
- computing the average weighted unit cost of providing shipping services for the updated profile of vessels, and the difference between this cost and the equivalent cost expected in the absence of CDP
- multiplying this difference by the actual quantity of shipping capacity provided in each of 2010 and 2011 to estimate total cost savings in US dollars, which were then converted to Australian dollars using the updated exchange rate.

These estimates suggest that daily ship operating costs for vessels visiting Melbourne have now reduced post-CDP, and that this has resulted in much greater cost savings to shipping companies than originally forecast.

However, the original business case assumptions do not reflect the significant impacts on worldwide shipping costs currently borne by ship owners and operators as a result of the GFC.

Specifically, the unprecedented global oversupply of shipping capacity following the GFC has led to a significant and sharp decline in freight and charter rates throughout the industry. While this has benefited cargo owners, it is threatening the financial viability of many ship operators and owners respectively. Collectively, these factors have dramatically increased the net costs borne by ship owners and operators worldwide, and are currently precluding the practical realisation of cost savings as a result of CDP.

The corporation's estimated cost savings to date rely on pre-GFC assumptions about the weighted average unit cost of shipping services associated with the profile/capacity of vessels visiting the port. These assumptions are unlikely to be accurate in the current global shipping market. It is not evident that the corporation accounted for these potential impacts in determining its current estimates of ship operating cost savings.

Monitoring and managing the realisation of benefits

Despite the project's significant cost, expected long-term economic benefits and importance to the state's economy, the corporation has not developed a benefits management plan (BMP) for CDP.

The Department of Treasury and Finance (DTF) has promoted this practice within its investment management standard since 2004, recognising that new information may be uncovered during a project's life that wasn't available to the original decision-makers.

Benefits monitoring enables the original investment assumptions and related strategies to be periodically validated and/or adjusted during a project's life to assure the investment delivers maximum benefit.

The corporation has instead focused on monitoring the project's performance against the business case critical success factors. While a BMP is not a mandatory requirement, the emergence of the GFC since the original CDP business case was developed, coupled with the project's 25-year horizon for benefits realisation suggests that such a review is warranted. Until this occurs, the soundness of the corporation's savings estimates from the project to date cannot be reliably assessed.

The corporation advised that a benefits review of CDP is planned for late 2014 following discussions with DTF in April 2012. This is a positive initiative, which reinforces the need to expeditiously develop a benefits management plan to enable the planned review to effectively occur.

Facilitating trade through the Port of Melbourne

The 2007 business case concluded that with or without CDP, the Victorian container trade volume was forecast to almost double by 2025. This forecast excluded the Tasmanian trade as these ships would not utilise the deeper draught provided by the CDP and would not be subject to the CDP fee.

From 2005 to 2008 trade volume through Melbourne, excluding the Tasmanian trade, steadily increased in line with the level forecast in the 2007 CDP business case. The GFC caused trade volumes to fall in 2009 and although they recovered in 2010 and 2011, volumes were slightly below the level forecast.

Melbourne's share of trade volume, excluding the Tasmanian trade, declined from 2006–07 to 2009–10 while Sydney's increased and was virtually equal with Melbourne in 2009–10. This trend was reversed in 2010–11 and 2011–12, following the completion of CDP. While not necessarily attributable to CDP, continuation of this positive two year trend would be consistent with the CDP objective of improving the port's competitiveness.

Delivery on time and budget

CDP's dredging and construction components were all completed on 25 November 2009, one month ahead of schedule. At June 2012, the project's expenditure was \$717.3 million, about \$250 million under the approved business case budget. It will remain significantly under budget after considering forecast expenditures in the future years for remaining surveys and monitoring programs. About half of the total savings—\$137 million—was due to the unused contingency provision, reflecting the effectiveness of the corporation's risk mitigation and project management processes.

As the corporation received a \$100 million contribution from the government, the net cost of \$617.3 million is being recovered through a CDP infrastructure levy.

Compliance with the environmental approval conditions

The audit assessed the corporation's compliance with the environmental approval conditions by examining the comprehensiveness and reliability of the Office of Environmental Monitor's (OEM) compliance reports and related assessment activities. We found OEM's independent scrutiny of the project's environmental compliance was active, comprehensive, and reliable, and that its conclusions were evidence based and could be relied on.

The corporation has delivered the project in compliance with the applicable environmental approval conditions with three minor exceptions relating to the clean-up, disposal and location of dredging works.

The corporation closely monitored its environmental performance during the course of the project. It also actively engaged with the public through media releases and press conferences about the project's activities and its environmental incidents. The corporation appropriately managed all minor nonconformances and environmental incidents which occurred. Importantly, the environmental effects of these incidents were inconsequential.

The project has not adversely impacted on the bay and the bay remains in good health.

Recommendations

Number	Recommendation	Page
	The Port of Melbourne Corporation, in consultation with the Department of Transport, should:	
1.	review the impact of the global financial crisis on the expected timing and quantum of future economic benefits from the Channel Deepening Project	26
2.	review existing Channel Deepening Project critical success factors/metrics and expedite development of a benefits management plan and related strategies for optimising the achievement of Channel Deepening Project objectives and future benefits	26
3.	commencing from 2014, implement regular and timely benefits reviews/reporting to the corporation's board, executive management and the Department of Transport, against the benefits management plan.	26

Submissions and comments received

In addition to progressive engagement during the course of the audit, in accordance with section 16(3) of the *Audit Act 1994* a copy of this report, or relevant extracts from the report, was provided to the Port of Melbourne Corporation, the Department of Transport and the Department of Sustainability and Environment with a request for submissions or comments.

Agency views have been considered in reaching our audit conclusions and are represented to the extent relevant and warranted in preparing this report. Their full section 16(3) submissions and comments are included in Appendix A.

1 Background

1.1 The Port of Melbourne

1.1.1 The significance of the Port of Melbourne

The Port of Melbourne is a key driver of the economy of Victoria and Australia. As the gateway to the international markets for Victoria and its surrounding regions in New South Wales, South Australia and Tasmania, it handles nearly \$75 billion in international and coastal trade each year, and contributes more than \$2.5 billion to the state economy each year.

Melbourne is also Australia's busiest container port, handling about 36 per cent of the nation's total container trade. In 2010–11, it handled 2.39 million twenty-foot equivalent units (TEU) compared to 2.02 million TEU for the port of Sydney and nearly 1 million TEU for Brisbane. Over the 10-year period prior to the global financial crisis (GFC) in 2008, Melbourne's container throughput had more than doubled from 1.05 million TEU in 1997–98 to 2.30 million TEU in 2007–08. While the growth in trade volumes slowed during the GFC, container trade has since recovered and has grown at an average rate of 6.6 per cent per annum since 2009. The strong growth trend is expected to continue, with trade volume forecast to double to about 4.6 million TEU by 2025.

The forecast growth in trade volumes will increase capacity constraints, thereby underscoring the need to improve the port's efficiency.

1.1.2 Management of the Port of Melbourne

The Port of Melbourne Corporation (the corporation) is responsible for managing the Port of Melbourne. Under the *Transport Integration Act 2010* and the *Port Management Act 1995* (previously the *Port Services Act 1995*), the corporation is required to manage the Port of Melbourne in an economically, socially, and environmentally sustainable manner. It is also required to provide safe and efficient movement of shipping through the channels and the port, and facilitate trade growth through the integrated management and development of land and maritime functions of the port.

1.2 The Channel Deepening Project

1.2.1 Rationale for deepening the bay

Successive government policies have recognised the importance of the Port of Melbourne as one of the key drivers of the state's economy, and therefore the need to maintain and strengthen its position as the premier container port of Australia.

The corporation identified the deepening of the shipping channels as a strategically important project based on strong growth in container trade over the past two decades. It started planning for the Channel Deepening Project (CDP) in early 2002 and submitted the business case for government approval in 2007.

The business case established a strong imperative for CDP. It predicted that Australia's container trade would grow at between 5 and 7 per cent per annum over the next 30 years in line with the projected growth in container trade worldwide. It also noted that trade growth was being accompanied by an increase in the size of container vessels, which need deeper channels for safe and efficient movement.

Before CDP, only vessels with draughts—the distance between the vessels waterline and its lowest point—up to 11.6 metres at all tides were able to access Port Phillip Bay. By 2006–07 about 27 per cent of all vessels calling at the port had a design draught of 11.6 metres or greater, and the average design draught for all vessels was predicted to increase to 14 metres by 2035. The corporation therefore proposed CDP to provide deep water access for vessels with draughts up to 14 metres at all tides.

The failure to provide additional channel depth was identified as likely to reduce the efficiency and competitiveness of the port over the short- to medium-term as a result of shipping companies having to work around the draught constraints by, for example:

- carrying less cargo on larger ships or
- carrying additional cargoes using alternative transport arrangements to and from other ports or
- increasing the number of calls with smaller vessels for the growing quantity of cargoes.

These alternative arrangements would lead to increased operating costs to shipping companies, which would ultimately impact adversely on exporters, importers and consumers. Over the long term, there was concern that this could result in the Port of Melbourne being downgraded as shipping companies choose to call at other more efficient Australian ports for their cargo services.

1.2.2 Objectives and scope of the Channel Deepening Project

The business case stated the project's objectives were to:

- provide competitive and efficient access to the port through innovative, high-quality facilities and services
- increase trade and trade-related business facilitation and expansion

- deliver the project on time and on budget
- comply with all relevant regulations and the environmental approval conditions.

The project comprised:

- dredging works to deepen the shipping channels to Port Phillip Bay
- placing dredged material in one of the two underwater storage sites
- upgrading berth pockets to accommodate docking by larger vessels
- installing new navigational aids and upgrading existing ones
- protecting underwater utility services affected by the dredging activity and the movement of larger cargo ships
- environmental and baywide monitoring and management.

1.2.3 The Channel Deepening Project's development history

Public interest in safeguarding the bay environment emerged as a major issue for CDP's approval. The project was subject to extensive and rigorous assessment under the *Environment Effects Act 1978* between early 2002 and late 2007 to assure the state and Commonwealth governments and the community that the corporation could effectively manage the project's environmental impact on Port Phillip Bay.

The project obtained both state and Commonwealth government approvals on 5 February 2008, and officially commenced on 8 February 2008. Key approval conditions included:

- the need for the corporation to comply with the project's environmental management plan (EMP), covering all aspects of the project delivery and management of its environmental effects
- the corporation providing an environmental performance bond of \$100 million to ensure the project has a dedicated funding stream to undertake any remedial action or post-dredging recovery if required
- the state government establishing an independent body to scrutinise CDP's environmental performance—for this purpose, the Office of the Environmental Monitor (OEM) was established in December 2007.

The final approved budget of \$969 million included \$137 million for contingency and risks.

CDP's construction phase was completed on 25 November 2009, about a month ahead of schedule. The baywide monitoring programs continued for another two years as required and all components were completed by June 2012.

1.3 Previous audit of the Channel Deepening Project

Our 2009 audit of CDP focused on the effectiveness of the corporation's development and implementation of the project up to that time. It examined and assessed the:

- veracity of the benefits and costs included in the business case

- appropriateness and value-for-money outcomes of the arrangements used to procure the services needed to complete the project works
- effectiveness of environmental performance and project delivery up to that time.

The audit found that:

- the final business case represented adequate and reliable estimates of the project costs and benefits
- the alliance arrangement for dredging works was appropriate and offered value-for-money
- the corporation had been effective in project delivery and in compliance with the approval conditions up to that time.

Key recommendations included that the corporation should:

- adopt measures to demonstrate the maximum draught of vessels using the port, and the actual draught of vessels on entry and when leaving the port
- document the lessons learnt from the channel deepening alliance in an executive completion report.

1.3.1 The Channel Deepening Project's benefits and critical success factors

Economic benefits

The business case established a strong expectation that the project would deliver tangible benefits in the form of efficiencies, improved port competitiveness, and significant cost savings to shipping companies annually. These benefits were expected to occur from 2010 up to 2035, as a result of the use of larger vessels with greater loads. Achievement of the benefits was also dependent on completion of additional landside investment.

It estimated the project's economic benefit of \$1.94 billion would exceed the economic cost of \$708 million with a benefit-to-cost ratio of 2.6.

Most of the estimated project benefits depend on the realisation of lower ship operating costs after the completion of the channel deepening over the project's 25-year life and comprised:

- \$1 661 million, or 86 per cent, from container shipping cost savings
- \$272 million, or 14 per cent, in savings from using larger grain, oil and petroleum vessels
- \$3 million, or less than 0.2 per cent, from lower greenhouse gas emissions.

Our 2009 audit of CDP found that the benefits were reliably estimated and based on an analysis of relevant information that was available at that time. We also carried out further sensitivity testing of limited variations to key business case assumptions underpinning the estimated economic benefits. Based on this testing we concluded that the benefit-to-cost ratio was unlikely to fall below two.

However, our previous audit also noted that even though the business case estimates at that time were reasonable, forecasting over such a long period (25 years) has inherent risks.

Since then, the GFC has adversely impacted demand for global trade, and the structure and financial performance of the shipping industry. The scale and severity of this global event including its associated effects could not have been reasonably foreseen by the corporation at the time it developed its 2007 business case. Similarly, the resulting impacts were not foreseeable at the time of our previous audit.

The implications of the GFC and its impact on the project are discussed in later sections of this report.

Critical success factors

The business case set out a number of critical success factors (CSF) to evaluate the project after its completion. The corporation selected measures for each CSF from its existing reporting processes to aid the ongoing assessment of the success of CDP. The measures also focused on comparisons against Sydney on the basis that it is the port's biggest competitor. The CSFs are listed in Figure 1A.

Figure 1A
Corporation's critical success factors for assessing the Channel Deepening Project's success

Project objective	Critical success factor	Method of measurement
To deliver the project on time	Deep water access to Swanson dock by December 2009	Survey acceptance report
To deliver the project on budget	To meet or better the approved project budget	Audit of final cost report
To deliver the project in compliance with regulative standards (including environmental)	At all times during CDP delivery be compliant with the <i>Coastal Management Act 1995</i> and <i>Environment Protection and Biodiversity Conservation Act 1999</i> consent conditions	Compliance reporting
Provision of innovative and high-quality facilities and services	Environment created that optimises investment in port facilities and encourages private sector participation	Container crane rates vs five ports' average
	Develop, influence and deliver long term plans for port development, access and support services	Investment commitments in port facilities by private operators—rolling average
Increase trade and trade related business facilitation and expansion by delivering the project	Promote and market port facilities and services to existing and potential users	Trade volume growth
	Enhance the port's competitive advantage and maintain the ports premier position	Corporation charges per TEU vs Sydney
	Facilitate trade growth that maximises revenue streams and achieves the required return on investment consistent with the port's planned development profile	Melbourne interface costs per TEU vs Sydney

Source: Victorian Auditor-General's Office, based on the Port of Melbourne Corporations business case.

Our 2009 audit found that the corporation's critical success factors were generally adequate for most aspects of the project, including key project outputs. However, the audit recommended that these should be complemented by additional measures to show how larger vessels had made use of the additional channel depth provided by the project. The corporation implemented this in its quarterly business performance reporting.

1.3.2 Assessing the Channel Deepening Project's impact and benefits realisation

Challenges to evaluating the Channel Deepening Project benefits

CDP was designed to deliver significant long-term operational improvements to the Port of Melbourne through to 2035. Therefore, it is important to recognise that the full benefits expected from the 25-year CDP cannot yet be fully determined.

Port operations, including international container shipping, are complex and influenced by numerous factors that can be beyond the direct control of a port authority and its infrastructure.

Various maritime and landside drivers, including changes in global trade markets and trends can affect the nature and quantity of cargo, and how ship owners respond in terms of providing suitable vessels and using their available tonnage capacity. The corporation cannot directly control these factors, which makes it difficult to directly measure the impact of CDP.

Impact of the global financial crisis

The GFC that started in 2008 was the most significant global recession of the past 70 years. While the effects have varied across countries and sectors, the overall impacts on worldwide productivity, employment and the liner shipping industry have been significant.

The freezing of global financial markets, coupled with the sharp decline in global manufacturing and trade flows, significantly reduced worldwide demand for containerised transportation in the period immediately following the crisis.

While trade growth has since rebounded in some markets, global demand for containerised shipping continues to remain substantially lower in the post-GFC environment.

This situation has created an unprecedented global oversupply of shipping capacity that has led to a significant and sharp decline in freight and charter rates throughout the industry, threatening the financial viability of many ship operators and owners respectively. Additionally, this overcapacity has been exacerbated by the arrival of new ships which were commissioned prior to the GFC.

Since the GFC, many shipping companies have postponed or withdrawn orders for new ship builds and have placed existing idle ships at anchor indefinitely due to the absence of charters or sufficient cargo. Further, many of the ships that continue to operate are now often sailing well below their full capacity.

Collectively, these factors have dramatically increased the net costs borne by ship owners and operators worldwide and are expected to continue to impact the growth, profitability and financial performance of the industry in the short- to medium-term.

These events are beyond the corporation's control, and it could not have reasonably foreseen them at the time it developed the 2007 business case for CDP.

Notwithstanding, the effects of the GFC have undoubtedly adversely affected the original business case assumptions concerning the expected growth in larger vessels, net costs for ship owners and operators, load capacity and draught utilisation of vessels visiting Melbourne, including economic return of CDP in the short to medium term.

Importance of monitoring the realisation of benefits

The practice of benefits monitoring recognises that new information may be uncovered during a project's a life that wasn't available to the original decision-makers, and which may necessitate additional interventions before the expected benefits can be realised.

It enables the original investment assumptions and related benefits management strategies to be periodically validated and/or adjusted during a project's life to assure the investment delivers maximum benefit.

The importance of progressively evaluating project benefits for accountability, continuous improvement, and for informing future business cases and related policy decisions is widely accepted. The Department of Treasury and Finance (DTF) has promoted this practice within its investment management standard since 2004. This standard offers guidance to agencies on the importance and approaches for ongoing monitoring of project benefits.

DTF's guidance highlights that the main purpose of an investment is to obtain a benefit. It further emphasises that benefits need to be clearly articulated at the outset and arrangements established to effectively monitor, manage and assure their achievement.

DTF acknowledges that active benefits monitoring will:

- drive more benefit from a funded investment
- validate the success of a completed investment
- provide lessons that will inform the shaping of future investments
- support better decision-making in the future.

The key elements of an effective benefits monitoring framework include:

- a benefits management plan
- benefits reporting
- periodic and timely investment reviews.

These practices are particularly relevant to CDP given its aim to deliver significant benefits over a 25-year period and the complex, dynamic environment in which it is being managed.

The corporation has advised that it has planned a benefits evaluation of CDP for late 2014.

1.4 Audit objectives, scope and cost

The overall objective of the audit was to determine how effective the corporation has been in achieving CDP's objectives by:

- improving the Port of Melbourne's efficiency and competitiveness
- increasing trade through the Port of Melbourne compared to the situation without the project
- delivering the project on time, on budget and to the required quality standards
- complying with the environmental approval conditions.

The audit examined performance against the first three objectives by asking the corporation to complete a self-assessment. We examined this assessment and the supporting evidence before forming our audit conclusions and recommendations.

The audit assessed the corporation's compliance with the environmental approval conditions by examining the Office of the Environmental Monitor's compliance reports and related assessment activities.

The audit was performed in accordance with section 15 of the *Audit Act 1994* and the Australian Auditing and Assurance Standards. The total cost of the audit was \$360 000.

1.5 Structure of the report

This report is structured into four further parts:

- Part 2 deals specifically with the impact of CDP on the efficiency and competitiveness of the Port of Melbourne
- Part 3 examines the role of CDP in facilitating trade growth to date
- Part 4 assesses the performance of project delivery
- Part 5 examines the compliance of the project with the environmental approval conditions and the health of Port Phillip Bay during the four years since the project started.

2 Improving the Port of Melbourne's efficiency and competitiveness

At a glance

Background

The Channel Deepening Project (CDP) was to provide efficient and competitive access to the Port of Melbourne through innovative, high quality, facilities and services.

Conclusion

CDP has enhanced the port's long-term competitiveness and, as forecast in 2007, the imposition of the channel deepening charge has reduced but not reversed Melbourne's price competitiveness. Changes to shipping markets that were not forecast and which are outside the Port of Melbourne Corporation's direct control may reduce the expected benefits of the project if the trends continue.

Findings

- The project has facilitated more visits by larger vessels. However, the number of visits by these larger vessels is below the level forecast in 2007.
- Larger vessels are arriving well below their full carrying capacity. While the business case partly anticipated this, it has been exacerbated by the global financial crisis, therefore ship operating cost savings to date are likely to be below that forecast in 2007.
- The corporation does not collect information on whether the project has reduced delays for some vessels or influenced the private sector investment in port infrastructure.
- There is presently insufficient evidence to confirm whether the corporation's revised estimated ship operating cost savings are soundly based, accurate or have been realised.
- A benefits management plan has not yet been developed for the project, however, a benefits review of CDP is scheduled for late 2014.

Recommendations

That the corporation in consultation with the Department of Transport:

- review the impact of the GFC on the expected future economic benefits
- review the project's critical success factors and expedite development of a benefits management plan
- commencing from 2014, implement regular benefit reviews and report the results.

2.1 Introduction

A key aim of the Channel Deepening Project (CDP) was to provide efficient and competitive access to the Port of Melbourne through innovative, high quality, facilities and services.

The 2007 business case indicated CDP would achieve this by:

- increasing the number of port calls by larger vessels
- reducing delays for vessels that previously had restricted port access
- facilitating an increased level of private sector investment in port infrastructure
- reducing shipping costs as a result of enabling the use of larger and more efficient vessels, relative to competing ports.

The following critical success factors were identified in the business case for this objective:

- environment created that optimises investment in port facilities and encourages private sector participation—to be measured by container crane rates versus five port's average
- develop, influence and deliver long-term plans for port development, access and support services—to be measured by investment commitments in port facilities by private operators—rolling average.

This part of the report examines CDP's progress in relation to each of these.

2.2 Conclusion

By deepening the channels, CDP has enhanced the Port of Melbourne's long-term competitiveness as it is now able to accommodate visits by larger vessels that previously had been restricted.

However, the global financial crisis (GFC) has adversely affected the number of visits by larger vessels, which is below the level forecast in the business case. Further, these vessels are not fully loaded because trade volumes have not kept pace with the growth and current oversupply in ship capacity. The CDP business case recognised that full utilisation of vessel capacity would not occur immediately post CDP as it would take time for trade volume to catch up with the step increase in ship capacity. However, the current global oversupply in ship capacity caused by the GFC has exacerbated the underutilisation.

These external impacts are beyond the corporation's control, and could not have reasonably been foreseen at the time it developed the 2007 CDP business case. If these trends continue the economic benefits realised from the project may be below that originally projected.

The CDP business case acknowledged that the imposition of the channel infrastructure fee would decrease Melbourne's price competitiveness but that Melbourne would nevertheless remain competitive with other Australian ports—this has occurred.

Private sector investment in port infrastructure pre-and post-CDP has similarly continued. However, the corporation is presently unable to demonstrate the extent to which this investment is due to CDP.

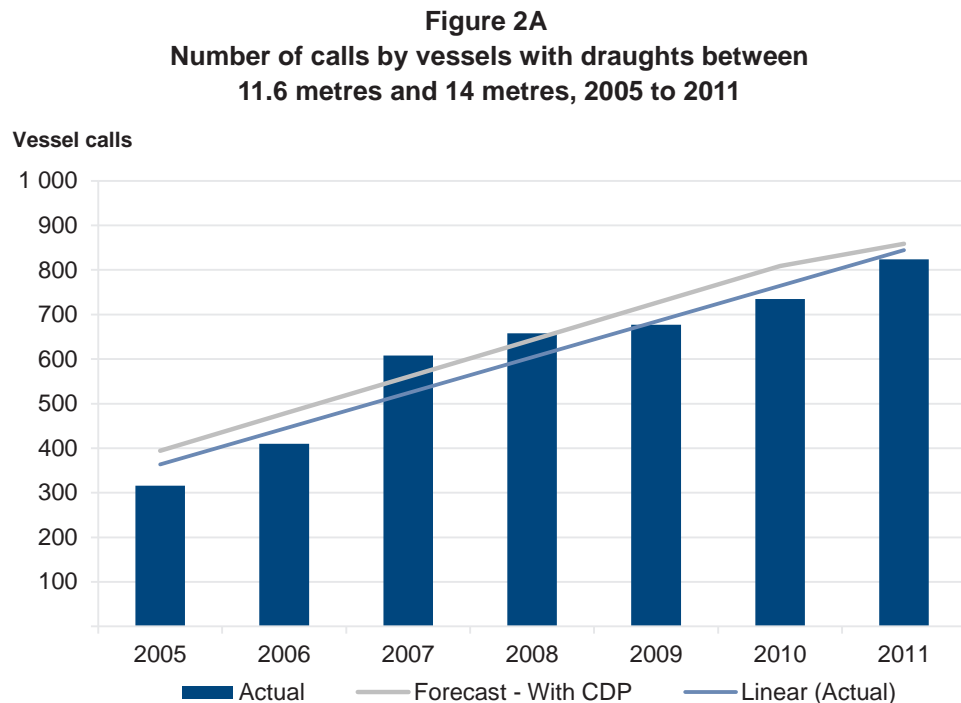
2.3 Increasing port calls by larger vessels

The CDP 2007 business case established that deepening the port to allow access by larger vessels with an operating draught greater than the existing 11.6 metres was central to improving its long-term efficiency and competitiveness. A vessel's draught is the distance between the waterline and its lowest point—usually the keel. The draught will change as the vessel becomes heavier or lighter. Larger vessels are now coming to Melbourne but this has occurred at a slower rate than was projected in the business case. This is consistent with the decline in new vessel builds, including global demand for containerised shipping that is evident following the GFC.

The current oversupply of ship capacity has meant that these larger ships are not fully loaded and therefore not yet fully using the expanded draught capacity CDP provides.

2.3.1 Changes to vessel port calls

Figure 2A shows the number of port calls by larger vessels pre- and post-CDP.



Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

Figure 2A shows that post-CDP the number of calls by larger vessels that would have previously been tide-constrained has been trending upwards but is below the level forecast in the business case. There were approximately 740 calls by large vessels in 2010 compared to the forecast number of 809. Similarly there were around 820 calls in 2011 compared to the forecast of 859.

Additionally, the number of visits by smaller vessels has been declining. In 2010 there were around 230 calls compared to the forecast of 359, and in 2011 there were 241 calls compared to the forecast of 330.

The changing pattern of visits by small and large vessels is broadly consistent with the CDP business case which indicated that shipping companies were trending towards using larger vessels instead of smaller ones because they are more operationally efficient. The trend towards larger vessels has been evident across all Australian eastern ports since 2006.

However, the original business case assumptions have been adversely affected by the GFC. Specifically, reduced global trade and demand for container shipping has contributed to a worldwide oversupply of shipping capacity. This has led to a significant decline in associated freight rates and charter fees. While this has benefited cargo owners, it has substantially increased the net costs borne by ship owners and operators respectively.

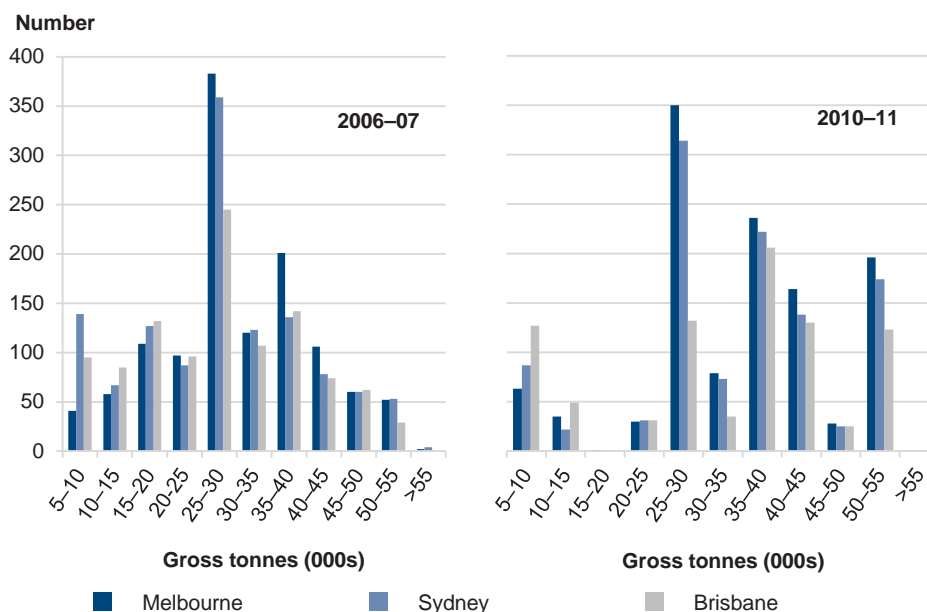
Further, the lower than expected numbers of larger vessels visiting Melbourne since CDP are arriving well below their full carrying capacity, which further increases net cost per twenty-foot equivalent unit (TEU) carried to operators. These global trends and impacts of the GFC are beyond the corporation's control, but are likely to preclude any practical realisation of ship operating cost savings to date post CDP.

The growth in larger vessels visiting Melbourne suggests that shipping owners are using vessels that may not have been able to access the port without CDP. However, the majority of these ships are not yet fully utilising the extra draught capacity of the port as trade volumes have not kept pace with the growth in ship capacity to date. While this outcome was foreseen in the business case it has been exacerbated by the current global oversupply in ship capacity caused by the GFC. The corporation acknowledges it will take a number of years for the increased ship capacity to be utilised.

Comparison of port calls—Melbourne, Sydney and Brisbane

Figure 2B shows port calls to Melbourne, Sydney and Brisbane by large and small vessels pre- and post-CDP.

Figure 2B
Distribution of vessel visits by size,
Melbourne, Sydney and Brisbane, 2006–07 and 2010–11



Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

Figure 2B shows that both pre- and post-CDP Melbourne has remained the dominant port in terms of visits by larger vessels.

In 2006–07 the distribution of vessel sizes was reasonably consistent across the three ports with the predominant sizes being 25 000 to 30 000 gross tonnes and 35 000 to 40 000 gross tonnes. In 2010–11 vessel distribution remained similar but there was a shift away from smaller to larger vessels. The similar distribution of vessel sizes across the three ports reflects that shipping lines tend to call at all three east coast Australian ports.

Limitation with port call data

While CDP may have contributed to the increased number of visits to Melbourne by larger vessels, the scheduling of port visits by shipping companies is outside of the corporation's control and influenced by a range of other factors including the:

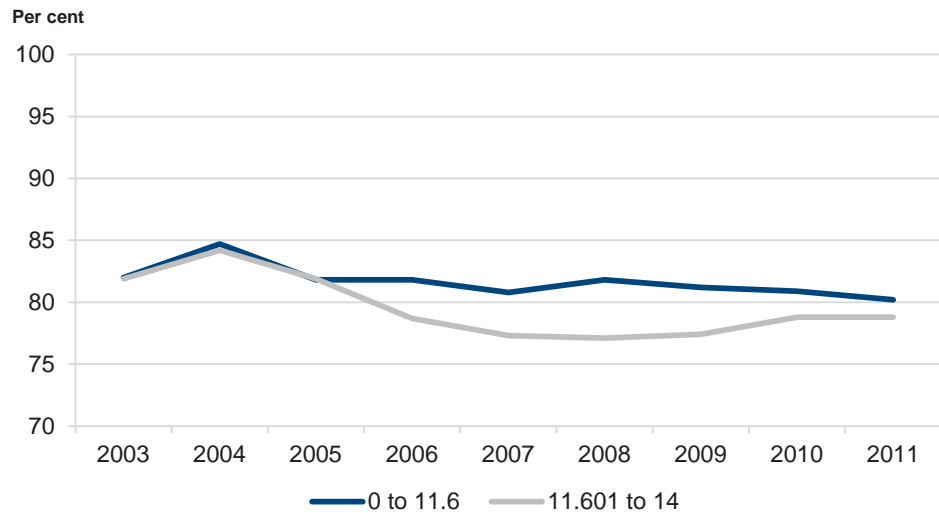
- health of global economies
- origin of an economy's imports and destination of its exports
- financial viability of a trade route.

To this extent it is not possible to identify the direct impact of CDP on port calls.

2.3.2 Utilisation of vessel carrying capacity

The utilisation of a vessel's carrying capacity can be measured by comparing the actual draught used by a vessel when it arrives or departs the port with the vessel's registered draught. Figure 2C shows that draught utilisation of the larger vessels visiting Melbourne declined from 84 per cent in 2004 to 77 per cent in 2008, but rose slightly to 79 per cent in 2010. The draught utilisation of smaller vessels had a similar pattern.

Figure 2C
Overall vessel draught utilisation, 2003 to 2011

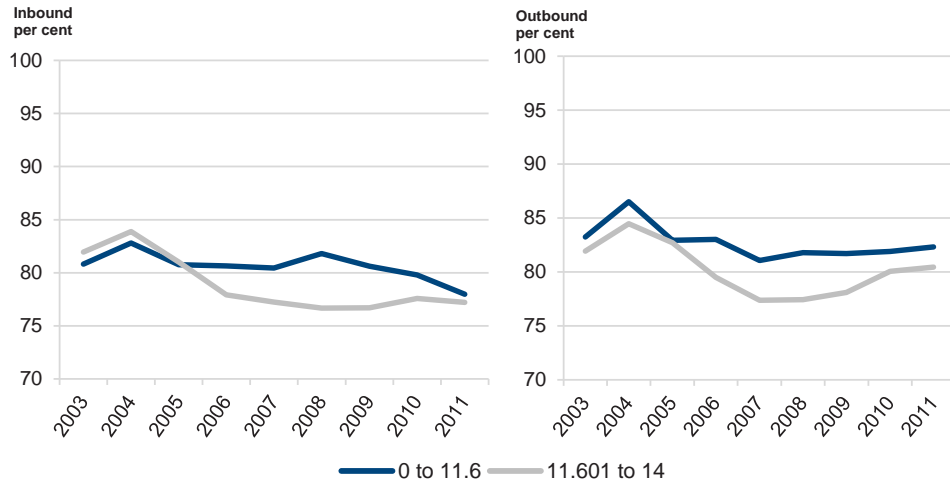


Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

The decline in draught utilisation of larger vessels pre-CDP occurred because a greater number of larger vessels were restricted.

Further analysis of draught utilisation levels for inbound and outbound vessels is shown in Figure 2D.

Figure 2D
Draught utilisation levels for inbound and outbound vessels, 2003 to 2011



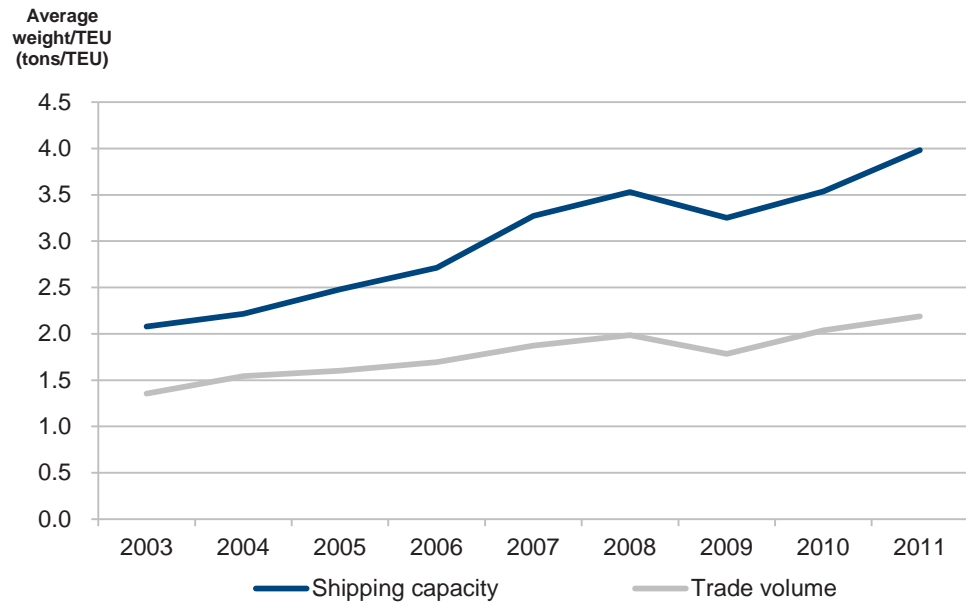
Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

Figure 2D shows that post CDP draught utilisation for small and large outbound vessels has been increasing since 2009, largely due to the break in the drought and increase in agricultural exports.

Figure 2E shows that the overall decline in draught utilisation has largely occurred because the growth in shipping capacity post-CDP has outstripped growth in trade volume. Pre-CDP shipping capacity was growing steadily at 12 per cent compared to a 7.6 per cent growth in trade. Post-CDP, shipping capacity has grown by 13.7 per cent while trade growth has fallen to 6.6 per cent.

The CDP business case recognised that full utilisation of vessel capacity would not occur immediately post-CDP as it would take time for trade volume to catch up with the step increase in ship capacity. However, the current global oversupply in ship capacity caused by the GFC has exacerbated the under-utilisation.

Figure 2E
Shipping capacity and trade volumes, 2003 to 2011



Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

The general decline in the draught utilisation levels of larger vessels is also due to the declining average weight of imported cargo—the predominant trade through Melbourne. In 2003 the average weight of imported cargo was approximately 9.1 tons per TEU compared to approximately 8.4 tons per TEU in 2011.

As stated earlier, if the load capacity of a vessel remains substantially under-utilised this is likely to impact on vessel operating efficiency as the cost per TEU will increase. This in turn may impact on the extent to which the expected ship operating cost savings resulting from CDP are realised. The corporation acknowledges it will take a number of years for the increased draught capacity to be utilised consistent with the forecast growth in trade volumes.

2.4 Reducing delays for restricted vessels

Prior to CDP, port access for some vessels was restricted. Vessels that had an operating draught of more than 11.6 metres were at risk of needing to wait for favourable tidal conditions to provide sufficient water depth to allow them to enter or leave the port. The maximum operating draught permitted with a high tide was 12.1 metres.

This restriction can negatively impact on port efficiency in terms of terminal productivity. Ship operating costs can also increase, particularly if ship owners choose to wait in order to maximise vessel loads.

2.4.1 Vessel delays

The corporation does not know whether CDP has reduced delays for some vessels using the port. This is because it does not collect any specific data on the extent of delays experienced by vessels accessing the port (if any) or delays for vessels which, before CDP, could not use the channels across all tides.

Despite the lack of data on vessel delays, the corporation considers the occurrence of vessel delays post-CDP to date have been minor. However, the absence of this data means that this cannot be verified.

2.5 Stimulating private sector investment

The CDP 2007 business case stated one measure of the project's success was the level of investment commitments in port facilities by private operators. Although these investments are not under the corporation's control, they contribute to achieving the CDP objective of providing innovative and high-quality facilities and services. The business case indicated that these investment would be a reflection of the environment created by CDP. The corporation's 2007 business case assumed that the private sector will invest to take advantage of the opportunity CDP presents to them. The 2007 business case also stated private operators will provide infrastructure to meet the capacity required by increased trade irrespective of CDP proceeding.

Private sector investment in port facilities post-CDP has occurred. The corporation is presently unable to demonstrate to what extent this investment was directly influenced by CDP as it does not have an accurate measure of the actual value of investment achieved to date to compare against the amount forecast in the 2007 business case.

2.5.1 Investment in port facilities

The CDP 2007 business case forecast that private sector investment in port facilities attributable to CDP would reach \$17.5 million by 2013.

While the corporation acknowledges it has not been able to directly measure progress against this target, it provided a comparison of the plant and equipment operated by two stevedore companies pre-and post-CDP as an indication.

This data shows private sector investment in port facilities has occurred both pre-and post-CDP to service the increased volume of port calls by larger vessels. For example, between 2005–06 and 2009–10 the two stevedore companies increased the number of operating cranes from six to eight—as well as the lifting capacity of these cranes. Both companies continued to invest in new equipment in 2012 which contributes to improving the Port of Melbourne's efficiency.

Limitations with infrastructure investment data

Although CDP could influence the need for more or improved port infrastructure, by enabling increased visits by larger vessels, it is not possible from the information held by the corporation to ascertain the extent to which this investment activity is directly attributable to CDP.

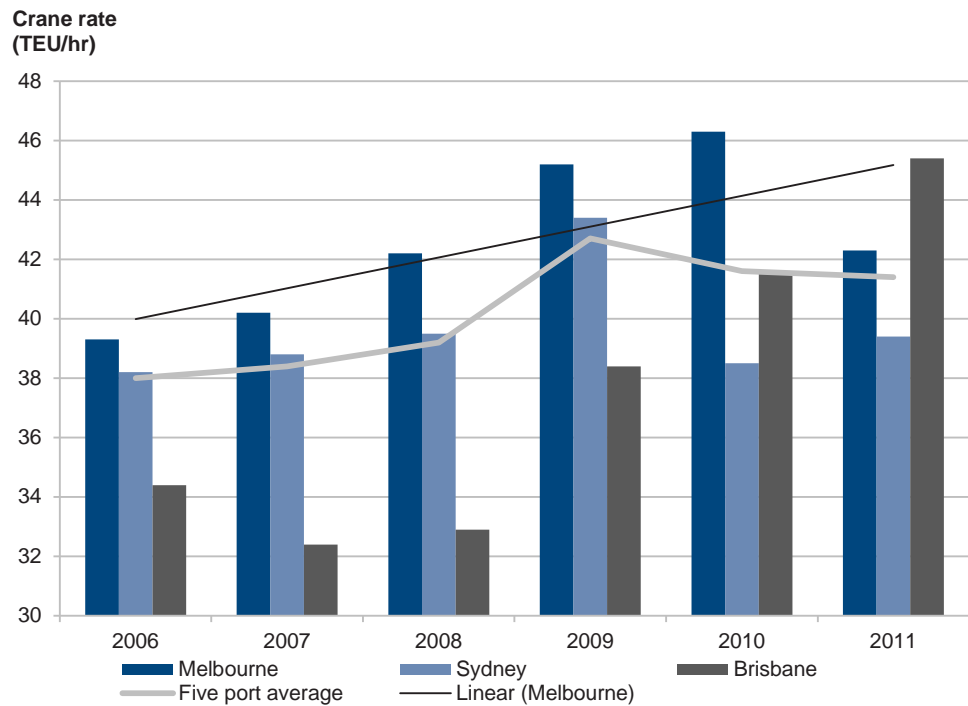
Due to the difficulty in obtaining accurate and timely private sector investment data, the corporation's use of this performance measure and related critical success factor was discontinued from 2008–09. It was not evident that the corporation had sought to identify an alternative performance measure.

2.5.2 Container crane rates

A crane rate is the total number of TEU's moved divided by the elapsed working time of the crane, and is expressed in terms of TEU's per hour. The business case identified this as a key measure of the project's critical success factor—to create an environment that optimises investment in port facilities and encourages private sector participation.

Figure 2F shows the average annual crane rates for Melbourne, Sydney, Brisbane and the average for five other ports pre- and post-CDP.

Figure 2F
Comparison of average annual crane rates, 2006 to 2011



Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

As shown in Figure 2F, Melbourne's crane rate had steadily increased and was ahead of all other ports from 2006 to 2010. Although Melbourne's crane rate declined in 2011 due to industrial action, it remained above Sydney and the five ports' average. Melbourne's crane rate over this six-year period was also above the baseline rate in the 2007 CDP business case.

The corporation maintains that the positive crane rates achieved by Melbourne reflects the continuing investment by stevedore companies of additional cranes with greater lifting capacity, and other container related infrastructure.

Limitation of crane rate data

Crane rates provide useful insights into private sector investment in port facilities. That Melbourne's crane rates have consistently remained above those of other ports, except in 2011, indicates that the port has better and more efficient equipment.

Crane rates are a relevant indicator of the port's efficiency and competitiveness, as a result of investments in port facilities. However, reliance on crane rates alone offers limited insights into the extent to which these investments are due to CDP, and have been optimised. The corporation acknowledges it cannot be certain whether any private sector investment to date has been influenced by CDP.

2.6 Reducing shipping costs relative to competing ports

The CDP 2007 business case stated that one measure of the Port of Melbourne's competitive position is how much it costs to transport goods through the port relative to other Australian ports. These costs include interface costs which comprise port charges and landside charges, as well as shipping costs.

The business case also stated that most of the benefits from CDP will be in the form of savings in container ship operating costs due to using larger ships and related economies of scale. The business case assumed that cost savings achieved by shipping companies would ultimately be passed on to importers, exporters and the economy as a whole through lower freight rates.

However, the impact of the GFC has reversed the effect to date. The downturn in global trade and demand for containerised shipping post-GFC coupled with the worldwide oversupply in capacity has resulted in a sharp decline in freight and charter rates. While this has benefited cargo owners, it has significantly increased the net costs borne by shipping companies in the medium term.

The 2007 business case acknowledged that the introduction of CDP infrastructure (recovery) charge would reduce the significant competitive advantage Melbourne had over other ports with respect to port charges. While this has occurred, Melbourne's port charges remain competitive with Sydney—its main competitor.

2.6.1 Port charges – Brisbane, Sydney and Melbourne

Port charges are the fees charged directly by the port authority and other services, for providing water-based activities such as pilotage and towage. Port charges include ship-based charges such as tonnage, and cargo-based charges for imports and exports.

Figure 2G compares port charges for Brisbane, Sydney and Melbourne in 2006 and 2010.

Figure 2G
Port charges for Brisbane, Sydney and Melbourne, 2006 and 2010

Port charges (\$/TEU)	Brisbane		Sydney		Melbourne	
	2006	2010	2006	2010	2006	2010
Total port charges per ship visit	74.80	79.29	69.08	89.14	42.73	85.33

Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

Figure 2G shows Melbourne's total port charges per ship in 2006 were well below Sydney's and Brisbane's. This changed in 2010 primarily due to the CDP infrastructure fee, which almost doubled the total port charge. While this has reversed Melbourne's advantage over Brisbane, Melbourne's port charges continue to be competitive with its main rival Sydney.

Channel deepening fee

The CDP infrastructure fee was established to recover the costs incurred by the corporation for CDP by imposing a levy on each international container, given containerised shipping companies are the prime beneficiaries of CDP.

The 2007 CDP business case indicated that while Melbourne's price competitiveness would decrease as a result of the fee, it would still remain competitive with other Australian ports.

The levy which was introduced in April 2008 was to be adjusted annually for movements in the consumer price index. It was to be reviewed at five-year intervals and was expected to be in place for 25 years or until the project costs were recovered.

The initial levy for 2007–08 was set at \$31.50, excluding GST, per international container and for 2011–12 was \$34.10. These charges are below those forecast in the 2007 CDP business case of \$35.31 and \$38.97 respectively. The variance is largely due to the CDP overall cost being offset by a government contribution of \$100 million.

At June 2012, the corporation had recovered \$222 million compared to the 2007 business case forecast of \$259 million. The main reasons for the under-recovery is the lower than expected trade volumes due to the GFC. However, based on current trade volumes and pricing assumptions cost recovery is on track with the projected 25-year recovery period.

2.6.2 Landside charges—Brisbane, Sydney and Melbourne

Landside charges comprise stevedoring fees for the loading and unloading of vessels, customs brokerage fees for imports and exports, and fees for land transport to and from the port. They are a major component of port interface costs—that is, the total cost of transporting goods through the port. The 2007 CDP business case identified port interface costs as a key measure of the critical success factor of increasing trade and trade related business facilitation and expansion. Changes in these measures are also relevant to assessing the port's competitiveness post-CDP.

As shown in Figure 2H, the competitive advantage Melbourne had over Sydney in 2006 with respect to landside charges was reversed in 2010. Melbourne's charges were higher than Brisbane's in 2006 and 2010 although the gap was reduced in 2010.

Figure 2H
Landside charges for Brisbane, Sydney and Melbourne, 2006 and 2010.

Landside charges (\$/TEU)	Brisbane		Sydney		Melbourne	
	2006	2010	2006	2010	2006	2010
Imports	590.00	694.23	746.00	723.94	711.50	767.65
Exports	567.50	699.09	718.00	714.69	668.00	748.01

Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

As stevedoring fees for the three ports were the same, the different landside charges were attributable to different customs brokers' fees and road transport charges.

Although import customs broker's fees in 2006 across the three ports were around the same, in 2010 Brisbane had the highest fee and Sydney the lowest. Melbourne had the lowest export customs brokers' fees in 2006 but in 2010 Melbourne's fee was below Brisbane's but above Sydney's.

Road transport charges across the three ports varied but the respective charge at each port was the same for imports and exports. In 2006, Brisbane had the lowest charge and Sydney the highest. In 2010, Melbourne's charge was the highest and Brisbane's remained the lowest.

Limitations with landside charges data

Road transport fees and custom brokerage fees have no direct connection with CDP in that there are no economies of scale for these companies as there are for shipping companies who are able to use larger vessels. Nevertheless recent changes to more accurately estimate Sydney's road transport charges have had the effect of improving Melbourne's competitiveness.

2.6.3 Port interface costs—Brisbane, Sydney and Melbourne

The 2007 CDP business case identified port interface cost per TEU as one measure of Melbourne's competitiveness relative to other ports.

As shown in Figure 21, Melbourne has lost the competitive advantage it had over Sydney in 2006 primarily due to the imposition of the channel infrastructure fee. As stated earlier, this impact was foreshadowed in the 2007 business case.

Figure 21
Port interface costs for Brisbane, Sydney and Melbourne, 2006 and 2010

Port interface costs (\$/TEU)	Brisbane		Sydney		Melbourne	
	2006	2010	2006	2010	2006	2010
Imports	712.00	801.74	835.18	843.10	765.31	864.54
Exports	690.00	806.60	790.68	792.52	721.81	844.99

Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

Melbourne's 2006 port fees as a percentage of total interface costs were 5.5 per cent for imports and 5.8 per cent for exports, and substantially lower than Sydney's at 8.0 per cent for imports and 8.5 per cent for exports. Melbourne's fees as a proportion of interface costs were also lower than Brisbane's.

As Melbourne's 2010 port fees almost doubled, port fees as a percentage of interface costs increased to 9.8 per cent for imports and 10.1 per cent for exports. This increase reduced Melbourne's competitive advantage over Sydney whose equivalent fees were 10.6 per cent for imports and 11.2 per cent for exports. Melbourne's competitive advantage over Brisbane was also reduced by a similar level.

2.6.4 Shipping costs

The costs of operating ships include wages, repairs and maintenance and insurance.

The CDP 2007 business case cost benefit analysis included an estimate of the average daily operating cost of ships of various sizes which showed that as vessel size increases, the daily operating cost per TEU falls. The business case further highlighted that as shipping companies were moving to using larger vessels, they should benefit from economies of scale.

Based on the original business case assumptions, the corporation estimates that daily ship operating costs for vessels visiting Melbourne have reduced post-CDP to US\$10.73 per TEU. This estimate compares favourably with the US\$12.03 forecast in the 2007 business case of ship operating cost of US\$12.07 per TEU expected in the absence of CDP.

However, the original business case assumptions do not reflect the significant adverse impacts on worldwide shipping costs currently borne by ship owners and operators as a result of the GFC. It instead relies on pre-GFC assumptions about the weighted average unit cost of shipping services associated with the profile/capacity of vessels visiting the port. These assumptions are unlikely to remain valid in the current global shipping market.

Current estimate of vessel cost savings

The corporation does not compile data on actual vessel costs incurred by ship owners/operators post-CDP. Instead, it has updated its 2007 estimate of ship operating cost savings by:

- substituting the original business case forecast of the size of vessel expected to visit Melbourne following CDP, with the actual profile of vessels that visited the port in 2010 and 2011
- computing the average weighted unit cost of providing shipping services for the updated profile of vessels, and the difference between this cost and the equivalent cost expected in the absence of CDP
- multiplying this difference by the actual quantity of shipping capacity provided in each of 2010 and 2011 to estimate total cost savings in US dollars, which were then converted to Australian dollars using the updated exchange rate.

Details of the corporation's estimated cost savings based on the 2007 cost benefit model are shown in Figure 2J.

Figure 2J
Projected and current estimated ship operating cost savings, 2010 and 2011

Type of vessel	Projected in the 2007 business case (\$mill)		Current estimate (\$mill)	
	2010	2011	2010	2011
Container vessels	25.6	33.1	73.3	83.1
Grain vessels	4.3	4.7	0.5	1.1
Crude oil tankers	13.6	14.2	9.9	9.4
Petroleum product carriers	0.4	0.4	0.0	0.0
Total estimated savings	43.9	52.4	83.7	93.6

Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

As shown in Figure 2J, the corporation estimates that container ship operating cost savings are now considerably higher than originally forecast. This result was predominantly due to the more rapid rise in the proportion of larger container vessels visiting Melbourne than had been assumed in the original 2007 cost benefit analysis.

Figure 2J also shows that the corporation's current estimate of cost savings for grain vessels and crude oil tankers is now lower than the 2007 forecast. This is mainly due to lower than expected trade volumes and the higher exchange rate. Cost savings for petroleum product carriers are now not expected to be realised as the infrastructure works required to achieve these benefits were not included in the final CDP scope.

Limitations with current estimate of ship cost savings

The quantum of savings estimated by the corporation above does not reconcile with the significant impacts of the GFC on the net costs currently borne by ship owners and operators, and is at odds with other vessel data compiled by the corporation.

The corporation has calculated the estimated cost savings achieved using an economic model which has inherent limitations, and does not reflect actual cost savings. While this approach was reasonable for the purposes of preparing the business case, it does not permit verification of the benefits estimated by the model. To do this, more up-to-date and accurate estimates of actual shipping costs associated with the profile of vessels visiting the port post-CDP is required to compare against the base case assumed in the 2007 business case. Actual cost savings can then be more accurately estimated by utilising more realistic unit cost data. However, the corporation does not have access to such data.

The corporation further advised that such a comparison at present would lack consistency and meaning because actual shipping costs since CDP have been influenced by emerging market conditions, whereas those originally modelled for the base case, i.e. expected shipping costs in the absence of CDP, were not.

While this is acknowledged, it does not invalidate the merits of estimating cost savings using this approach. Rather it reinforces the need for revisiting and, where necessary, reviewing the initial assumptions underpinning projected cost savings to assure that current and future benefits can be reliably estimated.

The savings estimated to date by the corporation are based on pre-GFC assumptions about the weighted average unit cost of shipping services, which are likely to be optimistic given the impacts of the GFC on the current global shipping market.

The corporation has also confirmed that the total number of calls by larger vessels post-CDP is less than the business case projected, and that these vessels are not fully loaded because trade volumes have not kept pace with the growth in vessel capacity. While the CDP business case recognised that it would take time for trade volume to catch up with the step increase in ship capacity post CDP, the gap experienced to date has been exacerbated by the global oversupply in ship capacity caused by the GFC.

It is acknowledged that the total cost of shipping is essentially fixed as soon as the choice of vessel is made. However, the extent to which the load capacity of a vessel is under-utilised is likely to further impact on the vessel's operating cost per TEU carried. This can impact on the extent to which the expected shipping cost savings resulting from the use of larger vessels are ultimately realised.

It is not evident that the corporation accounted for these potential impacts in determining the estimated shipping cost savings shown in Figure 2J.

Monitoring the realisation of benefits

The corporation has not yet developed a benefits management plan (BMP) for CDP as advocated by the Department of Treasury and Finance's Investment Management Standard. It has instead focused on monitoring the project's performance against the business case critical success factors.

The value of benefits monitoring is that it permits the original investment assumptions and related benefits management strategies to be periodically validated and/or adjusted during a project's life to assure the investment delivers maximum benefit.

The emergence of the GFC since the original CDP business case was developed is a further signal that such a review is warranted.

While it is not mandatory, ongoing benefits monitoring is a widely accepted better practice, especially for large, long-term complex projects such as CDP.

The key elements of an effective benefits monitoring framework include:

- a benefits management plan
- benefits reporting
- periodic and timely investment reviews.

A BMP establishes clear standards and agreed procedures for measuring benefits which enables the integrity of results, and the basis on which they are derived, to be transparently assessed. Regular benefits reporting/review also enable the success of an investment to be validated, and can provide important lessons that inform the shaping of future investments and related decisions.

The soundness of the corporation's approach to estimating the cost savings arising from the project to date cannot be reliably assessed in the absence of a BMP.

These limitations, coupled with the impacts of the GFC on the shipping industry and absence of more accurate and up-to-date estimates of actual shipping costs, mean there is insufficient evidence to confirm whether the corporation's revised estimated savings are soundly based, accurate, or have been realised.

Benefits monitoring could also inform decisions by the corporation on any future dredging works in Port Phillip Bay to complement CDP, including the ongoing maintenance of CDP which is estimated to cost approximately \$80 million every 10 years.

The corporation advised that a benefits review of CDP is planned for late 2014 following discussions with the Department of Treasury and Finance in April 2012. This is a positive initiative, which reinforces the need to expeditiously develop a benefits management plan to enable the planned review to effectively occur.

Recommendations

The Port of Melbourne Corporation, in consultation with the Department of Transport, should:

1. review the impact of the global financial crisis on the expected timing and quantum of future economic benefits from the Channel Deepening Project
 2. review existing Channel Deepening Project critical success factors/metrics and expedite development of a benefits management plan and related strategies for optimising the achievement of Channel Deepening Project objectives and future benefits
 3. commencing from 2014, implement regular and timely benefits reviews/reporting to the corporation's board, executive management and the Department of Transport, against the benefits management plan.
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3 Facilitating trade through the Port of Melbourne

At a glance

Background

A key objective of the Channel Deepening Project (CDP) was to increase trade and trade-related business facilitation and expansion. CDP's business case identified trade volume growth against the previous year as a key measure of achievement of this objective. However, this measure can be affected by a range of external factors which makes it difficult to assess the impact of CDP.

Conclusion

Trade growth post-CDP has occurred but at a slightly lower rate than was forecast in CDP's business case. While CDP may have contributed to this result, its impact to date cannot be assessed because trade growth was expected to occur in the short term with or without channel deepening.

Findings

- The steady growth in trade volumes between 2005 and 2008 was reversed in 2009 primarily due to the impact of the global financial crisis.
- In 2010 and 2011, actual trade volumes rebounded although were slightly below the levels forecast.
- Melbourne's share of the eastern seaboard trade declined between 2006–07 and 2009–10 but rose again over the two-year period to 2011–12 after completion of CDP.
- Changes to global economic circumstances since CDP was approved, including lower than forecast trade volume growth, reinforce the need to revisit the assumptions underpinning projected benefits.

3.1 Introduction

The 2007 Channel Deepening Project (CDP) business case was built on the premise of enabling the Port of Melbourne to service the trade that was forecast to happen. It identified that the growth in trade volume was resulting in a growing number of port visits by vessels that had an operating draught that was greater than the Port of Melbourne could accommodate.

The Port of Melbourne Corporation (the corporation) therefore determined that Melbourne was at risk of declining as a major port in the long term without channel deepening.

As such, a key objective of CDP was to increase trade and trade related business facilitation and expansion. The business case identified trade volume growth against the previous year as a key measure of achievement of this objective. However, this measure can be affected by a range of external factors beyond the direct control of a port authority or infrastructure project such as CDP.

The global financial crisis (GFC) significantly reduced worldwide demand for containerised transportation in the period immediately following the crisis. This led to a sharp decline in global manufacturing and trade flows, which has since rebounded in some markets but continues to remain substantially lower in the post-GFC environment.

The use of trade growth as an indicator of CDP's success therefore has inherent limitations. For example, changes in global trade markets and trends can affect the nature and quantity of cargo and how ship owners respond in terms of the provision of suitable vessels and utilisation of their capacity. These factors are beyond the corporation's control. For these reasons, assessing CDP's impact in facilitating trade growth is challenging.

This Part of the report examines the trends in trade volume, including changes in Melbourne's share of trade volume before and after CDP.

3.2 Conclusion

The impact of CDP to date in facilitating trade through the Port of Melbourne is not yet clear.

Trade growth has occurred in the two years after the completion of CDP although it is slightly below the rate forecast in the CDP business case. While CDP may have contributed to this result, its impact cannot yet be demonstrated as trade growth was expected to occur in the short term with or without channel deepening.

Despite the positive overall growth in trade volumes, Melbourne's share of the eastern seaboard trade declined between 2006–07 and 2009–10 and was virtually equal with Sydney in 2009–10. However, this trend was reversed in the two-year period to 2011–12, with Melbourne's trade share increasing and remaining above Sydney's. Continuation of this positive two-year trend would be consistent with the CDP objective of improving the port's competitiveness.

3.3 Facilitating cargo trade through the port

The 2007 business case concluded that with or without CDP, the Victorian container trade volume was forecast to almost double to 4.6 million twenty-foot equivalent unit (TEU) containers by 2025 with underlying growth rates of 4.7 per cent per annum to 2020 and then 4.6 per cent per annum to 2025. The business case forecasts excluded the Tasmanian trade as these ships would not utilise the deeper draught provided by the CDP and would not be subject to the CDP fee.

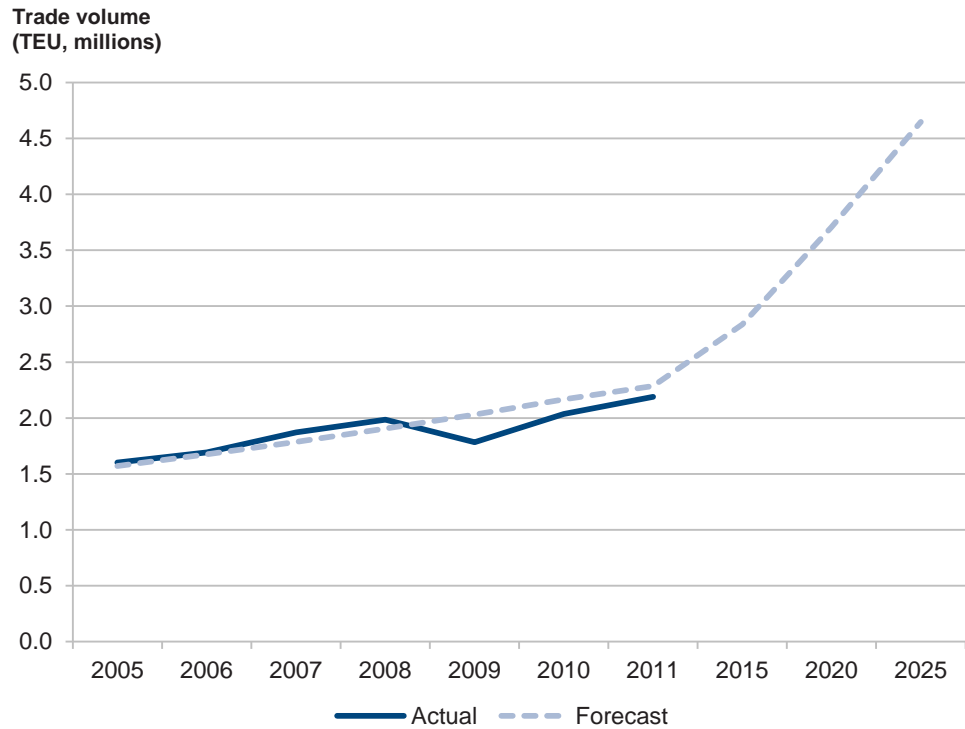
Melbourne's trade growth post-CDP has been rising but is slightly below the level forecast in the 2007 business case.

The extent to which CDP contributed to this result cannot yet be determined. The corporation has stated that it cannot identify any specific increases in trade directly tied to CDP. This is because the volume and range of individual commodities traded in containers is more directly influenced by global trade supply and demand factors than the ability of one or more ports to accommodate larger vessels.

3.3.1 Trade volume movements

Trade volume is measured in terms of TEU, the international measure for a standard sized container. Figure 3A shows actual and forecast trade volumes for the port, excluding the Tasmanian trade, from 2005 to 2011.

Figure 3A
Port of Melbourne trade volume, 2005 to 2011



Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

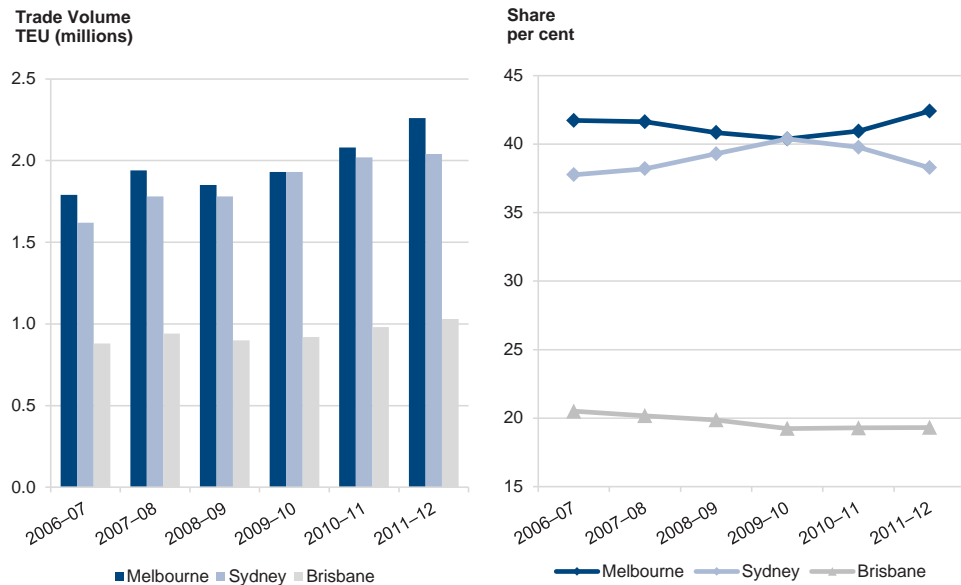
Figure 3A shows that from 2005 to 2008 trade volume steadily increased and was in line with the level forecast in the 2007 business case but fell in 2009 primarily due to the GFC. In 2010, actual trade volumes rebounded but were slightly below the forecast—2.0 million TEU compared to 2.2 million. This growth continued in 2011 but actual trade volume was still below the forecast —2.2 million TEU compared to 2.3 million TEU.

Pre-CDP the actual annualised growth rate of 8.1 per cent was above the forecast of 6.6 per cent, and post-CDP the growth rate of 7.5 per cent was above the forecast of 5.5 per cent. This growth is broadly in line with world trends.

3.3.2 Share of trade

Although post-CDP trade growth has been rising and is only slightly below the forecast it masks the fact that Melbourne's share of the eastern seaboard trade declined between 2006–07 and 2009–10.

Figure 3B
Trade volumes and percentage share, Melbourne, Sydney and Brisbane, 2006–7 to 2011–12^(a)



(a) Excludes Tasmanian trade.

Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

Figure 3B shows that Melbourne's share of trade volume declined from 2006–07 to 2009–10 while Sydney's increased and was virtually equal with Melbourne in 2009–10. In 2010–11 and 2011–12, following completion of CDP, Melbourne's share of trade increased and was slightly higher than its share in 2006–07. Sydney's share of trade has declined over the same two-year period.

The corporation advised that 87 per cent of Melbourne's container trade has an origin or destination within metropolitan Melbourne. However, it acknowledges the need to actively monitor and maintain the port's competitive position.

Changes to global economic circumstances since CDP was approved, including lower than forecast trade volume growth, reinforce the need to revisit the assumptions underpinning projected benefits, and the value of ongoing management and monitoring of benefits realisation.

4 Delivering the project

At a glance

Background

The Channel Deepening Project (CDP) was unique in many respects. As the Port of Melbourne's largest ever marine infrastructure development, it was faced with significant technical, procurement and environmental risks during its development. CDP's delivery needed to be within a strict set of environmental rules and conditions, and was closely watched by the regulators, interest groups and the public.

Conclusion

The Port of Melbourne Corporation successfully delivered the planned deep water access for 14 metre draught vessels at all tides one month ahead of schedule, and well under the approved project budget of \$969 million. This was due to effective incentive mechanisms in the alliance contract that promoted proactive risk management, innovations, and high standards of environmental performance.

Findings

- CDP's dredging and construction components were completed on 25 November 2009—one month ahead of schedule.
- The project was delivered for \$717.3 million, which was about \$250 million under the approved business case budget. \$137 million of this was the unused contingency provision, reflecting the effectiveness of the corporation's risk management and overall project management processes.

4.1 Introduction

While dredging is not an unusual activity for ports around the world, the Channel Deepening Project (CDP) was unique in many aspects. It was the Port of Melbourne's largest ever marine infrastructure development, and was highly complex and challenging in technical, procurement and environmental aspects. CDP needed to be delivered within a strict set of environmental rules and conditions, and failure to do so would directly impact on its schedule and budget.

The Port of Melbourne Corporation (the corporation) was fully aware of the level of public interest in this project and the risks associated with failure to comply with the environmental approval conditions. Our 2009 audit found the corporation had been effective in managing the project to that point.

This Part examines whether the project was delivered on time and within budget.

4.2 Conclusion

The corporation has successfully delivered the required deep water access to enable 14 metre draught vessels at all tides ahead of schedule. This was achieved well under the approved project budget of \$969 million.

4.3 Delivering all Channel Deepening Project components on time

The business case specified that CDP would achieve deep water access to allow 14 metre draught vessels at all tides to Swanson Dock by 31 December 2009. The project's approval required that it be delivered in compliance with all the environmental approval conditions.

To deliver this major output, CDP comprised the following key works:

- dredging of existing channels including the Yarra River Channel, Williamstown Channel, Port Melbourne Channel, South Channel and the Great Ship Channel at the entrance to Port Phillip Bay
- dredging of berth pockets primarily at Swanson Dock and Gellibrand Pier, and to some extent at Appleton Dock and Holden Dock
- placement of dredged material into one of the two dredged material grounds, in the north and the south of the bay
- modifications to existing infrastructure including berth works, river works, protection of underwater utility services, upgrades to existing navigational aids, and installation of new navigational aids.

An alliance agreement was established with a contractor who was responsible for the dredging-related works and the remainder of works were undertaken by other contractors.

We reviewed the corporation's close-out audits of project components and relevant facility handover certificates and concluded that:

- all dredging activities associated with CDP were completed on 2 November 2009
- additional sweeping works took place at the corporation's dredged material ground on 9 November 2009
- the marine-based navigation aids were finalised on 19 November 2009.

A total of 22.9 million cubic metres of material was dredged from the existing shipping channels and berths during CDP.

CDP was publicly announced as completed on 25 November 2009, 42 days ahead of the schedule stated in the business case.

4.3.1 Delivering the project within budget

The approved CDP budget in December 2007 was \$969 million. The corporation updated the budget estimates at the start of dredging operations in February 2008 and the major components comprised about:

- \$129.6 million for development and approval, which was treated as a sunk cost
- \$668 million for all construction works
- \$34.2 million for environmental monitoring
- \$137.1 million for contingency and risk provision.

Figure 4A shows the final actual expenditure as at June 2012 against these components.

Figure 4A
Channel Deepening Project expenditure
as at June 2012 against approved budget

Work package	Approved Budget as at end of 2007 (\$mill)	Approved variation as at February 2008 (\$mill)	Actual as at June 2012 (\$mill)	Variance (\$mill)
Development and approval	118.7	129.6	126.5	(3.0)
Construction (alliance and non-alliance)	679.7	668.0	571.0	(97.0)
Environmental monitoring	33.4	34.2	19.8	(14.4)
Contingency and risk provision	137.1	137.1		(137.1)
Total	968.9	968.9	717.3	(251.5)

Source: Victorian Auditor-General's Office based on data from the Port of Melbourne Corporation.

As at June 2012, the actual expenditure of CDP was \$717.3 million, resulting in an overall saving of \$251.5 million. More than half of this saving was due to the \$137.1 million contingency provision included in the budget. The amount of contingency allocated in the initial budget was reasonable and commensurate with the project risk profile. The fact that the contingency was not used reflects the effectiveness of the corporation's risk mitigation and overall project management processes.

The corporation received a government contribution of \$100 million towards the cost of CDP in 2008. The net cost of \$617.3 million is being recovered through a CDP infrastructure levy.

As at June 2012, the baywide environmental monitoring requirements had already been completed. There are still several requirements for post-construction inspections and surveys that are to be completed at specified times in the future, some at the fourth, sixth and tenth year post-dredging. The environmental monitoring expenditure up to June 2012 was \$19.8 million. A further \$1.1 million has been budgeted for 2012–13 and the forecast for the future years' inspections and surveys are expected to be in the vicinity of \$1.5 million.

The incentives embedded in the alliance contract worked effectively to help deliver CDP on time, within budget and to a high level of environmental performance. The corporation and the alliance partner implemented processes to actively monitor and report on risks, regularly review expenditures and schedules, and comprehensively report on costs. Through these processes cost savings were realised as a result of:

- dredging efficiency gains due to the use of larger dredging vessels and additional dredging vessels
- productivity gains due to improvements in methodology and use of materials for works—such as underwater service protection, construction and capping of the bund for placement of dredged material
- minimal delays due to high levels of environmental performance and conformance with legislation
- no delays or disruptions in project schedule due to industrial action and minimal delays due to inclement weather
- reduction in costs for plant, vessels and overheads due to early completion of works.

5 Complying with environmental approval conditions

At a glance

Background

The Channel Deepening Project's (CDP) environmental effects were assessed in accordance with the *Environment Effects Act 1978*, which identified key environmental risks in relation to protected marine species, seagrass, marine protected areas, deep reefs and nutrient cycling in Port Phillip Bay.

An environmental management plan set out the Port of Melbourne Corporation's (the corporation) procedures for monitoring and managing all key risks identified in the assessment, and was a significant condition of the project approval and delivery.

The Office of the Environmental Monitor (OEM) was set up to monitor CDP's compliance with environmental approval conditions and evaluate its impact on the bay's health.

Conclusion

OEM's independent scrutiny shows that the corporation complied with all applicable environmental approval conditions with three minor exceptions. The corporation appropriately managed these minor nonconformances and the related environmental incidents that occurred. The environmental effects of these incidents were inconsequential.

Findings

- OEM's independent scrutiny of CDP's environmental compliance was active, comprehensive and reliable.
- The corporation was effective and vigilant in managing the environmental risks associated with dredging works and achieved overall compliance with the environmental management plan.
- CDP has not adversely impacted on the bay, which remains in good health.

5.1 Introduction

Public interest in safeguarding the bay environment emerged as a major issue during the assessment and approval of the Channel Deepening Project (CDP). The project's environmental effects were assessed in accordance with the *Environment Effects Act 1978*, which identified key environmental risks in relation to protected marine species, seagrass, marine protected areas, deep reefs, and nutrient cycling in the bay. The assessment concluded that most impacts were expected to be confined in specific areas and of a short-term nature, with ecological recovery expected within two years of the project's completion.

Central to the state and Commonwealth approvals was the establishment of an environmental management plan (EMP) that sets out procedures for monitoring and managing all key risks identified in the assessment. The Port of Melbourne Corporation (the corporation) was responsible for delivering the project strictly in accordance with the EMP.

As the critical 'rule' book of CDP, the EMP contained detailed environmental management requirements to be followed and set out:

- the 58 project delivery standards (PDS) governing when, where and how the project should be carried out
- how CDP's environmental effects should be monitored, communicated, reported and managed
- how incidents and noncompliance should be notified and reported
- how CDP's implementation and compliance with the EMP should be communicated and managed between the corporation and its contractors.

The Office of the Environmental Monitor (OEM) was set up as an independent body to monitor CDP's compliance with environmental approval conditions and evaluate its impact on the health of Port Phillip Bay.

OEM assessed CDP's environmental performance independently by:

- scrutinising the corporation's quarterly project reports, and auditing its annual project reports in line with the approval conditions
- providing an independent assessment of the bay environment by examining the data from the monitoring programs
- investigating issues raised by the public, ministers and relevant government agencies
- commissioning independent audits and expert advice on key project activities and their impact
- conducting investigations into environmental incidents and nonconformances, and their likely impact.

We assessed the corporation's compliance with the environmental approval conditions by examining OEM's compliance reports and related assessment activities.

We examined the comprehensiveness and reliability of OEM's compliance audits by reviewing:

- the scope and methodology of OEM's independent audits of CDP's compliance with the EMP and investigations into incidents
- the evidentiary basis for the audit conclusions—in particular, how OEM quality assured the accuracy and integrity of data/reports it relied on for the assessments.

5.2 Conclusion

We were satisfied with OEM's scrutiny of the corporation which showed that it complied with the applicable environmental approval conditions, with three minor exceptions.

The corporation closely monitored its environmental performance during the course of the project, and actively engaged with the public through media releases and press conferences about the project's activities and its environmental incidents. The corporation appropriately managed all minor nonconformances and the related environmental incidents which occurred. The environmental effects of these incidents were assessed by OEM to be inconsequential.

The project has not adversely impacted on the bay and it remains in good health.

5.3 Monitoring compliance with the environmental management plan

5.3.1 Comprehensiveness of the Office of the Environmental Monitor's monitoring

We found that OEM's compliance monitoring was comprehensive and risk based, covering all PDSs and monitoring mechanisms, as well as both the construction and the two year post-construction periods.

OEM conducted 20 independent compliance audits of CDP. Of these:

- five audits were conducted to examine the project's compliance with the EMP PDSs
- four examined compliance with implementation and management requirements of the monitoring mechanisms
- four assessed whether the corporation's annual project reports fairly and accurately represented its performance against EMP requirements.

In addition, OEM conducted seven audits which targeted key CDP features that attracted a high level of public interest during its approval process. This included the dredging in the entrance of the bay and management of contaminated dredged material.

In assessing the integrity of the operations of the monitoring programs, OEM examined whether the following monitoring procedures were performed in accordance with the methods and requirements prescribed in the EMP, PDSs and the applicable detailed design documents:

- **sampling compliance**—whether the frequency and location(s) of sampling were in line with the approved design
- **indicators**—whether the required equipment and expertise employed for monitoring activities, such as data analysis and interpretation and management reviews, were in line with the standards and requirements prescribed in the design
- **quality assurance/quality control**—whether the prescribed quality assurance/quality control procedures had been adhered to
- **application of the data**—for example, whether all results from monitoring were considered and used by the corporation
- **authorisation environment**—for example, whether monitoring results that exceeded prescribed response levels/environmental limits were reported to the nominated agencies within the required time frame, and whether appropriate authorisation was obtained in accordance with the EMP for any changes made to the methods/design of monitoring programs.

5.3.2 Reliability of the Office of the Environmental Monitor’s monitoring

OEM employed robust quality assurance systems. All audits were designed and conducted consistent with the international standards, and OEM oversaw the planning and implementation of each audit to assure the audit activities comprehensively addressed EMP requirements.

In addition to OEM’s scrutiny of the corporation’s compliance with the EMP, CDP established a hierarchy of quality assurance mechanisms. These provided additional assurance to OEM about the accuracy and integrity of data/reports generated by the corporation and third-party monitoring agencies OEM used to assess CDP’s environmental performance/compliance.

The corporation’s project activities were closely monitored by its management, and subject to quality reviews by OEM against the standard operating procedures developed for CDP. CDP was also subject to internal audits by a separate unit within the corporation in accordance with the requirements set out in the EMP. Any deviations from the standards or the EMP requirements were reported as exceptions and subject to reviews and investigations in line with the relevant protocols.

Additional arrangements were in place for third-party agencies involved in the nine baywide monitoring programs (BMPs) to provide assurance over their data/reports. Figure 5A outlines these arrangements.

Figure 5A
A hierarchy of quality assurance for the baywide monitoring programs

The baywide monitoring programs for CDP were managed by the corporation, the Department of Primary Industries (DPI), the Department of Sustainability and Environment (DSE) and the Environment Protection Authority (EPA) and included a hierarchy of quality assurance, covering:

- **The design**—the detailed design documents for the nine BMPs received regulatory approval after an extensive process which involved input from environmental experts engaged by the corporation, staff across the three lead agencies which had been running similar monitoring programs, as well as peer reviews.
- **The implementation**—sampling and data collection was quality controlled not only by internal quality assurance procedures by the contractors engaged by the lead agency, but also by the corporation's audits of these procedures. The agencies that carried out the monitoring programs were required to report any deviations from the program design as exceptions.
- **Quality of data**—monitoring data were subject to multiple sources of cross-checks, e.g., turbidity levels in the bay were monitored by five separate programs operated by the three agencies.
- **Results interpretation and impact assessment**—the EMP sets out the environmental limits, assessment framework and reporting arrangements for the BMPs. The corporation was required to assess the results within these parameters and report the results in its quarterly and annual project reports. OEM attended these meetings as observer.
- **Management and coordination**—a steering committee consisting of the above agency representatives was established to oversee the delivery and quality of the BMPs, with OEM as observer. It was evident that the steering committee took it as its primary accountability to address quality of data reports from the BMPs. The steering committee reviewed all exception reports and endorsed the assessment of the impact of these exceptions reported by individual monitoring agencies.

In addition to these assurance arrangements, OEM conducted four audits into the implementation and management of the baywide monitoring programs. These audits checked compliance of the programs with the EMP, PDSs and detailed design documents. OEM also conducted quarterly project reviews through which it was able to identify, in a timely manner, opportunities for improvement in the environmental management of the CDP. For example, OEM's second quarterly project review released on 15 September 2008 recommended loss of turbidity monitoring data be reported to all relevant agencies within a set time line. OEM judged this was important because data on turbidity monitoring was a key indicator of CDP's environmental output risks. This requirement was incorporated into the revised EMP, and was approved on 3 November 2008.

Source: Victorian Auditor-General's Office.

5.3.3 Quality assurance in compliance auditing

OEM's audits were conducted by an external independent auditor appointed by OEM. For both the construction and post-construction phases, the same auditor was selected as the best candidate through an open tender process.

We examined the tender processes and found they followed due procedures and applied the selection criteria in a robust manner.

We found each report produced by the auditor demonstrated:

- sound audit methodologies were followed
- thorough investigations were undertaken using multiple lines of evidence to corroborate results
- clear analyses of compliance were documented against each applicable requirement.

Sound audit methodology

Each audit was undertaken adopting a methodology consistent with recognised international standard ISO 19011 *Guidelines for Environmental Auditing*, which defines quality standards for audit planning, collecting audit evidence, objectively assessing the evidence, and reporting in a clear and accurate manner.

For each audit, the auditor clearly documented the standards and requirements against which compliance was being checked, namely, the applicable EMP versions, the appropriate PDSs, and any ancillary requirements such as approved designs for the monitoring programs.

The auditor confirmed the audit scope, methodology and specifics with OEM at the beginning of each audit.

Thorough investigation with multiple lines of evidence

The auditor obtained substantial evidence from multiple sources to inform judgement, including:

- original field records and work reports from the alliance contractor
- relevant reports and audits from the corporation
- reports and original field records from other monitoring agencies.

The auditor found good record keeping practice at the corporation provided a rich source of information for audit. Our examination of records available for the baywide monitoring programs confirmed this. Despite the rich information available, the auditor requested additional field surveys be carried out to determine whether the bund and fill material complied with EMP requirements. This proactive approach provided further assurance over the rigour of OEM's independent assessments.

The auditor examined evidence against each requirement of the applicable PDSs, reviewed all exception reports, and assessed whether exceptions were significant. A number of opportunities for improvement were identified as a result, such as improving clarity of reporting by agencies, which were subsequently incorporated into the EMP and the relevant ancillary requirements.

Clearly documented analysis of compliance

The detailed findings of OEM's independent audits were clearly tabulated against each part of the relevant PDSs, documenting the auditor's analysis and sources of evidence used. The analyses demonstrated a clear logic between the evidence and the findings reached.

5.4 Responding to environmental incidents

We examined how effectively the corporation responded to nonconformance with the EMP and environmental incidents by reviewing:

- incident reports and investigation reports by the corporation, including any third-party expert advice sought
- OEM's investigation and assessment.

The corporation effectively managed nonconformance with the EMP and other environmental incidents that occurred.

During the construction phase of CDP, the corporation provided a total of 28 notifications to the public and OEM of environmental incidents, including three notifications of the three minor nonconformances.

Our 2009 audit covered the corporation's management of the first 16 environmental incidents which occurred between February 2008 and 10 February 2009, including one minor nonconformance relating to incomplete clean-up of the dredged material at the entrance dredging on 20 July 2008. The audit confirmed that the corporation had appropriately responded to and managed the minor nonconformance in line with the EMP and other incidents in accordance with the Victorian Marine Pollution Contingency Plan.

Between 11 February 2009 and 2 July 2009, the corporation promptly notified the public and OEM of a further 12 environmental incidents, comprising:

- one minor nonconformance on 19 April 2009 relating to dredging outside of the defined areas
- one minor nonconformance on 3 August 2009 relating to emergency disposal of dredged material outside of the defined area
- nine small spills of oil or hydraulic fluid into the environment
- one incident of a hydrocarbon sheen appearing around the dredging vessel when it was dredging the contaminated sediments at Yarraville.

The nine spills of oil or hydraulic fluids involved six cases of less than 50 litres and three of less than 250 litres entering the Yarra River or Port Phillip Bay. In all cases OEM determined that the corporation had acted in accordance with relevant regulations and implemented corrective actions as required, and that the impacts of these incidents on the environment were inconsequential.

The corporation's response to the two minor areas of nonconformance is described in Figures 5B and 5C. In summary, OEM's assessment found:

- the minor nonconformances were thoroughly investigated
- the corporation had clearly identified corrective actions to prevent likelihood of a recurrence, and had already implemented the remedial actions, where applicable
- the three minor nonconformances had inconsequential environmental effects.

Figure 5B
Dredging outside the defined area

The PDS No 24 specifies a construction zone for all areas to be dredged. On 19 April 2009 the Queen of Netherlands dredged outside of the defined areas. The alliance contractor identified this incident during a validation process on 7 May 2009 and promptly alerted the corporation. The following day the corporation notified OEM in accordance with the procedures required by the EMP, and was requested to conduct an investigation.

On 22 May 2009 the corporation provided an incident report to OEM which identified that miscommunication between crew members on the dredging vessel caused the incident. As a result, about 300 cubic metres of sandy seafloor material were dredged about 90 metres outside the defined dredge area. The incident report also documented the corrective actions the corporation implemented between 11 and 14 May 2009, which included:

- giving visual prominence to the tracking of the dredging vessel
- shortening the time taken for the offshore office to validate the onboard vessel tracking data
- improving staff training and communication in relation to handling and reporting vessel tracking information.

On 21 June 2009 OEM released its independent assessment of the incident. OEM was satisfied with the corrective actions taken by the corporation in this instance and assessed the environmental impact of this noncompliance as inconsequential. The incident was assessed as minor noncompliance.

Source: Victorian Auditor-General's Office.

Figure 5C
Disposal of dredged material outside the designated area

The PDS No. 34 includes rules on where dredged material can be placed.

On 3 August 2009 approximately 400 cubic metres of uncontaminated clay were disposed of about 2km outside of the corporation's dredged material ground in the north of the bay. Because of a sudden onset of high winds, for the safety of the crew and equipment onboard, this emergency measure was considered necessary. The incident resulted in uncontaminated loose material covering a sea floor area of about 55 metres by 15 metres, outside the dredged material ground.

The following day—4 August 2009—the corporation notified OEM in line with the EMP's requirement and started an investigation into the incident's impact and any necessary remedial actions. An impact assessment of the affected site was conducted by an expert engaged by the corporation on 10 August 2009. On 17 August 2009, in its incident report, while a number of remedial options were canvassed, the corporation considered the best option was not to take further action.

Following the incident, the corporation:

- reinforced the requirements and importance of reporting near misses to its contractors
- identified opportunities to reduce the risk of similar events
- established contingency arrangements.

On 26 August 2009 OEM released its assessment and concluded the incident did not impact on protected species under the relevant regulations and that the overall impact of the incident was inconsequential.

Source: Victorian Auditor-General's Office.

5.5 The health of Port Phillip Bay

Prior to CDP, a number of government agencies had already established arrangements to monitor the health of Port Phillip Bay. For example, DSE monitored the nutrient cycling process in the bay, DPI monitored the level of fish stock, and EPA monitored water quality. The CDP's environmental assessment determined that these programs needed to be augmented for additional spatial coverage and frequency of sampling so the health of the bay could be monitored more closely during and after CDP.

OEM assessed the bay health by examining the water quality, plants and animals, fish stocks and contaminants in fish during the construction and post-construction periods. When monitoring results were outside of expected ranges further investigations by OEM, and management reviews by the corporation, were conducted to determine if they were linked to CDP activities and/or were the result of complex interactions between natural events, such as storms and ecological processes in the bay.

More than 275 000 hours of baywide monitoring was carried out and 99.99 per cent of data capture was achieved during these periods. OEM assessed the bay health by:

- reviewing all monitoring reports, and all exceptions to monitoring program design and reports
- assessing instances when monitoring results were outside of expected ranges.

During the project works and the two years following its completion, some results of the indicators for water quality and fish population were outside of the expected ranges. After OEM's assessment that followed an accepted decision-making framework, it determined these results were not caused by CDP activities.

The environmental impacts of the project were well within the acceptable ranges which were set at project approval. The environment of Port Phillip Bay has not been adversely affected by the project. The bay remains in good health.

Appendix A.

Audit Act 1994 section 16— submissions and comments

Introduction

In accordance with section 16(3) of the *Audit Act 1994* a copy of this report was provided to the Port of Melbourne Corporation, the Department of Transport and the Department of Sustainability and Environment with a request for submissions or comments.

The submission and comments provided are not subject to audit nor the evidentiary standards required to reach an audit conclusion. Responsibility for the accuracy, fairness and balance of those comments rests solely with the agency head.

RESPONSE provided by the Chairman, Port of Melbourne Corporation



Classification: Commercial-In-Confidence

2 November 2012

Mr Des Pearson
Auditor-General
Victorian Auditor-General's Office
Level 24, 35 Collins Street
MELBOURNE VIC 3000



Dear Mr Pearson

Thank you for the audit report on the *Port of Melbourne Channel Deepening Project*. The Port of Melbourne Corporation (PoMC) believes this Report provides further valuable insight into this significant long term Victorian infrastructure project.

1. Audit Summary - Findings

In particular, PoMC notes your specific recommendations:

"The Port of Melbourne Corporation in consultation with the Department of Transport, should:

- 1. review the impact of the global financial crisis on the expected timing and quantum of future economic benefits from the Channel Deepening Project*
- 2. review existing Channel Deepening Project critical success factors/metrics and expedite development of a benefits management plan and related strategies for optimising the achievement of Channel Deepening Project objectives and future benefits*
- 3. commencing from 2014, implement regular and timely benefits reviews/reporting to the corporation's board, executive management and Department of Transport, against the benefits management plan."*

PoMC accepts each of these recommendations and will implement them.

In commenting on the conclusions noted in the report, I am pleased to respond as follows:

2. Complying with environmental approval conditions

"The environment impacts of the project were well within the acceptable ranges which were set at project approval. The environment of Port Phillip Bay has not been adversely affected by the project. The bay remains in good health."

PoMC agrees.

3. Delivering the project

"The Port of Melbourne Corporation successfully delivered the planned deep water access to enable 14 metre draught vessels at all tides one month ahead of schedule, and well under the approved project budget of \$969 million. This was due to effective incentive mechanisms in the alliance contract that promoted proactive risk management, innovations, and high standards of environmental performance."

PoMC agrees.

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**RESPONSE provided by the Chairman, Port of Melbourne Corporation –
continued**

4. Facilitating trade through the Port of Melbourne

“Trade growth post CDP has occurred but at a slightly lower rate than was forecast in CDP’s business case. While CDP may have contributed to this result, its impact to date cannot be assessed because trade growth was expected to occur in the short term with or without channel deepening”.

PoMC suggests that trade growth most probably, in the short term, would have occurred even without channel deepening. However, importantly, channel deepening is about a 25 year vessel access at “all states of tide” and providing confidence for shipowners to bring larger vessels. Additionally, it is about providing confidence to those who make decisions on trade-generating land based capital investments that Melbourne has long term marine capacity.

5. Improving the Port of Melbourne’s efficiency and competitiveness

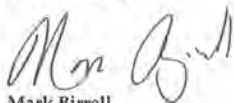
“CDP has enhanced the port’s long-term competitiveness and, as forecast in 2007, the imposition of the channel deepening charge has reduced but not reversed Melbourne’s price competitiveness. Changes to shipping markets that were not forecast and which are outside the Port of Melbourne Corporation’s direct control may reduce the expected benefits of the project if the trends continue.”

As your detailed report indicates, this is a complex matter. PoMC will address it as part of the benefits management plan review.

Your comment in the Report that shipping capacity growth has outstripped trade growth is a positive development for a port corporation. It facilitates the access to available shipping space for our valuable regional exporters and keeps downward pressure on freight rates.

Our management team has advised me that the studious and professional way Mr Steven Vlahos and Dr Fei Wang approached this audit is to be commended.

Yours sincerely



Mark Birrell
Chairman

RESPONSE provided by the Secretary, Department of Transport



Department of Transport

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Trim Ref: Doc/12/253537

Mr D D R Pearson
Auditor-General
Victorian Auditor-General's Office
Level 24, 35 Collins Street
MELBOURNE VIC 3000



Dear Mr ^{Be's} Pearson,

**PROPOSED AUDIT REPORT PORT OF MELBOURNE CHANNEL DEEPENING –
ACHIEVEMENT OF OBJECTIVES**

Thank you for your letter of 19 October 2012 enclosing the above proposed report.

I note your conclusion that the construction phase of the project was delivered ahead of time, under budget and, except for three minor nonconformances, in compliance with the environmental approval conditions.

I advise that the department will work with the Port of Melbourne Corporation in respect of the three recommendations.

Yours sincerely


JIM BETTS
Secretary

23/ 10 /12



RESPONSE provided by the Secretary, Department of Sustainability and Environment



**Department of
Sustainability and Environment**

Ref: SEC009084
File: FF/46/3289

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25 OCT 2012

Dear Mr Pearson *Del*

**PROPOSED AUDIT REPORT - PORT OF MELBOURNE CHANNEL DEEPENING PROJECT:
ACHIEVEMENT OF OBJECTIVES**

Thank you for your letter dated 19 October 2012 regarding the proposed report *Performance Audit - Port of Melbourne channel deepening project: Achievement of objectives*.

Part of the performance audit addresses matters for which I am responsible, namely the Port of Melbourne Corporation's compliance with environmental approval conditions. For these matters, I welcome your findings that:

- The scrutiny of environmental compliance was active, comprehensive and reliable.
- The project has not adversely impacted on Port Phillip Bay and the bay remains in good health.

I also welcome the audit as it provides a valuable case study for the effective and efficient delivery of environmental regulation.

Thank you again for raising this matter with me.

Yours sincerely

Greg Wilson
Secretary

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