



Department of
Infrastructure, Planning and Natural Resources

**Revised Primary Submission to the Commission of Inquiry
Executive Summary**

**Proposal by Sydney Ports Corporation to Construct and Operate a New Container
Terminal and Associated Infrastructure at Port Botany in the City of Botany Bay Local
Government Area**

Department of Infrastructure, Planning and Natural Resources

October 2004

Executive Summary

Introduction

This report represents the Department's primary submission to the Commission of Inquiry (COI) into the proposal by Sydney Ports Corporation (the Applicant) to construct and operate a new container terminal and associated infrastructure at Port Botany in the City of Botany Bay Local Government Area (the proposal). This report updates and replaces the Department's previous Primary Submission to the COI, dated May 2004 to take into account the expanded terms of reference of the Inquiry.

The submission outlines the Department's ongoing assessment of the environmental impacts associated with the proposed development and addresses the following terms of reference for the COI:

- i. Justification of the proposal;
- ii. the terrestrial and marine environment;
- iii. the hydrodynamics of Botany Bay;
- iv. the acoustic environment;
- v. air and water quality, including groundwater;
- vi. safety, both in terms of shipping navigation and the operations of Kingsford-Smith Airport;
- vii. local and regional traffic road and rail networks;
- viii. local and regional infrastructure, including the implications on container movements and growth within NSW;
- ix. recreational opportunities in and around Botany Bay, in particular Foreshore Beach and Reserve;
- x. cumulative impacts of the proposal in the context of the total Port environs taking into account any relevant strategy for Botany Bay; and
- xi. the social and economic implications of the development, including the implications to the State of not proceeding.

As result of a recommendation by the Parliamentary Inquiry into the Port Infrastructure in NSW, the Minister for Infrastructure and Planning amended the terms of reference for the COI on 28 May 2004 to include:

- xii. An analysis of any potentially feasible alternatives at Port Botany to the carrying out of the development, including, the alternative proposed by P&O Ports Limited.

The submission therefore also addresses the additional term of reference. The submission also includes an assessment of further information provided by the Applicant subsequent to the Department's initial submission to the COI and in the light of issues raised by the Department at that previous stage.

The Department will continue to participate in the COI process and update its submission as appropriate and in light of any additional or new information provided.

ES1. Development Proposal

The proposed Port Botany expansion consists of three major components:

- Extension of the existing Brotherson Dock North container terminal covering approximately 63 hectares, including reclaiming 57 hectares of land through dredging.
- Provision of supporting infrastructure including road, rail and terminal facilities.
- Enhancement of the public and ecological areas adjacent to the proposed new container terminal.

Section 2 of the Department's primary submission provides a detailed description of the proposal and its locality. A map showing the context of the proposal is at Figure 2 of the report.

ES2. Statutory Planning Framework

In accordance with the provisions of the *Environmental Planning and Assessment Act, 1979* (the Act) and the relevant Environmental Planning Instruments that apply, the proposed development is classified as State significant and designated development and is permissible with consent. The Minister for Infrastructure and Planning (the Minister) is the consent authority and an Environmental Impact Statement has been prepared by the Applicant.

The proposal is being assessed in the context of Federal and State legislation. **Section 3** of the Department's submission describes in detail the statutory planning framework under which the proposed development is being assessed. The conclusion is that the proposals are broadly consistent with the current statutory planning instruments, noting that those and others may vary in the future in light of planning reform initiatives and regional and State strategic planning work currently underway by the Department.

The Department also considers that the requirements of the Act and Regulation regarding notification, advertising, exhibition and community involvement have all been met.

ES3. EIS Exhibition and Issues Raised in Submissions

The Development Application (DA) and associated Environmental Impact Statement (EIS) were initially exhibited from 28 January 2004 until 29 March 2004. During this period, a total of 1159 separate submissions were received. This included submissions from Federal, State and Local Government agencies, at least 20 non Government community and environmental organisations and over 1000 individuals. Of the 1159 submissions received by the Department, approximately 90% objected to the proposal.

Section 5 of this report provides details of various issues raised in submissions and **Appendix B** provides a summary of all initial submissions. In summary, the key issues of concern raised in initial submissions, include:

- Traffic and transport (85.2% of submissions).
- Consideration of alternative Ports such as Newcastle and Port Kembla (83.8% of submissions).
- Impacts on Terrestrial ecology, particularly migratory birds (81.1%).
- Risk assessment/contamination and emergency incident response (80.4%).
- Recreational/social impacts (79.5%).
- Noise impacts (73.5%).

In response to the amended terms of reference for the COI, the Applicant submitted the following supplementary reports:

- *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany*; and
- *Supplementary Submission to Environmental Impact Statement*.

The supplementary reports submitted by the Applicant included a Multi-criteria analysis of 11 alternative port layout options to the EIS proposal as well as additional information on a range of potential environmental and amenity impacts including hydrology and water quality, traffic, air quality, hazard and risk and environmental management and monitoring.

The supplementary reports (with the initial DA and EIS) were exhibited from 26 August 2004 until 27 September 2004. The Department has subsequently received an additional 106 submissions during re-exhibition. Of the 106 submissions received by the Department, approximately 98% objected to the proposal.

The issues raised in the re-exhibition of the proposal are also addressed in **Section 5** and summarised in **Appendix B**. In summary, the key issues raised in subsequent submissions, include:

- Traffic and transport (96.1%).
- Alternative location – mainly Port Kembla and Newcastle (92.2%).
- Terrorism/security and groundwater – 83.3%.
- Hydrology, water quality impacts, noise and air - (82.4%).
- Visual, coastal processes and hydrodynamics and terrestrial ecology impacts (81.4%).
- Risk assessment and contamination (80.4%).

These issues are illustrated graphically in Figure 4 of the Report.

ES4. Justification of the Proposal

The Department recognises the strategic significance of Port Botany to the trade and wider economy of Sydney, New South Wales and the nation. The Port represents critical infrastructure essential to the growth and strengthening of Sydney as a global city.

The Department accepts in principle that there is justification for Port Botany to accommodate a throughput of 3.2 million TEUs¹ per annum by 2025. This would strengthen and maintain the strategic significance of Port Botany and is consistent with the NSW Government Ports Growth Plan that promotes the next phase of container trade growth being accommodated at Port Botany, with subsequent growth transferring to Newcastle.

As discussed in more detail in Section 6 of the report, there are emerging trends which increase the need for additional Port throughput and the implications of not facilitating throughput of 3.2 million TEUs per annum by 2025 will have ramifications for the competitiveness of the NSW economy.

Having said that, the Department recognises that the proposal advanced by the Sydney Ports Corporation, to achieve such an increase in throughput, has potentially important local and regional environmental impacts as well as strategic planning implications. In that context, there are essentially three tests that ought to apply in the assessment process:

1. the proposal must be consistent with, and integrated within, the studies and investigations into the development of a Metropolitan Intermodal Freight Strategy, and the wider Metropolitan Strategy, in particular, the achievement of a 40% rail mode share (as proposed in the EIS) from the expanded Port throughput;
2. that environmental and amenity impacts on Botany Bay, Penrhyn Estuary and surrounding areas can be fully addressed or mitigated. This includes addressing any conflict with aviation safety and the orderly and safe operation of Kingsford-Smith Airport; and
3. that the proposal is the most appropriate option for achieving the throughput of 3.2 million TEUs as modelled in the EIS.

It is important that the Inquiry process independently focus on these areas in its reporting to the Minister.

¹ TEU is a freight industry term standing for Twenty-Foot Equivalent Unit (Container). The abbreviation is used throughout the Department's submission.

1. Strategic Planning

Section 4 of this submission addresses the strategic planning framework within which the proposed Port expansion must be consistent and integrated.

Any increase in throughput at the Port must be orderly and efficiently distributed throughout Sydney and beyond, consistent with good environmental and amenity outcomes. The Department supports the Applicant's objective of a transport modal split of 40% of freight by rail, as proposed in the EIS. This will necessitate additional infrastructure in freight rail as well as intermodal facilities, strategically located throughout the region. It is essential that the Port proposal be integrated within this broader transport/planning framework.

These broader strategic planning issues are currently being addressed through a number of strategic initiatives, including the *Metropolitan Strategy*, studies and investigations being prepared for a *Metropolitan Intermodal Freight Strategy* and *Towards a Strategy for Botany Bay*. Specifically these initiatives will attempt to address:

- ensuring a coordinated approach to the development of further metropolitan intermodal terminal capacity;
- managing the balance between freight and passenger access to the rail network, and thereby increasing the reliability of rail access to the Port; and
- commitment to rail network infrastructure upgrades to facilitate freight movement

As indicated above, these studies are on-going at this stage.

2. Environmental and Amenity Impacts

Section 7 of this submission addresses the Department's preliminary assessment, identifying key issues the Department considers could be managed through appropriate mitigation measures.

The Department's assessment to date highlights a number of issues where the Department and other agencies consider additional information is required from the Applicant to finalise the assessment of the proposal. The key issues for which additional assessment is required include:

- Operational aviation issues, in particular the compatibility of the proposal with airport radar facilities and the availability and timing of appropriate technology to address these issues;
- Terrestrial and marine environment impacts, particularly the adequacy of the peer review of the Species Impact Statement and methodology used in the Risk Assessment;
- Penrhyn Estuary water quality impacts, in particular the inputs chosen for modelling; and
- The adequacy of the assessment of rail noise impacts.

3. Conflicting Port Throughput Capacity Scenarios

The main justification of the proposed expansion of Port Botany as described in the EIS is "to provide sufficient port capacity to meet long term forecast growth in NSW container trade" of more than 3 million twenty foot equivalents units (TEUs) per annum by 2025. This is now being questioned by submitters, with DIPNR aware of a number of sources of varying estimates of the capacity of the existing footprint (without any expansion) and the proposed expansion of Port Botany, including submissions by stevedores.

The table below provides a summary of each position, highlighting the conflict in estimates of capacity at both the existing port and SPC's proposed expanded port. Estimates of the existing

port “footprint” range from 1.5 million TEUs per annum to 3.3 million TEUs per annum. The table also indicates that capacity predictions of SPC’s proposed expansion range from 3.2 million TEUs per annum to 6.4 million TEUs per annum.

Total Port capacity estimates

	SPC EIS	SPC COI	SPC Alternatives	SPC COI letter	P&O
Current port	1.6–1.8	1.6	1.5	n/a	2.3
Current port (best practice)	2.29	n/a	1.5	n/a	3.3
EIS option	3.2	3.2	3.13	3.33	4.4 (potential 6.4)
Alternative Option 2 (P&O)	n/a	n/a	2.64	2.97	4.2 (potential 6.0)

Capacity predictions have implications for the justification of the proposed expansion. The Port expansion is justified in the EIS on the basis that the current Port cannot accommodate the predicted growth in container volume. The environmental, social and economic impacts of the proposal are all predicated on this primary justification.

The Department concludes that the issue of Port capacity predictions and implications should be addressed during the Commission of Inquiry process.

4. *Alternative Potentially Feasible Options for the Expansion of the Port in Botany Bay*

The Minister amended his direction to the Commission of Inquiry to include the additional term of reference to also inquire and report on “an analysis of any potentially feasible alternatives at Port Botany to the carrying out of the development, including the alternative proposed by P&O Ports Limited”. In response, the Applicant engaged consultants to undertake an evaluation of alternatives at Port Botany. The consulting team used a multi criteria analysis to evaluate a short list of five options, including SPC’s EIS option (Option 1) and the P&O option (Option 2). This document *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany* was made publicly available on August 25 2004.

The *Analysis of Options* concluded that Option 1 was the preferred alternative, providing “significantly” more capacity than Option 2“. The key disadvantages of Option 2 [P&O option] is that it results in a new port layout which will be capacity limited earlier than Option 1, it is comparatively less suitable for rail transportation and it does not include the road connection enhancements present within Option 1. It does not provide the potential for additional terminal operators.

An analysis of the document undertaken by the Department (**Section 6A**) raises a number of concerns, including:

- The composition of the panel and its representativeness of “stakeholders”;
- Justification for selection of sub-criteria and associated weighting; and
- The adequacy of sensitivity and scenario analysis.

Based on these concerns, the Department does not consider that the *Analysis of Potentially Feasible Options* provides an adequate analysis of the options nor at this stage provides

adequate justification for the selection of the EIS proposal (Option 1). The Department therefore considers that this issue needs to be further examined during the Inquiry.

ES6. Conclusion

At this stage of its assessment, the Department draws the Inquiry's attention to the need to focus on the three areas and associated issues raised in this submission, namely:

- a. The proposal's consistency and integration within *Towards a strategy for Botany Bay*, the current investigation into the development of a *Metropolitan Intermodal Freight Strategy* and the wider *Metropolitan Strategy* and the achievement of modal split targets;
- b. Pending information required to address a number of outstanding environmental and amenity issues, particularly aviation and impacts on Penrhyn Estuary; and
- c. Conflicting information on the throughput capacity of the Port both in terms of its current "footprint" and proposed "footprint".

The Department recognises the need to provide for an increase in trade through Port Botany, and to accommodate an increase in the modelled annual throughput of 3.2 million TEUs. The options of achieving this should be further and carefully considered. Such options will have implications for the environmental, amenity, transport and strategic planning outcomes.

In reporting to the Minister, the Inquiry should ensure proper consideration of these issues.



Department of
Infrastructure, Planning and Natural Resources

Revised Primary Submission to the Commission of Inquiry

Proposal by Sydney Ports Corporation to Construct and Operate a New Container Terminal and Associated Infrastructure at Port Botany in the City of Botany Bay Local Government Area

Department of Infrastructure, Planning and Natural Resources

October 2004

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1. INTRODUCTION

This report is the Department's revised primary submission to the reconvened Commission of Inquiry into the proposed development by Sydney Ports Corporation to expand Port Botany.

1.1 Background

On 26 November 2003, the Department received a Development Application (DA) and Environmental Impact Statement (EIS) from Sydney Ports Corporation (the Applicant) for the construction and operation of a new container terminal and associated infrastructure at Port Botany in the City of Botany Bay local government area (the proposal).

The terms of reference to the Commission of Inquiry into the Port Botany expansion were amended on 28 May 2004 by the Minister of Infrastructure and Planning in response to recommendations made by the *Inquiry into Port Infrastructure in New South Wales* being held by the Legislative Council's Standing Committee on State Development. The interim report into the Inquiry recommended:

That the Minister for Infrastructure, Planning and Natural Resources ensures that any expansion of the Port Botany terminal facilities is only undertaken after the identification and rigorous evaluation of all viable alternatives, including the current proposal.

Consequently, the Commission of Inquiry, which was scheduled to start on 31 May 2004, was adjourned to allow the Applicant to prepare a supplementary report which would include a detailed analysis of all feasible alternatives at Port Botany. The Department received the Applicant's *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany* and the *Supplementary Submission to Environment Impact Statement* on 25 August 2004. This report has been updated to include the Department's assessment of these supplementary reports and also considers the additional information received from the Applicant since May 2004.

1.2 Environmental Impact Assessment

The Development Application (DA) and associated Environmental Impact Statement (EIS) relating to the proposed Port expansion were exhibited from 28 January 2004 to 29 March 2004. During this time, and subsequently, the Department received a total of 1159 separate submissions. Submissions were received from the following parties:

- 8 from NSW government agencies (Department of Environment and Conservation, NSW Fisheries, Department of Health, State Transit Authority, Roads and Traffic Authority, NSW Heritage Office, Sydney Water and RailCorp);
- 2 submissions from Commonwealth government agencies (Airservices Australia and Department of Transport and Regional Services);
- 4 submissions from local government (City of Botany Bay Council, Randwick Council, Strathfield Council and Sydney Coastal Councils Group);
- 20 from public interest groups; and
- the remainder from individual members of the public.

Of the 1159 submissions received by the Department in relation to the proposed Port expansion, 89% objected to the proposed development, 9.4% stated no position (but raised concerns in relation to various environmental impacts), 1.2% expressed concern but did not state a position and 0.4% supported the proposal.

1.3 The Supplementary Reports

The Department placed on exhibition, from 26 August 2004 until 27 September 2004, the *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port*

Botany and the Supplementary Submission to Environment Impact Statement. During the exhibition period, 106 submissions were received.³

Submissions were received from the following parties:

- 5 from NSW government agencies (NSW Heritage Office, Department of Lands, RailCorp, Sydney Water and Department of Health);
- 1 submission from local government (Randwick Council);
- 2 from public interest groups; and
- the remainder from individual members of the public.

Of the 106 submissions received by the Department in relation to the proposed Port expansion, 98% objected to the proposed development.

All issues raised during the exhibition of the EIS and the supplementary reports have been summarised in section 5 and considered in section 7 of this report.

1.4 Commission of Inquiry

On 2 December 2003, the Minister for Infrastructure and Planning directed that a Commission of Inquiry (COI) be held into all environmental aspects of the proposed development, in accordance with section 119 of the *Environmental Planning and Assessment Act 1979*. The COI would provide an independent inquiry process into the Port Botany expansion and provide an independent and transparent review and assessment as an input into the decision making process. The COI would also facilitate public participation ensuring the assessment delivers a highly transparent public process.

The Minister appointed Commissioner Kevin Cleland to constitute the COI. Commissioner Cleland will be assisted by two specialist advisers (Mr Tony Wright and Professor Hans Westerman). The public hearing session which was scheduled to commence on Monday 31 May 2004 was adjourned to allow the Applicant to consider the recommendations of the Parliamentary Inquiry into the NSW Port Infrastructure. The Commission of Inquiry will reconvene on 19 October 2004.

Following the Inquiry, the Commissioner will make an independent recommendation on the proposed development to the Minister for Infrastructure and Planning. The Commission report of findings and recommendations will be made publicly available as soon as prepared and before the Minister's decision. The Department will also provide its final assessment to the Minister, which will include the findings of the Inquiry. The Minister will then proceed to determine the development application after considering the findings and recommendations of the Commissioner, together with all other submissions and advice. The Minister's determination of the DA is the final decision in the process.

1.5 Terms of Reference

On 29 January 2004, the Minister for Infrastructure and Planning, pursuant to section 119(1) of the *Environmental Planning and Assessment Act 1979*, formally directed that a Commission of Inquiry be held into all environmental aspects of the proposal by Sydney Ports Corporation to construct and operate a new container terminal and associated infrastructure with particular emphasis on the:

- i. Justification of the proposal;
- ii. the terrestrial and marine environment;
- iii. the hydrodynamics of Botany Bay;
- iv. the acoustic environment;
- v. air and water quality, including groundwater;

³ all figures quoted refer to submissions received up to and including 1 October 2004. The Department will also consider a number of additional submissions expected.

- vi. safety, both in terms of shipping navigation and the operations of Kingsford-Smith Airport;
- vii. local and regional traffic road and rail networks;
- viii. local and regional infrastructure, including the implications on container movements and growth within NSW;
- ix. recreational opportunities in and around Botany Bay, in particular Foreshore Beach and Reserve;
- x. cumulative impacts of the proposal in the context of the total port environs taking into account any relevant strategy for Botany Bay; and
- xi. the social and economic implications of the development, including the implications to the State of not proceeding.

As a result of the recommendation by the Parliamentary Inquiry into the Port Infrastructure in NSW, the Minister for Infrastructure and Planning amended the terms of reference on 28 May 2004, to include:

- xii. An analysis of any potentially feasible alternatives at Port Botany to the carrying out of the development, including, the alternative proposed by P&O Ports Limited.

The Table below provides a list of various sections within this report that address the terms of reference.

Term of Reference	Relevant Section of this Report
Justification of the proposal	6
The terrestrial and marine environment	7
The hydrodynamics of Botany Bay	7
The acoustic environment	7
Air and water quality, including groundwater	7
Safety, both in terms of shipping navigation and the operation of Kingsford-Smith airport	7
Local and regional traffic road and rail networks	7
Local and regional infrastructure, including the implications on container movements and growth within NSW	4 & 7
Recreational opportunities in and around Botany Bay, in particular foreshore beach and reserve	7
Cumulative impacts of the proposal in the context of the total port environs taking into account any relevant strategy for botany bay	7
The social and economic implications of the development, including the implications to the state of not proceeding	3 & 7
An analysis of any potentially feasible alternatives at port botany to the carrying out of the development, including, the alternative proposed by P&O ports limited.	6A

1.6 Scope of this Report and Assessment

This report represents the Department's revised primary submission to the Commission of Inquiry. It outlines the Department's assessment of the environmental impacts associated with the proposed development including an assessment of the multi-criteria analysis (*Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany*) undertaken by Sydney Ports Corporation to consider and compare the alternative options for the proposed layout of the Port's expansion.

To assist in the Department's assessment of environmental impacts, the Department organised several 'specialist meetings', each meeting dealing with particular potential impact associated with the proposal. The meetings provided an opportunity for the Department and

relevant government agencies to obtain clarification and further information from the Applicant. The meetings proved helpful in assisting with the process, especially in articulating agencies preliminary issues and obtaining further information from the Applicant.

This report also highlights other additional Departmental information requirements identified in its assessment into the proposal which, at the time of completing this supplementary report, the Applicant may not have submitted to the Department. This additional information is required before the Department can complete an adequate level of assessment of the relevant environmental impacts. As such, the assessment presented in this report is preliminary, pending the satisfactory resolution of outstanding information issues.

In particular, the Department's submission at this stage focuses on and highlights the key consideration that the Inquiry should address in its reporting to the Minister.

It is also noted that the Department will continue to update this submission throughout the course of the Inquiry and in light of the information provided.

2. DEVELOPMENT PROPOSAL

2.1. Background

Sydney Ports Corporation seeks consent for the construction and operation of a new container terminal and associated infrastructure at Port Botany in the City of Botany Bay local government area. The proposal would provide for the future growth and expansion of the Port. The Multiple Criteria Analysis commissioned by the Applicant (presented in *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany*) concluded that the proposed layout described in the Environmental Impact Statement remains the Applicant's preferred layout.

2.2. Proposed Development Site

The proposed development site is located on the north-eastern edge of Botany Bay, which is approximately 12 km south of Sydney's CBD in the suburb of Banksmeadow, NSW. The site is located between the existing container terminals Brotherson Dock and the Parallel Runway at Sydney Airport. Figure 1 indicates the location of the site. The proposed expansion would extend approximately 550 m west and 1,300 north of the existing Patrick Stevedores container terminal and would cover approximately 63 hectares.

In 1969, the State Government endorsed the Port Botany concept plan. The plan indicated that development would be accommodated in the northern part of the Bay with reclamation occurring in four stages. Stages 1 and 2 have been completed with the construction of the container terminals at Brotherson Dock and the Bulk Liquids Berth at the entrance to the dock. The area set aside for Stage 4 is now occupied by the Parallel Runway. The proposed expansion is situated in the area originally set aside for Stage 3.

2.3. Description of Proposed Development

The Applicant is proposing to conduct the Port's expansion in two principal stages:

- construction of the additional terminal area and associated port infrastructure, (refer to Figure 2) to accommodate capacity of 3.2 million twenty foot equivalent units per annum by 2025; and
- progressive development of terminal facilities for operations within the additional terminal area.

The key components of the development would include:

- a new container terminal covering approximately 63 ha of land extending approximately 550 m west and 1,300 m north of the existing Patrick Stevedores container terminal;
- approximately 1,850 m of additional wharf face with five new shipping berths;
- a paved container storage area within the new terminal with more than 8,000 container storage bays and container stacks up to 6 high;
- an interchange within the new terminal where containers would be transferred to or from trains and/or trucks;
- three rail sidings of between 400 m and 600 m in length within the new terminal parallel to the wharf face for loading and unloading of containers and for shunting operations;
- dedicated road access consisting of a signal-controlled junction on Foreshore Road and an entrance bridge across the channel separating the existing shoreline from the new terminal;
- rail access to the new terminal are by means of an extension of the existing Botany Freight Rail Line parallel to Foreshore Road including a rail bridge and culverts;
- a strip of existing land north of the existing Patrick Stevedores container terminal for an internal port road and two additional rail sidings;
- construction of a road bridge over the rail line at the eastern end of Penrhyn Road;
- a tug boat facility capable of berthing up to six tugs;

- a dredged navigation channel providing access to the berths including the necessary aids to navigation;
- terminal equipment including quay cranes and rail mounted gantries;
- buildings including an administration and operations centre, equipment maintenance workshop and gatehouse;
- supporting services and facilities including a stormwater management system, water supply, sewerage connections, power supply, telecommunications and lighting; and
- enhancement of the public and ecological areas adjacent to the new container terminal.

Figure 1 - Location of the proposed Port Botany Expansion



Figure 2 - Proposed Port Botany Expansion



3. STATURY PLANNING FRAMEWORK

3.1. Permissibility

The *Botany Local Environmental Plan 1995* (LEP) requires development consent for the proposed Port Expansion.

The proposed Port Expansion covers land that is zoned by the LEP as - 5(A) Special Uses, land that is a “Deferred Area” and areas unzoned (water areas). The Special Use area is lettered “Port” on the LEP map. The Deferred Area requires reference to the zoning of previous Environmental Planning Instruments (EPI) that apply to the site. Interim Development Order 21 (IDO 21) previously applied to the site. The “Deferred Area” is zoned “Open Space” under the IDO 21. The open space zoning lists utility installations as a permissible use. The IDO uses the *Environmental Planning and Assessment Modal Provisions 1970* definition of utility installations. In accordance with this definition the proposed Port expansion is permissible as a public utility undertaking. Areas not zoned in the LEP require reference to clause 19 of the LEP which prescribes that development within areas not zoned is permissible with consent.

Therefore, the proposal is considered to be permissible with consent in accordance with the existing zoning.

3.2. Minister's Role

The proposed Port Expansion, which is for container shipping and associated structures, is considered State significant development in accordance with a declaration made under section 76A(7) of the *Environmental Planning and Assessment Act 1979* (the Act) for berths for shipping, shipping terminals and associated buildings, structures and works. The declaration was made by the then Minister for Urban Affairs and Planning on 29 June 2001. The Minister for Infrastructure and Planning (the Minister) is the consent Authority for the proposal as the Minister is the consent authority for State significant development under section 76A(9) of the Act.

3.3. Regulatory Requirements

In accordance with the provisions of the Act, the proposed development is classified as State significant and designated development.

As required for this type of designated development, an Environmental Impact Statement (EIS) was prepared and lodged by the Applicant with the subject development application to the Department.

Notification and Exhibition

In accordance with Division 4, Part 6 and Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (the Regulation), the development application (DA) and accompanying Environmental Impact Statement (EIS) were initially publicly exhibited for at least 30 days. Exhibition of these documents took place between Wednesday 28 January 2004 and Monday 29 March 2004 (60 days). The Department considered a 60 day exhibition period appropriate rather than a 30 day exhibition due to the size and complexity of issues associated with the proposal. The DA and EIS were exhibited at the following locations:

- DIPNR’s Information Centre, Sydney.
- The Council of the City of Botany Bay - Administration Centre, Mascot, Central Library, Eastgardens and Mascot Library.
- Randwick City Council – Central office, Randwick, Bowen Library Maroubra and Matraville Branch Library Matraville.
- Rockdale City Council.
- Kogarah Municipal Council.

-
- Sutherland Shire Council.
 - Nature Conservation Council, Sydney.
 - Department of Environment and Heritage, Canberra.

The Department notes that the same documents exhibited during the public exhibition period were also exhibited by the Office of the Commissioners of Inquiry for Environment and Planning as part of the COI process. The COI exhibition commenced on Tuesday 30 March 2004.

Exhibition of the DA and EIS (undertaken by the Department, as opposed to the COI exhibition period) was notified in the following newspapers on 27 January and 17 February 2004:

- *St George and Sutherland Leader*;
- *Sydney Morning Herald*; and
- *Weekly Southern Courier*.

All adjacent landowners/ occupiers and all landowners/ occupiers in the vicinity of the proposed Port Botany Expansion that may be adversely impacted by the proposal were notified of the exhibition of the DA and EIS. The Department wrote to these parties directly, as well as providing a letterbox drop across the notification area. In excess of 20,000 landowners/ occupiers were notified in this manner. The notification area included the areas of Banksmeadow, Botany, Randwick, Kurnell, Taren Point, Kyeemagh, La Perouse, Mascot and Pagewood. Written notifications provided details of the proposal, exhibition locations and dates, and information on how interested parties could make a submission. All notifications were undertaken in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* (the Act).

Re-Notification and Re-Exhibition

The Department publicly re-exhibited the DA, accompanying EIS and additional information supplied by the Applicant for at least 30 days. The additional information exhibited included a “*Supplementary Submission to Environmental Impact Statement – Port Botany Expansion 2004*” and “*Sydney Ports Corporation – Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany (25 August 2004)*”. Exhibition of these documents took place between Thursday 26 August 2004 until Monday 27 September 2004.

The DA, EIS and additional information were re-exhibited at the same locations as the initial exhibition period. The Department notes that, as with the initial public exhibition, the same documents exhibited during the re-exhibition period were also exhibited by the Office of the Commission of Inquiry for Environment and Planning as part of the COI process. That COI exhibition commenced on 1 September 2004.

Re-exhibition of the DA, EIS and additional information (undertaken by the Department, as opposed to the COI exhibition period) was again notified in the following newspapers on 24 August and 14 September 2004:

- *St George and Sutherland Leader*;
- *Sydney Morning Herald*; and
- *Weekly Southern Courier*.

As with the initial exhibition period all adjacent landowners/ occupiers and all landowners/ occupiers in the vicinity of the proposal that may be adversely impacted by the proposal were notified of the re-exhibition of the DA, EIS and additional information. The Department wrote to these parties directly, as well as providing a letterbox drop across the notification area. In excess of 20,000 landowners/ occupiers were notified in this manner. The notification area included the areas of Banksmeadow, Botany, Randwick, Kurnell, Taren Point, Kyeemagh, La Perouse, Mascot and Pagewood. Written notifications provided details of the proposal, re-

exhibition locations and dates, and information on how interested parties could make a submission. All notifications stated clearly that public submissions made during the initial exhibition period will remain valid. All notifications of the re-exhibition were undertaken in accordance with the requirements of the the Act.

State Significant Development

As noted above, the proposed Port Expansion, which is for container shipping and associated structures, is considered State Significant Development in accordance with a declaration made the then Minister for Urban Affairs and Planning under section 76A(7) of the Act for berths for shipping, shipping terminals and associated buildings, structures and works on 29 June 2001.

The Act provides that the Minister is the consent authority for all State significant development.

Designated Development

The proposed development is listed in Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* (Regulations) and is thus designated development. As such, the development application was accompanied by an Environmental Impact Statement. In particular, the proposed development is designated as "Shipping facilities".

Development by the Crown/Integrated Development

The proposal is considered *Development by the Crown* under Part 5A of the Act as the Applicant, Sydney Ports Corporation, is considered to be a Statutory State Owned Corporation (*State Owned Corporation Act 1989*) and therefore a Public Authority for the purposes of the Act.

Section 90(2) of the Act indicates that integrated development does not apply to development which is the subject of a development application to which Part 5A of the Act applies. Therefore, this proposal is **not** integrated development as defined under section 91 of the Act. Subsequently the integrated development provisions of the Act do **not** apply to the proposed Port expansion.

However, a number of licences and approvals will still be required to be obtained by the Applicant in addition to development consent. These approvals are listed as follows:

- an Environment Protection Licence (EPL) from the Department of Environment and Conservation (EPA component) under the *Protection of the Environment Operations Act 1997*;
- a permit from the NSW Maritime Authority under Part 3A the *Rivers and Foreshores Improvement Act 1948*;
- a permit from NSW Fisheries under section 201 of the *Fisheries Management Act 1994*;
- a permit from NSW Fisheries under section 205 of the *Fisheries Management Act 1994*; and
- a consent from the NSW Roads and Traffic Authority under section 138 of the Roads Act 1993.

Although the proposal is not integrated development in accordance with the Act, the Department has notwithstanding forwarded copies of the DA, EIS and additional information to the Government agencies that administer the above-mentioned approvals and licences. This includes the NSW Maritime Authority and the NSW Department of Primary Industries (former NSW Fisheries), Department of Environment and Conservation (DEC), NSW Roads and Traffic Authority (RTA). The Department received detailed initial submissions from RTA and DEC and has viewed the NSW Department of Primary Industries initial submission to the COI.

DEC and RTA indicated in their initial submissions that some matters remain outstanding and must be resolved before it can formulate a final position in relation to the proposal (and determine whether an Environment Protection Licence and consent for road works could be

issued). The Department of Primary Industries has made recommendations for monitoring and management, which is discussed in section 7 of this report.

During the re-exhibition of the supplementary reports, the Department received additional submissions from NSW Heritage Office, Department of Lands, RailCorp, Sydney Water and Department of Health.

3.4. Commonwealth Legislation

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires approval from the Commonwealth Minister for the Environment for actions that have a significant impact on matters of national environmental significance. The Applicant has identified that the proposal may have an impact on one or more listed matters of national significance including:

- *listed migratory species due to the potential loss of ecological habitat; and*
- *listed threatened species.*

As a result, the Applicant referred the development to the Commonwealth Minister for the Environment and Heritage (Commonwealth Minister). Specifically the referral included potential impacts on the aquatic ecology of Towra Point Nature Reserve. The Nature Reserve is a RAMSAR wetland. It was concluded in the referral that there would be no significant impacts from the proposal on the wetland. The proposal was also referred to the Commonwealth Minister in accordance with Section 26 of the EPBC Act. Section 26 requires referral if actions may have an impact on Commonwealth Land (in this case Sydney (Kingsford Airport)). The EIS concludes that the proposal would not have a significant impact on Commonwealth land.

The Commonwealth Minister in response to the referral has declared the proposal a “Controlled Action” under the EPBC Act. The controlling provisions include:

- under Part 3 Division 1:
 - sections 16 and 17B (Wetlands of international importance);
 - sections 20 and 20A (Listed Migratory species); and
- under Part 3 Division 2:
 - sections 26 and 27A (Protection of the environment from actions involving Commonwealth land).

As the proposal has been declared a “Controlled Action”, approval from the Commonwealth Minister is required under Part 9 of the EPBC Act. The EPBC Act has a provision that enables the Commonwealth Minister to accredit the NSW environmental impact assessment process. This provision ensures that the environmental impact assessment process is not duplicated by an additional Commonwealth assessment process. Therefore the Commonwealth Minister has accredited the NSW environmental impact assessment process. As a result the DIPNR assessment and independent COI process satisfy the assessment requirements of the EPBC Act.

The Commonwealth Minister will use the conclusions of the NSW environmental impact assessment as a basis for a decision when considering approval or refusal of the proposal under the EPBC Act. In addition, the Department has continually involved the Commonwealth Department of Environment and Heritage (DEH) in the assessment process. This involvement has included input into the Department’s Director-General requirements for preparation of the EIS, and direct involvement in the specialist meetings referred to in section 1.5 of this report. In particular DEH has had direct input into additional information requests relating to migratory waders as referred to in section 7.3 of this report.

Airports Act 1996

The *Airports Act 1996* and the *Airports (Protection of Airspace) Regulations 1996* provides provisions for the protection of airspace at and around airports. Airspace is protected by two measures above the surface including:

- Obstacle Limitation Surface; and
- Procedures for Air Navigational Services – Aircraft Operations (PANS-OPS) surface.

Activities that intrude into the airspace is defined by the *Airports Act* as “Controlled Activities”. Controlled activities are required to be approved by the Department of Transport and Regional Services (DoTARS) or the airport operator.

Section 182 of the *Airports Act* defines controlled activities. The Applicant has made reference to the provisions of the *Airports Act* and indicated that due to the design of all structures of the proposal that the proposal will **not** intrude into Sydney Airport’s airspace and therefore is not a controlled activity.

The Department has consulted direct with DoTARS, Sydney Airport Corporation and AirServices Australia. The Department understands that all organisations agree that the proposal is not a controlled activity under the *Airports Act*. However, the Department has received submissions from DoTARS, Sydney Airport Corporation and AirServices Australia. The three submissions are discussed in detail in section 7.10 of this report.

Quarantine Act 1908

The Applicant has indicated in the EIS that the proposal includes provision of facilities to enable Australian Quarantine Inspection Services to enforce the provisions of the *Quarantine Act 1908*.

Ozone Protection Act 1989

The Applicant acknowledges in the EIS that the provision of air conditioning units with the expanded Port facility will need to be in compliance with the provisions of the *Ozone Protection Act 1989*.

Hazardous Waste (Regulation of Exports and Imports) Act 1989

The *Hazardous Waste Act* regulates the export, import and transit of hazardous waste to ensure that exported, imported or transited waste is managed in an environmentally sound manner so that human beings and the environment, both within and outside Australia, are protected from the harmful effects of the waste.

The Applicant acknowledges in the EIS that the proposed expanded Port may handle hazardous waste cargo (as classified under the *Hazardous Waste Act*). The *Hazardous Waste Act* also has provisions to enable inspectors to enter sites such as the proposed facility and require the cooperation of the terminal operator with inspectors undertaking administrative functions of the *Hazardous Waste Act*. Hazards are addressed in detail in Section 7.8 of this report.

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

This Act enables local Aboriginal communities to grant or refuse consent to the decay or destruction of sites that are of particular significance to Aborigines in accordance with Aboriginal tradition. The Applicant claims in the EIS that the proposal will not impact on sites or items of Aboriginal archaeological significance.

Section 7.12 of this report addresses in detail potential impacts of the proposal on heritage including potential impacts on Aboriginal sites.

3.5. Relevant Environmental Planning Instruments

The assessment of the proposed development is subject to the following environmental planning instruments:

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- *State Environmental Planning Policy No. 11 – Traffic Generating Developments Hazardous and Offensive Development;*
 - *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;*
 - *State Environmental Planning Policy No. 55 – Remediation of Land;*
 - *Draft State Environmental Planning Policy No. 66 – Integration of Landuse and Transport;*
 - *Sydney Regional Environmental Plan No. 17 – Kurnell Peninsula (1989);*
 - *Botany Local Environmental Plan 1995; and*
 - *Interim Development Order No.21.*

State Environmental Planning Policy No. 11

The aims, objectives, policies and strategies of SEPP No.11 are to ensure that the Traffic Authority (NSW Roads and Traffic Authority (RTA)):

(a) is made aware of; and

(b) is given an opportunity to make representations in respect of certain types of traffic generating development as listed in schedule 1 and 2 of the SEPP.

The Department has consulted with and received representation from the RTA in accordance with the provisions of SEPP No.11 as the proposal represents Traffic Generating Development as defined by Schedule 1 of the SEPP.

RTA has provided a number of comments regarding traffic generation associated with the proposal. These comments and the detailed traffic impacts of the proposal are discussed in Section 7.1 of this report.

State Environmental Planning Policy No. 33

The broad provisions of SEPP 33 are:

- To provide a definition of hazardous and offensive industries.
- Ensure all Environmental Planning Instruments (EPIs) are consistent with this definition and in terms of permissibility provisions relating to hazardous and offensive development.
- Ensure measures proposed to reduce the impact of a development are taken into account when determining if that development is a hazardous or offensive industry.
- Ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact.
- Ensure advertising is undertaken for hazardous and offensive industry DA's.

The Applicant has indicated that the proposed development is a “*potentially hazardous industry*” under the provisions of SEPP 33 and therefore a Preliminary Hazard Analysis (PHA) was prepared as required by SEPP 33. The PHA accompanied the EIS.

The Department initially reviewed the findings of the PHA shown in accordance with the requirements of SEPP 33 and the current Department's risk criteria. The Department's initial review considered a number of detailed additional information requirements.. The Applicant provided a revised PHA to the Department as part of the EIS Supplement. Section 7.8 of this report provides detail of the Department's assessment and additional information requirements.

State Environmental Planning Policy No. 55

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) provides for a Statewide planning approach to the remediation of contaminated land. In particular, the SEPP aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. In particular, SEPP 55 requires that the consent authority (in this case, the Minister) must not consent to the carrying out of a development on land unless:

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- it has considered whether the land is contaminated;
 - if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out; and
 - if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

The Applicant indicates in the EIS that previous studies have shown that the areas to be dredged and reclaimed were uncontaminated and contained only low to very low concentrations of a range of heavy metals, petroleum hydrocarbons and organic pollutants. However, the EIS also explains that in Penrhyn Estuary sediments were found to be contaminated with semi-volatile chlorinated hydrocarbons, mercury and chromium, transported from drains into the upper end of the Estuary which acts as a sediment trap. The Department understands that these areas within the Estuary will not be dredged but will be enhanced as a wading bird habitat. The enhancement requires the removal of mangroves and placement of sediment material. It is claimed by the applicant that these enhancement works will not result in the remobilisation of contaminated sediments. The applicant concludes that the areas proposed for development of the new terminal are considered suitable for the intended use and remediation is not required.

As referred to in section 1.6 of this report, the Department has been involved in a number of specialist meetings with various Government agencies and the Applicant. The issue of sediment quality sampling was raised at one of these meeting. DEC has indicated that there was limited sediment quality information in the EIS to enable clarification of the proposed dredged material. DEC also indicated that further sampling would be required before an Environment Protection Licence could be issued. The outcome of this meeting was for the Applicant to prepare a detailed sediment quality sampling program for DEC to use in the setting of the Environment Protection Licence requirements. The Applicant subsequently prepared the detail for the required sediment quality sampling program (a copy of the proposed sampling program is provided in Appendix A of this report). DEC is currently evaluating the program proposed by the applicant. Once details of amounts and fate of dredged fine materials are ascertained, DEC has recommended that consent conditions could require potential environmental issues to be characterised and where necessary mitigated.

DEC's submission also highlights a DEC proposal to declare a remediation site under Section 21 of the Conservation Land Management Act for those areas of Penrhyn Estuary affected by the contamination originating from the Orica premises. Any proposals in the declared area (including the possible Port expansion) should not be inconsistent with the need to remediate the contamination.

This issue is also detailed in section 7.5 of this report. The Department considers that the need to undertake the detailed sediment quality sampling program prior to construction is required and the results considered in detail by both DEC and the Department. The detailed analysis by both Departments shall include consideration of the need for remediation, if at all, and subsequently the required remediation process.

Draft State Environmental Planning Policy No. 66

Draft State Environmental Planning Policy No.66 (Draft SEPP 66) aims to ensure that urban structure, building forms, land use locations, development designs, subdivision and street layouts help achieve the following planning objectives:

- (a) improving accessibility to housing, employment and services by walking, cycling, and public transport,
- (b) improving the choice of transport and reducing dependence solely on cars for travel purposes,
- (c) moderating growth in the demand for travel and the distances travelled, especially by car,

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- (d) supporting the efficient and viable operation of public transport services,
 - (e) providing for the efficient movement of freight.

Draft SEPP 66 applies to the Botany Bay area and essentially requires that the consent authority (the Minister in this case) when considering the transport implications of the proposed development shall have regard to the accessibility of the site by a range of transport modes, including public transport, walking and cycling and the promotion of alternatives to travel by car should be assessed.

When addressing the provisions of Draft SEPP 66 the Applicant makes mention of the design of the proposal to increase the proportion of container freight which would be moved by rail from the current level of 25% to a minimum of 40% in an effort to reduce the reliance on truck movements. The Applicant also provides details of existing access to public transport by workers of the terminal. Buses operate reasonably regularly but they can take up to an hour to provide connections around shift changeover times. The Applicant claims in the EIS that from the port workers' point of view, travel by public bus is a less attractive option compared to private vehicle because of lengthy bus routes, frequent stops and the distance from the existing terminals to the bus stops.

The Applicant proposes to provide cycle paths and pedestrian paths in the recreation area along Foreshore Beach that will connect to Sir Joseph Banks Park. The applicant also identifies the opportunity for the future terminal operator to encourage bicycle use by providing shower and change rooms.

The Department received submissions from the State Transit Authority of NSW and RTA during the initial public exhibition. The State Transit authority has raised a number of concerns regarding the EIS traffic analysis (details of these concerns are addressed in section 7.1 of this report). In regard to Draft SEPP 66 the State Transit Authority makes particular reference to the lack of analysis in the EIS of pedestrian movements across Foreshore Road.

As addressed in detail in section 7.1 of this report, the Department considers there is a need for the Applicant to address the detailed outstanding issues raised by the State Transit Authority, RTA and a number of Council submissions. The Department will be in a position to finalise the traffic component of its assessment once these outstanding issues are resolved.

Sydney Regional Environmental Plan No. 17

Sydney Regional Environmental Plan No 17 (SREP 17) generally aims to conserve the natural environment of Kurnell Peninsula, apply environmental performance criteria to ensure the environment is not adversely affected by development, facilitate development compatible with these aims while also ensuring tourism, leisure and recreation potential of the Kurnell Peninsula is maintained. Its application extends from Kurnell Peninsula to adjacent waterways; therefore it is a consideration for the proposal.

The Applicant concludes in the EIS that the proposal would have negligible impact on the sensitive habitats of Kurnell Peninsula.

The Department considers that the proposal is consistent with the aims of SREP 17 and will not compromise conservation of Kurnell Peninsula. Detailed discussion regarding the impacts of the proposal on southern areas of Botany Bay are discussed in detail in section 7.6 of this report.

Botany Local Environmental Plan 1995, Interim Development Order No.21 and Council Development Control Plans

The proposed Port Botany Expansion is located within three landuse zonings as described in Botany Local Environmental Plan 1995 (LEP). The three zonings include: zoned 5(a) – Special Uses – “Port” (existing Port area); a “deferred area” (proposed restoration/recreation area and tug facility); and an unzoned area (existing waterway components of the proposal). The Applicant claims that the proposal is permissible with consent in accordance with the LEP provisions for the three zone areas.

In the case of the 5(a) – Special Uses – “Port” zone and the unzoned area (which requires reference to clause 19 of the LEP) the proposed development is clearly permissible with consent in accordance with the LEP provisions. As a component of the proposal site is a “deferred area” zoning under the LEP there is a need to refer to the provisions of previous environmental planning instruments (EPI) to determine permissibility. As a result IDO No.21 is the relevant EPI for this area. IDO21 zones this land “Open Space”. The Applicant claims that the proposal is permissible with consent within the “Open Space” zone.

The Department agrees with the Applicant’s conclusions that the proposed Port Expansion is permissible with consent in accordance with the zoning provisions of the LEP and IDO21.

In addition to the LEP and IDO21 provisions of a number of Council Development Control Plans (DCP) apply to the proposal. The relevant DCPs that apply include: *Off-street Parking DCP*; *DCP No. 29 – Waste Minimisation and Management Guidelines*; *Energy Efficiency DCP*; *Access DCP*; and *DCP No.24 –Notification of Development Applications*. The Department considers that the proposal meets the specific requirements of each DCP as described by the Applicant in Table 9.2 of the supporting EIS.

3.6. Statutory Requirements Compliance

The Department considers that the requirements of the Act regarding notification of landowners adjacent to the development site, advertising, exhibition and public involvement have been met.

As is referred to throughout this report, there are a number of issues that can be managed through appropriate mitigation measures. As a result the Department considers that the proposal complies with SEPP55, SREP17, Botany LEP 1995, Interim Development Order No21 and Botany City Council DCPs.

However, more information is required to be provided by the Applicant to enable the Department to determine if the proposed Port Expansion complies with the requirements of SEPP 11, SEPP 33 and Draft SEPP 66.

4. STRATEGIC PLANNING FRAMEWORK

Commonwealth and International Treaties

- Commonwealth International Environmental Treaties on migratory species including:
 - CAMBA - CAMBA - *The Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment* (CAMBA)
 - JAMBA - JAMBA - *The Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their Environment*
 - Bonn Convention - *The Convention on the Conservation of Migratory Species of Wild Animals*,
- RAMSAR Convention - *The Convention on Wetlands of International Importance especially as Waterfowl Habitat*.
- CITES - *The Convention on the International Trade in Endangered Species of Wild Fauna and Flora*.
- Vienna Convention for the Protection of the Ozone Layer.
- *The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*.

Issues raised in submissions

Public submission

1.8% of submissions received by the Department have made specific reference to Strategic Planning issues and the Strategic Planning context of the proposed development. At the time of writing the proportion of submissions and issues raised had not changed from that stated in the Department's initial submission. Key issues raised include:

- What is the solution post 2020?
- Question the Port Development Strategy.
- No decision should be made until the Parliamentary inquiry into port infrastructure is completed.
- There is a need for a National Freight Strategy.
- No reference to the Water Resource Management Plan for the Bay and its tributaries is provided in the EIS.
- There is a lack of an actual "Ports Growth Plan".
- Proposal goes against decentralisation policies.
- Data on origin of NSW exports is required to assess the suitable location of the port.
- Potential role of Newcastle and Port Kembla as alternative (alternatives are addressed in detail in Section 6 of this report).

Government agency and Council submissions

Botany City Council (initial submission)

- There is a need for a state wide review of future Port needs in NSW.
- There is a lack of up to date metropolitan rail freight strategy.
- There is a lack up an up to date south-eastern Sydney road network strategy.
- Lack of whole of bay approach to the assessment.

Randwick City Council (initial and additional submission)

- Need for a supplementary report in addition to the EIS to address Strategic planning for port facilities.
- All viable alternatives should be considered within the Framework of a wider Metropolitan Strategy and State Transport and Freight Strategy.

Strathfield City Council (initial submission)

- Request deferred decision on DA until transport capacity of the Metropolitan area is reviewed.

There have been no other Government agency submissions received by the Department regarding strategic planning issues at the time of writing of this report.

Department Considerations

The Existing Role of Port Botany

Port Botany is the largest port in NSW and serves a range of purposes, with a mix of activities being undertaken at the port. As well as being the major container port in NSW, it is also the key receiving port for bulk fuels, other liquids and gas, and is an export port for a range of manufactured goods and primary products.

Port Botany is owned by Sydney Ports Corporation (SPC), a state owned corporation, and the port facilities are leased to a range of companies. Patrick Stevedores and P&O Ports operate container terminals, and several other companies lease sites from SPC for a variety of purposes.

Port Botany is a key component of the NSW ports system, with other facilities located at Port Kembla and Newcastle, and smaller facilities at Eden on the south coast and Yamba on the north coast. Port Jackson (Sydney Harbour) is also an active port for cars, oil and other cargo.

The port facilities are a significant contributor to the economy of Sydney and NSW. Ongoing growth in activity at the port will ensure that Port Botany's role in the regional economy continues to grow in importance. In 2002-03, more than 1.1m TEU (twenty foot equivalent units) were moved through Port Botany and this figure is expected to grow strongly in the next 20 years, with forecasts of more than 3m TEU per annum expected by 2025. The EIS predicts that the current capacity of the port is expected to be reached between **2010 and 2015**.

4.1. NSW Ports Growth Plan

Recognising the need for a strategic framework for the future growth of ports in NSW, the NSW Government announced the NSW Ports Growth Plan in October 2003. The plan sets out the overall strategic direction for the roles of the various NSW ports and the manner in which they are expected to grow in the coming decades.

The Ports Growth Plan incorporates a number of key initiatives, including:

- gradual relocation of container processing, general cargo and car stevedoring from Port Jackson (Sydney Harbour) to Port Kembla;
- future development of the former BHP Steel site at Newcastle as a multi-purpose port, with the ability to handle significant levels of container trade, as well its existing focus on coal exports; and
- a Commission of Inquiry into the proposed development of an additional container berth at Port Botany.

The plan recognises the ongoing importance of Port Botany in accommodating the majority of container movements in NSW. Port Botany will continue to play a key role in the NSW ports system.

Development or expansion of facilities at Port Kembla and Newcastle will take advantage of available land at these locations, as well as the ability to improve transport links to the port sites. It is expected that the expansion of Port Kembla and Newcastle will occur over time, as leases expire in Port Jackson and as shipping companies adjust their preferences to reflect the different roles of the various ports.

The overall objective of the Ports Growth Plan is to ensure that the NSW ports system is able to efficiently cope with the large increases in various freight tasks which are expected in the coming decades.

4.2. Metropolitan Strategy

The NSW Government will use the Metropolitan Strategy to respond to the growth and change that will occur in the Greater Metropolitan Region over the next 30 years.

The Metropolitan Strategy will include:

- A vision of what kind of city we want to live in.
- Directions and strategies on how the growth will be managed and how the cities in the greater metropolitan region will work together.
- Implementation – this is the action that government will take through its plans, budget decisions and future choices.
- A management process to keep the strategy up to date.

The Metropolitan Strategy will guide major decisions and plans by State and local government and inform private sector investment.

DIPNR is coordinating the development of the Metropolitan Strategy and has released a discussion paper for comment. The Department is inviting comments up to 30 November 2004.

NSW Government has identified nine directions to respond to the key issues in metropolitan Sydney. These directions will guide major decisions and plan-making by State and local government and to inform private sector investment in Botany Bay and surrounds. The directions include:

1. Plan for balanced growth within natural resource limits
2. Strengthen the regions
3. Manage growth and value non-urban areas
4. Build liveable new communities
5. Renew existing areas
6. Strengthen employment centres and precincts
7. Connect centres with the transport network
8. Better target infrastructure provision
9. Use appropriate finance and governance arrangements

As noted above, the discussion paper lists connecting centres with the transport network as one of the key directions for managing the changing direction. As part of this direction, the strategy identifies the NSW Ports Growth Plan as providing direction for industry to accommodate growth in trade through NSW Ports. The discussion paper acknowledges that planning for ports and freight transport will help to ensure the efficient movement of goods.

It is expected that the Metropolitan Strategy will be released in early 2005.

4.3. Investigations into the development of a Metropolitan Intermodal Freight Strategy

The strategic transport context for Port Botany is complex and can be characterised in the following manner:

- the port enjoys good access to the regional road network, with Sydney's motorway network connected to the port by Foreshore Road. Trucks also use a range of other roads to arrive at and depart from the port;
- direct rail access to the port is also available via a dedicated freight rail line;
- around 25% of containers are currently moved by rail, with the remainder moved by trucks on various routes;

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- both the NSW Government and the Applicant are keen to increase the proportion of containers moved by rail (the Applicant, through the EIS, proposes a target of 40%), and RailCorp has been upgrading rail access to the port in recent years to assist in this regard; and
 - notwithstanding these improvements, and recent increases in rail's mode share, a range of issues remain only partially resolved or unresolved, highlighting the need for greater clarity in strategic freight planning in NSW. These issues are explored in further detail in section 6 and section 7 of this report.

Each of these issues is dealt with in more detail below in order to establish the strategic transport context.

The NSW Government has invested significantly in expanding Sydney's motorway network over the last decade. Both the Eastern Distributor and M5 East motorways were developed with the objective (among other objectives) of improving freight access to both Sydney Airport and Port Botany. Botany Road and Foreshore Road provide the main links to the arterial road network and a significant proportion of freight generated by the port travels on roads other than the motorway network, particularly to port-related businesses in the Botany and Central Industrial areas.

In terms of rail access to the port, the NSW Government has completed the first three stages of an upgrade to the Cooks River – Port Botany dedicated rail freight link. However, Stage 4, which would duplicate the line, has not yet been undertaken, and is estimated to cost between \$65m and \$70m. While the first three stages have led to significant capacity increases on the line, duplication will be required if the mode share target for rail is to be achieved. A range of other "upstream" issues such as train path availability and intermodal terminal capacity will also need to be resolved in the future.

Of relevance to the proposal, the current investigations into the development of a Metropolitan Intermodal Freight Strategy will particular address:

- ensuring a coordinated approach to the development of further metropolitan intermodal terminal capacity; and
- managing the balance between freight and passenger access to the rail network, and thereby increasing the reliability of rail access to the port.

4.4. Strategic Planning Context for Botany Bay

The Department's comments below are an update of the Department's position regarding the regional strategic planning context.

DIPNR recognises the strategic importance for Port Botany, particularly in increasing the economic strength and competitiveness of Sydney as a 'Global City'. In addition to the flow-on economic benefits, expansion of import and export related activities are expected to increase employment opportunities across the 'Global Arc'. Notwithstanding, the Department has a number of concerns in relation to the potential regional effects of the Applicant's proposal that will need addressing at the local and regional scale through:

- Facilitation of an effective balance between the conflicting residential, commercial, industrial and other employment land use pressures in the area (including the CBD to Airport corridor);
- Identification of the cumulative effect of major proposals in the Botany Bay area on transport infrastructure and identification of funding for future infrastructure improvements; and
- Long-term management of the significant environmental and social values of Botany Bay including any local and regional impacts resulting from the proposed Port Botany expansion that may be realised over a variety of timescales.

Towards a strategy for Botany Bay

This sub section reports on the status of *Towards a strategy for Botany Bay*.

DIPNR exhibited a discussion paper, *Towards a strategy for Botany Bay* between May and August 2004. The discussion paper set out major issues of concern for the area and broad objectives for management of the Bay and proposed a set of initiatives to underpin reform of the planning and management framework in Botany Bay, including:

- Informing external planning processes – to ensure that planning processes are informed by an understanding of management needs for Botany Bay;
- Strong links to catchment management – to ensure that management of Botany Bay is considered as a component of catchment management for the Georges and Cooks River;
- Consistent impact assessment and management – to provide policy guidance to ensure consistent and transparent plan-making and land use, development and environmental management decision-making;
- Cumulative improvement of Botany Bay – to improve coordination of management of the physical environment to maximise social, natural and economic benefits for Botany Bay; and
- Targeted strategic planning for key areas of Botany Bay – to focus planning effort on priority issues and areas, including sand extraction on the Kurnell Peninsula, groundwater management north of the Bay and wetland management.

The exhibition of the discussion paper was an opportunity for interested parties to provide input on the future direction for Bay management. The discussion paper and the submissions received during the exhibition period will guide future reform of the planning and management framework in and around Botany Bay. The discussion paper, *Towards a strategy for Botany Bay*, has been referred to the COI as background information about proposed reforms for planning and management in the area.

Department's position

DIPNR position on strategic planning issues

The Department considers that the ability of Port Botany to accommodate forecast container growth would reinforce the strategic role of the Botany Bay area as Sydney's primary economic gateway with significant new investment and employment opportunities. However, there is some concern regarding potential regionally significant environmental and social impacts of the proposal that may require management across a variety of timescales.

It is also acknowledged that broader strategic planning issues need to be addressed through an integrated approach to the development of ongoing strategic exercises, including the Metropolitan Strategy, current investigations into the development of a Metropolitan Intermodal Freight Strategy and *Towards a Strategy for Botany Bay*.

DIPNR Position on Strategic Transport Issues

From a strategic freight and transport planning perspective, the Department recognises the need for Port Botany to accommodate the next phase of container trade growth. However, detailed environmental and social factors still need to be addressed by the Applicant to enable the Department's assessment to be completed.

The Department's submission highlights issues to be further addressed by the Applicant in that the proposal relies quite heavily on achieving a significant increase in the proportion of containers moved by rail (40% rail modal share). While there have been improvements in rail's mode share in recent years, and the rail access is being improved at a localised level, "upstream" issues need further addressing. These issues are as follows:

- management of train path availability for freight trains, particularly during peak passenger periods;

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- constrained ability to accommodate longer trains either at the port, on the metropolitan rail network or at the intermodal terminals in the metropolitan area;
 - whether sufficient intermodal terminal capacity exists in Sydney and, in fact, whether it is capable of being delivered within timeframes consistent with the forecast growth in container traffic; and
 - whether assumed efficiency gains in transport of containers by truck will be realisable and, if they are achieved, whether they will in fact enhance the competitive position of truck transport.
 - there is a need for continued commitment and ongoing long term commercial viability of rail operators to service this short haul metropolitan market.

Each of these “upstream” issues represents a risk to achieving efficient transport access to the port (EIS proposed 40% rail mode share). However, they are issues which are being addressed by the Department and other agencies through current investigations into the development of a comprehensive Metropolitan Intermodal Freight Strategy. The investigations are expected to be finalised for inclusion in the Sydney Metropolitan Strategy.

DIPNR Position on Strategic Significance

The Department recognises the strategic significance of Port Botany to the trade and wider economy of Sydney, New South Wales and beyond. The Port represents a critical infrastructure essential to the growth and strengthening of Sydney as a global city.

The Department’s assessment (provided in detail in Section 6 and 7) concludes that there is justification for Port Botany to substantially increase its capacity to throughputs as modelled in the EIS in order to strengthen and maintain the strategic significance of Port Botany.

There are emerging trends which increase the need for port facilities to accommodate additional throughput and the implications of not doing so will have important ramifications for the competitiveness of the NSW economy.

The Department’s support of any option for facilitating additional container throughput at Port Botany is subject to the achievement of three key tests:

- a) Integration and consistency with the Metropolitan Strategy and investigations into the development of a Metropolitan Intermodal Freight Strategy.
- b) Environmental and amenity impacts on Botany Bay, Penrhyn Estuary and surrounding areas can be fully addressed or mitigated.
- c) The most efficient option to achieve throughput as modelled in the EIS.

The Department’s position regarding the Applicant’s proposal can be summarised, against the three tests mentioned above, as follows:

- a) Considerations of the Metropolitan Strategy and investigations into the development of a Metropolitan Intermodal Freight Strategy.
- b) Resolution of a number of outstanding issues identified by Government requiring additional information, clarification and/or assessment from the Applicant.
- c) Clarification of existing and proposed port capacity and clarification of the most efficient option.

5. ISSUES RAISED IN SUBMISSIONS

This section covers issues raised in submissions received during the two exhibition periods: 28 January 2004 – 29 March 2004 (Development Application (DA) and Environmental Impact Statement (EIS)) and 26 August 2004 – 27 September 2004 (*Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany* and the *Supplementary Submission to Environment Impact Statement*).

5.1. Exhibition of Development Application and Environmental Impact Statement

During the extended exhibition period, the Department received a total of 1159 separate submissions from the following parties:

- 8 from NSW government agencies (Department of Environment and Conservation (Environment Protection Authority (EPA) and National Parks and Wildlife (NPWS), NSW Fisheries, Department of Health, State Transit Authority, Roads and Traffic Authority, NSW Heritage Office, Sydney Water and RailCorp)
- 2 submissions from Commonwealth government agencies (Airservices Australia and Department of Transport and Regional Services);
- 4 submissions from local government (City of Botany Bay Council, Randwick Council, Strathfield Council and Sydney Coastal Councils Group)
- 20 from public interest groups:
 - Botany Environment Watch
 - Hunter Bird Observers Club
 - Birds Australia – Southern NSW and ACT Group
 - Australasian Wader Studies Group
 - Rockdale and District Landscape Heritage Committee
 - South Ward Action Group
 - Rockdale Wetlands Preservation Society
 - Oatley Flora and Fauna Conservation Australia
 - NSW Road Transport Association
 - Taren Point Wetland Group
 - South West Environment Centre Coast and Wetlands Society Inc
 - The Blue Mountains Commuter and Transport Users
 - Clean Up Cooks River Campaigners
 - Cook's River Valley Association
 - NSW Wader Study Group
 - Kurnell Progress and Precinct Resident's Association
 - Australia Citizens Committee for Civil Concerns
 - Kurnell Regional Environment Planning Council
 - Botany Bay Explorers
 - The Wetland Trust of Australia
- approximately 1120 submissions from individual members of the public.

Of the 1159 submissions received by the Department in relation to the proposed Port expansion, 89% objected to the proposed development, 9.4% stated no position (but raised concerns in relation to various environmental impacts), 1.2% expressed concern but did not state a position and 0.4% supported the proposal.

The main issues of concern (refer to Figure 3) are:

- traffic and transport (85.2%)⁴
- alternative location – mainly Port Kembla and Newcastle (83.8%);
- terrestrial ecology impacts (81.1%);
- risk assessment, contamination and emergency issues (80.4%);

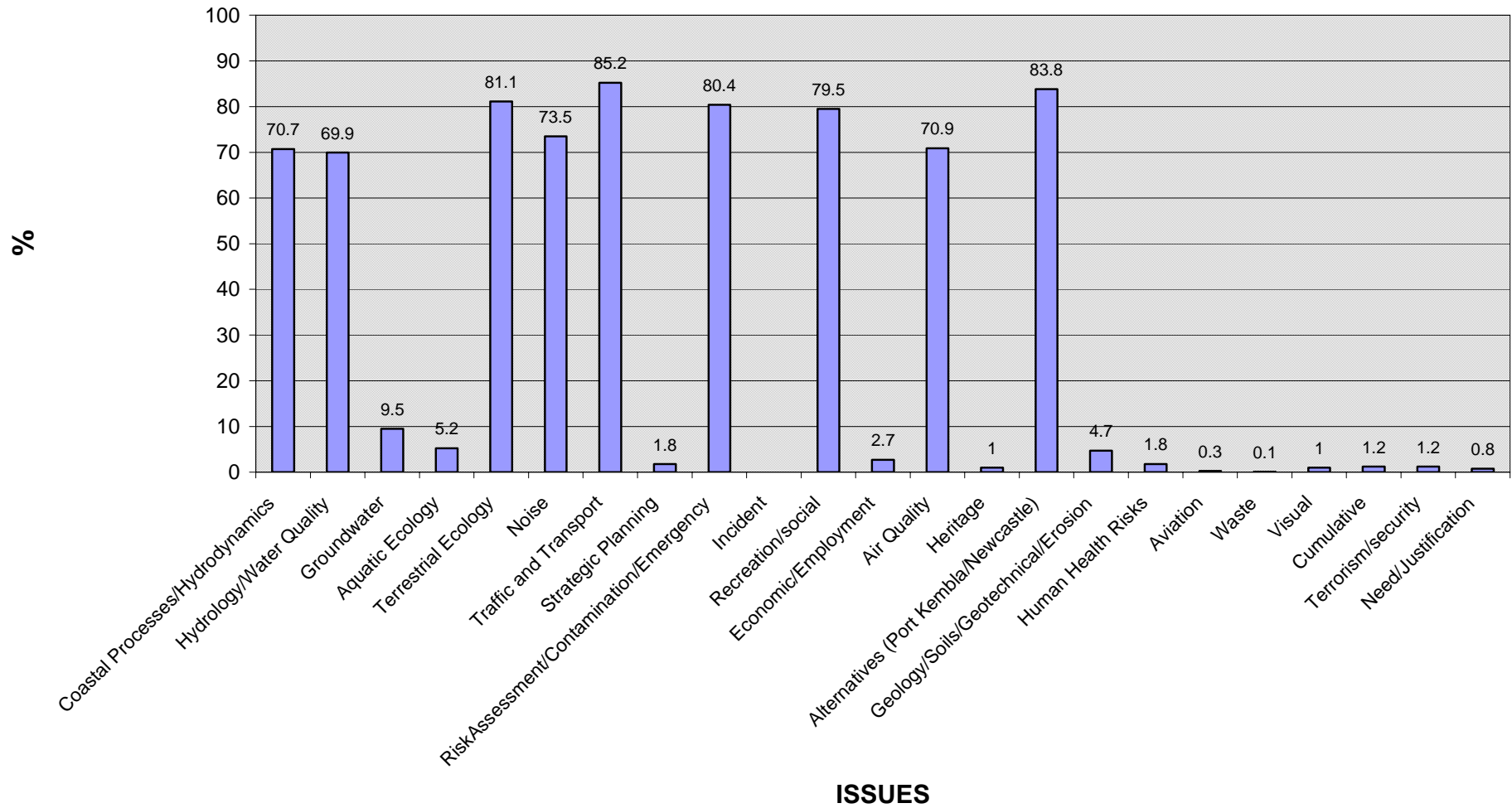
⁴ Please note that % shown represents the % of submissions that raised the specific issue. The majority of submissions received by the Department refer to more than one key issue.

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- recreation and social impacts (79.5%);
 - noise impacts(73.5%);
 - air quality impacts (70.9%);
 - coastal processes and hydrodynamics (70.7%); and
 - hydrology and water quality impacts (69.9%).

These issues and others raised in submissions are considered in detail under the relevant parts of section 7 of this report.

Copies of all submissions made to the Department during the exhibition of the subject development application and Environmental Impact Statement have been forwarded to the Office of the Commissioners of Inquiry for Environment and Planning to be considered during the Inquiry for the proposed Port expansion. A summary of these submissions is provided in Appendix B to this report.

Figure 3 - KEY ISSUES RAISED IN SUBMISSIONS (EIS)



5.2. Exhibition of Supplementary Reports

The Department exhibited the *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany* and the *Supplementary Submission to Environment Impact Statement* from 26 August 2004 until 27 September 2004. During this period, 106⁵ submissions were received. The majority of submissions raised issues regarding the proposal as presented in the Environmental Impact Statement and not issues raised in the Multi-Criteria Analysis (presented in the *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany*) used by Sydney Ports Corporation to assess alternative port layouts.

The Department received a total of 106 separate submissions following the exhibition of the Supplementary Reports. Submissions were received from the following parties:

- 5 from NSW government agencies (NSW Heritage Office, Department of Lands, RailCorp), Sydney Water and Department of Health)
- 1 submission from local government (Randwick Council)
- 2 from public interest groups:
 - Rockdale Wetlands Preservation Society
 - South West Environment Centre Coast and Wetlands Society Inc
- approximately 98 submissions from individual members of the public.

Of the 106 submissions received by the Department 98% objected to the proposed development.

The main issues of concern (refer to Figure 4) are:

- traffic and transport (96.1%)
- alternative location – mainly Port Kembla and Newcastle (92.2%);
- terrorism/security and groundwater – 83.3%
- hydrology, water quality impacts, noise and air - (82.4%).
- visual, coastal processes and hydrodynamics and terrestrial ecology impacts (81.4%);
- risk assessment and contamination (80.4%);

These issues and others raised in submissions are considered in detail under the relevant parts of section 6 of this report.

Copies of all submissions made to the Department during the exhibition of the subject development application and Environmental Impact Statement and the Supplementary Reports have been forwarded to the Office of the Commissioners of Inquiry for Environment and Planning to be considered during the Inquiry for the proposed Port expansion. A summary of these submissions is provided in Appendix B to this report.

Figure 5 represents a summary of all the issues raised during the exhibition periods for the EIS and the Multi-Criteria Analysis (supplementary reports).

The main issues of concern are:

- traffic and transport (85.2%)
- alternative location – mainly Port Kembla and Newcastle (83.6%)
- terrestrial ecology impacts (80.3%)
- risk assessment and contamination (79.6%); and
- recreation and social impacts (72.4).

⁵ all figures quoted refer to submissions received up to and including 1 October 2004. The Department will also consider a number of additional submissions expected.

Figure 4 - KEY ISSUES RAISED IN SUBMISSIONS (Analysis of MCA)

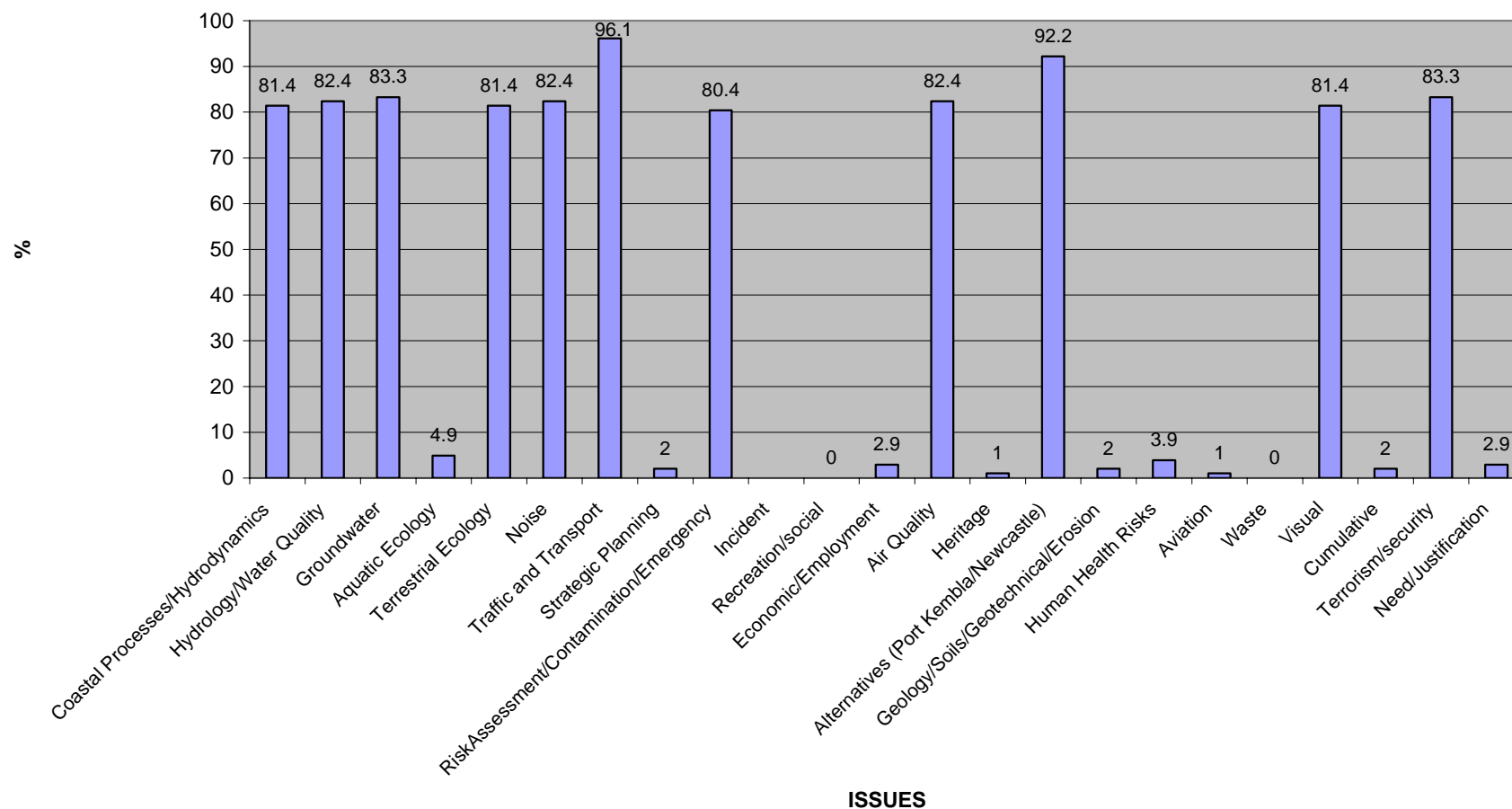
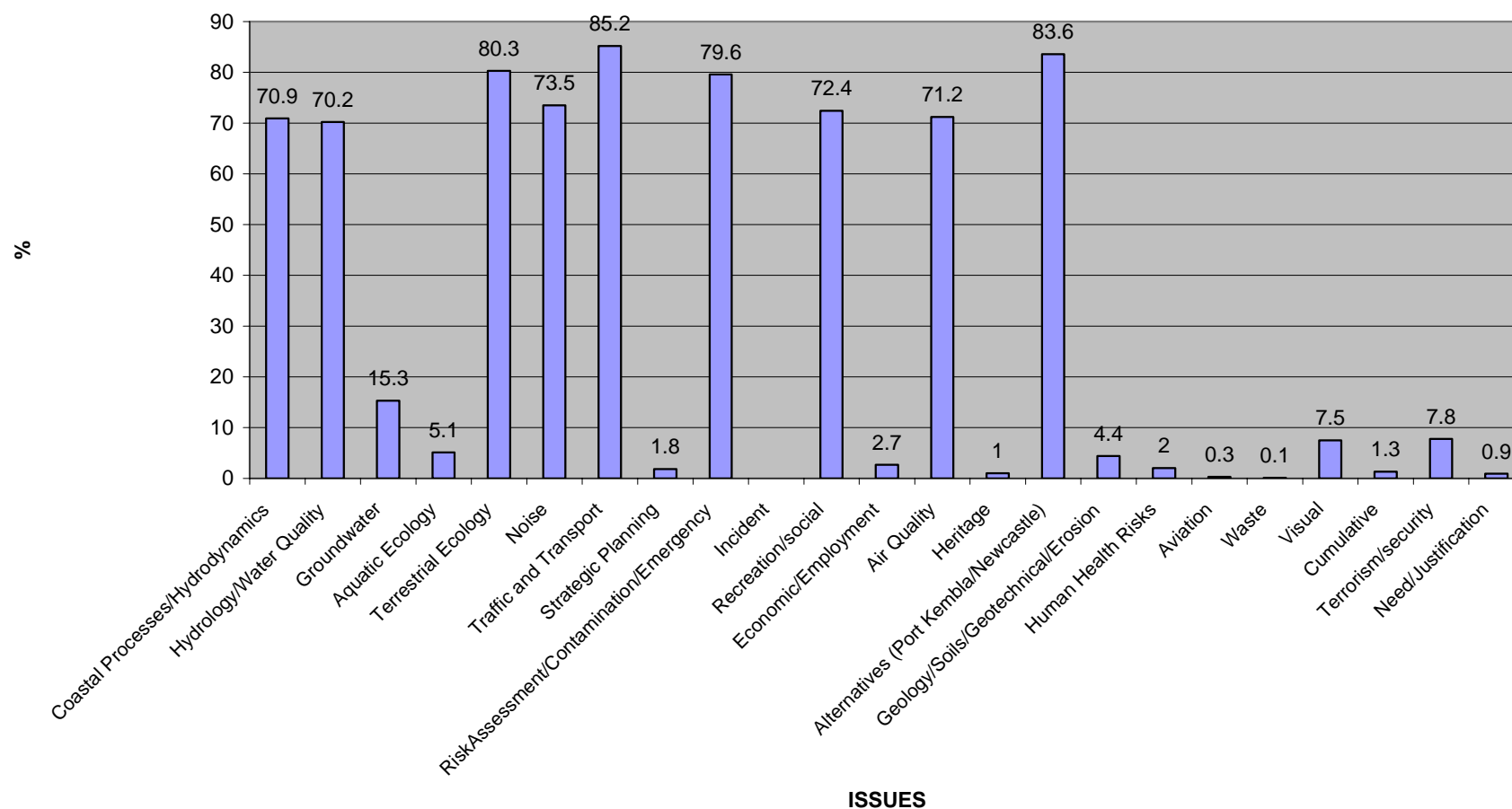


Figure 5 - KEY ISSUES RAISED IN SUBMISSIONS (EIS & Analysis (MCA))



6. JUSTIFICATION OF PROPOSAL

Applicant's Position

The EIS assessed the justification of the proposal against the following objectives:

- ability to meet the identified needs and objectives of the project;
- consistency with key government planning, transport, urban development and environmental policy objectives;
- environmental benefits and impacts;
- social benefits and impacts;
- economic benefits and impacts; and
- consistency with the principles of Ecologically Sustainable Development (ESD).

The Applicant considers that the proposal is consistent with each of these objectives. Section 40 of the EIS addresses justification of the proposal in detail.

The EIS provides an argument that additional capacity at Port Botany is required no later than 2010. If adequate capacity is not provided in time, the additional costs of congestion would be increasingly borne by consumers and business in the form of higher transport costs and delays in deliveries, all of which affect the price of goods and the competitiveness of exports.

This argument is based on estimates that the practical capacity of the current facility will be around 1.6 million twenty foot equivalent units (TEUs) per annum by 2010 and that, by 2025, more than 3 million TEUs will be required.

Issues Raised in Submissions

Public Submissions

During the public exhibition of the DA and EIS, just less than 1% of submissions received by the Department specifically referred to the justification of the proposal. However, taking into account the environmental impacts which flow from the proposal, all submissions implicitly refer to justification of the proposal. Key issues raised in submissions include:

- Question the need.
- Justification as part of the NSW Government's "Ports Growth Plan".
- Need for port location near markets.
- Lack of justification.
- Need to wait for the findings of the "Inquiry into Port Infrastructure in NSW".

Government Agency and Council Submissions

A number of Government agencies and Council submissions made specific reference to the justification of the proposal. Government agencies included RTA, and Rail Corp. Council submissions include Botany City Council, Randwick Council and Strathfield Council.

Government Agencies

- The RTA submission indicates that RTA supports the expansion of Port Botany as being the least cost option as opposed to the expansion of Newcastle Port and Port Kembla in order to accommodate the forecast trade in containers by 2021;
- RTA also considers that the proposal provides the least cost road infrastructure impacts in terms of the need for more road capacity;
- RTA also notes that the proposal will, however, require significant additional investment in road and rail capacity up to 2021 in order to maintain adequate levels of service.
- The Railcorp submission indicates that the proposal complements Government Policy including the Ports Growth Plan, Action for Air and Action for Transport 2010.

Botany Council

- Botany Council suggests there is a need for state wide review of future Port needs;
- The Council also suggests that the justification provided in the EIS is economic orientated and deal inadvertently with the environmental and social consequences of the proposal.

Randwick Council

- The Council suggests the EIS contains inadequate strategic justification for the proposal.

Strathfield Council

- Council acknowledges economic importance, but questions sustainability of proposal in terms of broader metropolitan framework.
- Notes assumptions of assessment rely on the 40% rail/road modal split.
- Requests deferred decision until transport capacity of the Metropolitan area is reviewed.

Industry submissions

P&O Ports Ltd

- supports an expansion of Port Botany, though not the expansion as proposed in the EIS.

Department's Position

The Department acknowledges that the port facilities are a significant contributor to the economy of Sydney and New South Wales. It has considered the justification of the proposal against the key justification objectives outlined in the EIS and makes the following comments:

1. Ability to meet the identified needs and objectives of the project

The Department notes the first objective, and primary justification, of the project is to “provide sufficient port capacity to meet long term forecast growth in NSW container trade.” The Department agrees that this project objective is of fundamental importance, and that environmental, social and economic impacts of the proposal are all predicated on this primary justification.

The EIS estimates that, with a medium to high level of trade growth, a capacity of more than 3 million TEUs per annum will be required by 2025. This estimate is generally supported by Government and industry.

The EIS (chapter 4 and Appendix D) estimates that the current facility will reach its capacity of 1.6 million TEUs around 2010. This is based on an assumption of medium container trade growth and modest productivity improvements at the terminal. The EIS proposal provides for an estimated additional 1.6 million TEUs, thus providing a capacity of 3.2 million TEUs per annum to service Port Botany trade.

It is important to note that studies undertaken for the EIS, including transport and traffic, noise, air quality studies and hazards, are based on a capacity of 3.2 million TEUs per annum.

Since the exhibition of the EIS, the Department has received additional analysis of terminal capacity from a Port Botany Lessee, P&O Ports, which indicates variations to the estimates provided by the Applicant in the EIS and supporting documentation. P&O Ports, commissioned a report from Drewry Shipping Consultants to analyse the capacity of P&O's alternative to the proposal (“Option 2”). P&O's estimates vary substantially from those contained in the EIS and therefore have important implications for the justification of the proposal. These various estimates are detailed below.

Port Botany Total Terminal Capacity Estimates

Current throughput for Port Botany is considered to be between 1 to 1.2 million TEUs per annum. The Port Botany capacity estimates presented in Table 1 are a summary of a number of estimates received by the Department. These estimates are sourced from the following references:

- Port Botany Expansion Environmental Impact Statement November 2003 (SPC EIS)
- Sydney Ports Corporation's Primary Submission to Commission of Inquiry May 2004 (SPC COI)
- Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany August 2004 (SPC Alternatives)
- Sydney Ports Corporation letter to COI Commissioner Kevin Cleland re Port Botany Expansion –Additional Term Of Reference 25 August 2004 (SPC COI letter)
- P&O Ports based on the Port Botany Capacity Study prepared for P&O Ports by Drewry Shipping Consultants July 2004 (P&O)

Table 1 outlines estimates of total port capacity under the existing and proposed expanded options. All figures presented in table 1 are in million TEUs per annum.

Table 1: Total Port capacity estimates

	SPC EIS	SPC COI	SPC Alternatives	SPC COI letter	P&O
Current port	1.6–1.8	1.6	1.5	n/a	2.3
Current port (best practice)	2.29	n/a	1.5	n/a	3.3
EIS option	3.2	3.2	3.13	3.33	4.4 (potential 6.4)
Alternative Option 2 (P&O)	n/a	n/a	2.64	2.97	4.2 (potential 6.0)

The Department notes that capacity depends not only on the area available (terminal area and quayline or berth capacity) but also on productivity – which can be improved through technology, work practices and efficiencies. It is the difference between area available and productivity which largely accounts for the significant variations in capacity estimates which are evident in the attached table.

The EIS indicates that the Applicant, while taking productivity improvements into account, does not believe it can rely upon them to meet forecast growth. However, advice from P&O is that international trends in technology can readily achieve a much higher capacity than those indicated by the Applicant.

2. Consistency with key government planning, transport, urban development and environmental policy objectives

This is assessed in detail in section 4, Strategic Planning Framework. The Department considers that the enhancement of Port Botany's capacity would reinforce the strategic role of the Botany Bay area as Sydney's primary economic gateway with significant new investment and employment opportunities. However, the Department's support of any option for facilitating additional container throughput at Port Botany is subject to the achievement of its integration

and consistency with the Metropolitan Strategy and investigations into the development of a Metropolitan Intermodal Freight Strategy, in particular the ability to meet the Applicant's proposed 40 per cent rail mode share.

3. Environmental benefits and impacts

The Applicant has undertaken its environmental impact assessment of the proposal – including the impacts on transport and traffic, noise, air quality studies and hazards – based on 3.2 million TEUs per annum.

The Department considers that, as would be expected with a proposal of this magnitude, there are considerable environmental impacts. While many of these are manageable, the Applicant has not yet addressed a number of issues to the satisfaction of the Department and other agencies. These may be resolved through additional mitigative measures. The Department will continue discussions with the Applicant and relevant agencies in order to clarify outstanding matters prior to a determination of the proposal. The most significant of these matters include:

- Aquatic and terrestrial ecology impacts, particularly the risk assessment of proposed enhancement works for Penrhyn Estuary
- Penrhyn Estuary water quality
- Radar capabilities at Sydney Airport
- Traffic and transportation mitigation measures
- Noise impacts
- Human health impacts

These matters are further discussed in section 7.

4. Social benefits and impacts

The Department concurs with the Applicant that the greatest social impact will be at the local level, with the surrounding community most directly affected by construction impacts, increased traffic, loss of public open space and recreation facilities, noise impacts and the visual impact of the development.

The Department considers that these impacts can be addressed through mitigation and management measures. The potential local and subregional traffic and transportation impacts of the proposal can be adequately addressed through both the mitigative measures proposed by the Applicant and additional measures recommended by the Department.

However, the Department's consideration of social benefits and impacts must be seen in the context of its position on the primary justification of the proposal, which is the need to "provide sufficient port capacity to meet long term forecast growth in NSW container trade."

5. Economic benefits and impacts

The economic benefits of the proposal are based on the provision of adequate international trade infrastructure, thereby improving efficiency and reducing costs – which are borne by the consumer – of cargo handling.

The Department accepts the need to meet the predicted growth in container trade in the coming decades. The cost benefit of the proposal relies on it being the most efficient and sustainable means, compared with alternatives, of providing the capacity required to meet that growth. The Department shall make a final determination of the economic benefit of the proposal following the investigation of alternatives through the Commission of Inquiry.

6. Consistency with the principles of Ecologically Sustainable Development (ESD)

The Applicant has defined ecologically sustainable development according to the principles outlined in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. The ability of the proposal to fulfil these principles is addressed in Chapter 39 of the EIS.

The Department concurs that the proposal as described in the EIS has been developed with reference to the principles of ecologically sustainable development. The Department has considered issues of sustainability through its assessment of the environmental impact in Section 7.

However, the Department's consideration of ESD must be seen in the context of its position on the primary justification of the proposal, which is the need to "provide sufficient port capacity to meet long term forecast growth in NSW container trade."

Conclusion

The Department's support of any option for facilitating additional container throughput at Port Botany is subject to the achievement of its integration and consistency with the Metropolitan Strategy and investigations into the development of a Metropolitan Intermodal Freight Strategy, in particular the ability to meet the Applicant's proposed 40 per cent rail mode share.

Trends in Australian container trade growth require that the port facilities of New South Wales achieve a substantial increase in capacity in the short to medium term. The Department acknowledges that the implications of not achieving this capacity will have serious ramifications for the competitiveness of the New South Wales economy.

The Department also acknowledges that this area of Botany Bay has been earmarked for future port growth purposes since the 1970s, and that Port Botany is the most efficient next step towards the goal of enhancing the State's major container capacity. It is noted that, with the attainment of the capacity indicated in the EIS, the Port of Newcastle is earmarked to provide for the next phase of container trade expansion in New South Wales.

The Department concludes that, in order to meet expected growth in container trade and consistent with the NSW Ports Growth Plan, a facility to meet forecast throughput is required at Port Botany. Meeting that capacity is justified and in the public interest.

The Department notes that the EIS proposes a capacity of approximately 3.2 million twenty foot equivalent units (TEUs) being required by 2025. Importantly, this estimate is one of the key assumptions of the EIS's transport and traffic, noise, air quality studies and hazards.

Capacity predictions have implications for the justification of the proposed expansion. The Applicant has justified its expansion on the basis that the existing Port "footprint" cannot accommodate the predicted growth in container volume. The environmental, social and economic impacts of the proposal are all predicated on this primary justification.

Further, if the proposed expansion proceeds – but with a capacity much greater than the Applicant proposes – this would have significant implications for the provision of infrastructure.

The Department concludes that the Commission of Inquiry process should focus on addressing the issues raised in this section, particularly as regard to Port capacity and the wider environmental and socio-economic implications.

6A. ALTERNATIVES

Part 1 of this section considers alternatives which the Applicant identified in its EIS. Part 2 then considers the Applicant's response to the Commission of Inquiry's additional term of reference, requiring "an analysis of any potentially feasible alternatives at Port Botany to the carrying out of the development, including the alternative proposed by P&O Ports Limited."

Part 1: Environmental Impact Statement

Applicant's position

The EIS provided an argument that there are no viable alternatives to the proposed expansion of Port Botany that would provide capacity for long term growth in container trade. Alternatives considered by the EIS include:

- interstate development of port facilities - Melbourne and Brisbane;
- development at other existing NSW port facilities - Port Kembla and Newcastle;
- development at greenfield sites in NSW – Jervis Bay, Port Stephens and Broken Bay/Pittwater;
- Sydney Harbour;
- Botany Bay;
- alternative layouts within Port Botany; and
- the "do nothing" scenario.

When considering alternatives the Applicant considered a number of factors including:

- availability of land for terminal facilities;
- availability and capacity of landside transport (road and rail) and proximity to trade markets;
- ship size and port infrastructure – ability to cater for future generations of larger ships;
- ability to compete in the global shipping market;
- availability of supporting services (customs services, quarantine, shipping agents, fuel supply, etc);
- environmental considerations; and
- capital cost of providing port and transport infrastructure.

Taking the above factors into consideration the applicant claims that none of the alternatives considered provide a viable option. The EIS concludes that the interstate options of Melbourne and Brisbane are too far away to reliably and economically service the Sydney Market.

In terms of potential NSW alternatives the Applicant makes the following conclusions:

Alternative	Conclusion
Port Kembla	<p>In terms of land availability and berth length Port Kembla could handle approximately 100,000 to 200,000 TEUs of growth from the Sydney market.</p> <p>The scale and proximity of Port Kembla to the major ports in Sydney would make it highly unlikely that Port Kembla would be able to attract major shipping lines as it would be contrary to the existing world-wide trend towards rationalisation of services. A further disadvantage is the lack of surplus capacity on the existing rail and road connections, as well as the additional transport costs to get products to or from the Sydney market.</p> <p>However, it is expected that Port Kembla would continue to service a niche market for regional commodities and may attract small volumes of containers from smaller shipping lines and/or from parts of NSW closer to Port Kembla than to Port Botany, but Port Kembla is not considered to be a viable alternative for any significant proportion of Sydney's future growth in container trade.</p>
Newcastle	<p>In terms of land availability and berth length Newcastle Port's proposed Multi Purpose Terminal (MPT) is planned to handle approximately 350,000 to 500,000 TEUs per year with potential for further expansion.</p> <p>A disadvantage of Newcastle is the lack of available capacity on the already congested rail and road connections providing the 170 km link to Sydney's markets. The cost of providing additional capacity is likely to be prohibitive. As no government funding has been allocated to any upgrading of road and rail infrastructure necessary to service Newcastle, these costs would have to be borne by the prospective developer of container handling facilities and would ultimately be passed on to exporters and consumers.</p> <p>As there would also be the additional transport costs associated with Newcastle, major shipping lines would continue using Port Botany as the gateway to the Sydney market.</p> <p>Newcastle is therefore not considered to be a viable alternative for any significant proportion of Sydney's existing or future container trade.</p>
Sydney Harbour	<p>Due to its proximity to the Sydney CBD, and competing land uses, the port facilities and wharfage area in Sydney Harbour have been considerably reduced over the past 25 years. The remaining facilities in Glebe Island, White Bay and Darling Harbour currently provide the only non-containerised and general bulk and break-bulk facilities in Sydney.. White Bay and Darling Harbour collectively also handled approximately 90,000 TEUs in 2001/02.</p> <p>Following a recent State Government policy decision, container traffic through Sydney Harbour is to be phased out over time. However, Sydney Harbour will continue to perform an essential function in handling general bulk and break-bulk cargoes for Sydney. Sydney Harbour is therefore not considered to be a viable alternative for any significant proportion of Sydney's existing or future container trade.</p>
NSW Greenfield Sites	<p>Each of the greenfield locations considered have significant constraints including environmental issues, incompatible land uses and the requirement for significant capital investment to establish basic port facilities (e.g. breakwaters, navigation channels, rail spurs and arterial road links etc), these sites are not considered suitable to accommodate the forecast growth in Sydney's container trade and have therefore not been assessed further.</p>

In the EIS, the Applicant also considered alternatives within Port Botany, including alternative layouts. It was argued that the potential to develop alternative sites within Botany Bay is very limited due to environmental sensitivities, land availability and usage, community requirements and the cost of required transport linkages (predominately rail links).

The Applicant also claims that alternative layout options, including both the north and south Brotherson dock, are limited by environmental considerations, land ownership, the operational buffer distances required by Sydney Airport and the operational requirements of the existing facilities at Port Botany. Three specific alternative layouts considered by the were Applicant including an eastward extension of existing berths at Brotherson Dock, westward extension of existing berths at Brotherson Dock South; and westward extension of existing berths at Brotherson Dock North.

In addition the applicant has also considered an alternative layout of the preferred option at Brotherson Dock North. However, it was concluded that alternative layouts at Brotherson Dock North were not viable for the following reasons:

- serious environmental consequences;
- not acceptable to local and broader communities;
- threat and/or destruction of migratory bird habitat;
- impacts on flow characteristics of Springvale and Floodvale Drains and creation of additional flood risk;
- impact on groundwater levels;
- significant loss of beach area and public amenity;
- lack of terminal efficiency; and
- increased operational impacts.

Issues Raised in Submissions

Public Submissions

84% of all submissions received raised issues directly related to alternatives to the proposal. Key issues raised in submissions include:

Alternatives

- Need to use Newcastle and Port Kembla as viable alternatives.
- Newcastle and Port Kembla can support a growing population shift.
- Communities of Newcastle and Port Kembla want the Port.
- Newcastle has better infrastructure.
- Investment could be used for rail/road improvements between Newcastle, Port Kembla and Sydney markets.
- Role of Sydney Harbour should remain.
- Strategic planning benefit of even distribution of containers between three Ports (Newcastle, Port Kembla and Port Botany). Some submissions include four Ports (including Sydney Harbour).
- Opportunity to use Federal Rail Freight funding to make Port Kembla/Newcastle alternatives possible.
- Alternative Port Botany layout including expansion of Brotherson Dock North and South.
- Need for further detailed investigation of alternatives.
- Lack of viability of alternative options.

Government Agency and Council Submissions

A number of Government agencies and Council submissions made specific reference to consideration of alternatives. Government agencies included RTA, and Rail Corp. Council submissions include Botany City Council and Randwick Council.

Government Agencies

- The RTA submission:

-
- highlights a number of key traffic and transportation issues. However, the submission also indicates that RTA supports the expansion of Port Botany as being the least cost option as opposed to the expansion of Newcastle Port and Port Kembla in order to accommodate the forecast trade in containers by 2021;
 - RTA also considers that the proposal provides the least cost road infrastructure impacts in terms of the need for more road capacity; and
 - also notes that the proposal will however require significant additional investment in road and rail capacity up to 2021 in order to maintain adequate levels of service.
 - The Railcorp submission indicates that the proposal compliments Government Policy including the Ports Growth Plan, Action for Air and Action for Transport 2010.

Botany Council

- suggests there is a need for state wide review of future Port needs;
- states that due to the significant environmental and social impacts of the proposal Newcastle and Port Kembla should be considered in more detail given the employment needs in both regions and the formation of an “Illawarra Alliance” in support of the expansion of Port facilities at Port Kembla.

Randwick Council

- Suggests need for strategic planning context for the future growth of all NSW ports, including further assessment of alternatives and increased efficiencies.

Bulk Liquid Industry

The Department has received correspondence from the Bulk Liquid Industry requesting that any consideration of alternatives options should assess the impacts of those alternatives on the existing Bulk Liquid Terminal.

Department’s position on alternatives outside Port Botany

Recognising the need for a strategic framework for the future growth of ports in New South Wales, the Government announced the NSW Ports Growth Plan in October 2003. The plan sets out the overall strategic direction for the roles of the various ports and the manner in which they are expected to grow in the coming decades.

The Ports Growth Plan incorporates a number of key initiatives, including:

- ensuring the future growth and development of port capacity in NSW;
- future development of the former BHP Steel site at Newcastle as a multi-purpose port, with the ability to handle significant levels of container trade, as well its existing focus on coal exports; and
- gradual relocation of container processing, general cargo and car stevedoring from Port Jackson (Sydney Harbour) to Port Kembla.
- a Commission of Inquiry into the proposed expansion of container facilities at Port Botany.

The plan recognises the ongoing importance of Port Botany in accommodating the majority of container movements in NSW. Regardless of the outcome of the Commission of Inquiry, Port Botany will continue to play a key role in the NSW ports system.

Development or expansion of facilities at Port Kembla and Newcastle will take advantage of available land at these locations, as well as the ability to improve transport links to the port sites. It is expected that the expansion of Port Kembla and Newcastle will occur over time as Port Botany reaches capacity, as leases expire in Port Jackson, and as shipping companies adjust their preferences to reflect the different roles of the various ports.

The Plan also acknowledges that Sydney Harbour is and will remain a working Port, retaining import of materials to support the construction industry, cruise shipping, long term oil imports and maritime construction, maintenance and repair.

The overall objective of the Ports Growth Plan is to ensure that the NSW ports system is able to efficiently cope with the large increases in various freight tasks which are expected in the coming decades.

In its submission to the Legislative Council Standing Committee inquiry, the NSW Government acknowledges that Port Botany is the preferred location for enhancing the State's major container capacity and acknowledges that the relevant part of Botany Bay has been earmarked for future port growth purposes since the 1970s.

Accordingly, the proposals are consistent with the government's adopted Ports Growth plan and consideration of alternatives should be considered in the context of that plan.

Part 2: Detailed consideration of alternatives within Port Botany

This section addresses the assessment of alternative layouts within Port Botany as presented in the EIS and subsequently in the *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany*, undertaken by PricewaterhouseCoopers and GHD on behalf of Sydney Ports Corporation (SPC) in response to the additional term of reference required by the Commission of Inquiry.

On the basis of information provided in its EIS, the Department concluded that insufficient information had been provided to make an informed decision on the proposal. On 11 May 2004 the Department wrote to the Applicant seeking further information regarding a number of issues, including alternative layouts. The Department asked that the Applicant to further consider alternative layouts including P&O Ports' proposal and, when comparing alternative layouts, to consider the following aspects:

- Details of capital cost and basis for the difference between the preferred option and alternatives.
- Consideration of alternatives against the project objectives.
- Consideration of the social, economic and environmental impacts of alternatives.
- Consideration of a combination of alternatives A, B and C (as presented in the EIS).

On 28 May the **Legislative Council Standing Committee on State Development - Inquiry into Port Infrastructure in NSW** released its *Interim Report of the Legislative Council Standing Committee on State Development - Inquiry into Port Infrastructure in NSW* with the recommendation that the Minister ensure that an identification and evaluation of alternatives be undertaken prior to a determination on the SPC proposal.

Following this recommendation, on 28 May 2004 the Minister amended his Direction to the Commission of Inquiry under Sections 119 (1) (b) and 4 (8) of the Environmental Planning and Assessment Act by requesting the Commission of Inquiry to also inquire and report on 'an analysis of any potentially feasible alternatives at Port Botany to the carrying out of the development, including the alternative proposed by P&O Ports Limited.'

The Commission of Inquiry was adjourned in order to permit the Applicant to prepare a supplementary document addressing the Minister's additional term of reference. This document *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany* was made publicly available on August 25 2004.

The Applicant engaged consultants to undertake an evaluation of alternatives at Port Botany. The consulting team used a multi criteria analysis to evaluate a short list of five options, including SPC's EIS option (Option 1 in the *Analysis of Options*) and the P&O option (Option 2).

The *Analysis of Options* concluded that Option 1 was the preferred alternative, providing "significantly" more capacity than Option 2: "The key disadvantages of Option 2 [P&O option] is that it results in a new port layout which will be capacity limited earlier than Option 1, it is

comparatively less suitable for rail transportation and it does not include the road connection enhancements present within Option 1. It does not provide the potential for an additional terminal operator.” (p. iv).

The *Analysis* considered a number of alternatives (11, reduced to a short list of five) in terms of

- Logistics
- Environment and ecology
- Cost
- Local amenity and public health
- Economics and revenue
- Safety

Within these main or “parent” criteria were sub-criteria which addressed specific issues. For example, under the parent criteria of logistics, sub criteria included total terminal capacity, overall terminal flexibility, efficient use of existing port land and infrastructure, shipping and navigation, efficient road access and efficiency and capacity of rail loading operations.

In order to assess the relative importance of different criteria and to rank the overall performance of the options, the criteria were scored or weighted by a panel of experts (pp 162-163) against three stakeholder perspectives:

- Citizens of NSW
- Local residents
- industry

Applicant’s position

In their submission of the *Analysis* to the COI, Sydney Ports Corporation advised the Commissioner that “The results of the *Analysis* are conclusive in that the SPC EIS proposal (Option 1) provides the best alternative for expansion of container port facilities in Port Botany...SPC is convinced that, from a Government, community, environmental and broad industry perspective the EIS layout provides the most efficient means of providing additional container port capacity to meet trade growth to 2025 and beyond.”

Submissions

The Department exhibited the *Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany* and the *Supplementary Submission to Environment Impact Statement* from 26 August 2004 until 27 September 2004. While one submission from Randwick Council commented directly on the alternatives, most submissions did not directly address the *Analysis*. Submissions are further detailed in section 5 of this report.

Randwick Council

- Randwick Council indicates there appears to be scope for the Port to consider increased efficiencies, for example increased hours of operation and use of improved technologies, thus limiting the area required for expansion and/or extend the lead time required. Recommends review of all viable alternatives, including those outside Botany Bay area.

Independent Review

The Department also engaged the University of Sydney to undertake an independent review of the analysis. This review is included at Appendix C. The review highlights a number of issues with the *Analysis* in the following areas:

- process used to generate weightings for the project.
- lack of detail about how the scores for each subcriteria were generated.
- some lack of consistency between subcriteria.
- limited nature of the sensitivity tests.

Department's position

The Department's consideration of the analysis of alternative options identified the following issues:

General comments/ method

The Department considers the *Analysis* does not provide adequate information on the design of the multi criteria analysis, the reasons for the adoption of particular methods and processes and the justification for particular decisions. In particular:

Constitution of Panel

- In relation to the constitution of the weightings of the panel, while the Department appreciates that genuine representativeness may be difficult to achieve, it appears the panel is unduly weighted towards expertise in port and transport infrastructure with less representation of broader community and environmental issues. In particular, the Department seeks justification for the inclusion of a Sydney Ports Corporation representative on the panel.

Stakeholder perspectives

- The panel was asked to comment on the different sets of weighting according to three stakeholder perspectives: local residents, industry and citizens of NSW. Without an explanation of these categories – in particular the very broad “citizens of NSW” category – it is difficult for the Department to assess the validity of the weightings and scorings which flow from it.

Weighting the criteria

- The Department was not consulted regarding sub criteria weighting. For example, a basis for a Logistics sub criteria weight for Efficiency and Capacity of Rail Loading Operations of 50% needs to be justified as this has large influence on the overall findings.
- The Department notes that the number of sub criteria and sub criteria weighting has substantial influence on the outcome of the overall scores.

Sensitivity and scenario analysis

- The Applicant needs to clarify the basis of the different criteria weights used in the sensitivity analysis.
- The sensitivity analysis would benefit from direct residents input into the development of weighting.

Specific comments on criteria

Evaluation of Expansion Options (2.2.2)

- Table 3, page 10 of the *Analysis* lists the parent criteria and sub criteria against which the relative performance of each alternative was assessed. The Department queries a possible inconsistency between the number of sub criteria used under each criteria. Logistics has six sub criteria, Environment and Ecology has four sub criteria, Local Amenity and Public Health has three sub criteria, Economics and Revenues has two sub criteria, Cost has two sub criteria and Safety has two sub criteria. This may create a bias on findings, where an equal amount of sub criteria would be more appropriate.

Total Terminal Capacity (4.2.1.1)

Yard Capacity Analysis

- The Department seeks clarification on the extent to which Patrick or P&O stevedores have been consulted as part of the *Analysis* when determining the terminal capacity, particularly yard capacity (Table 16, page 74 of the *Analysis*). As this is relevant to the terminal cost findings (section 4.2.5 of the *Analysis*) which rely on the terminal capacity, it is apparent the yard capacity figures influence more than one of the scores.
- In addition there seems to be some inconsistency between the EIS and *Analysis* regarding overall yard or terminal area capacity. Table 4.3 of the EIS “Forecast Capacity of the Existing

Terminals at Port Botany” indicates that the Total Terminal Area Capacity of the existing Port would be 2.4 million TEU pa in 2025 and that Total Berth Capacity would be 1.8 million TEU pa in 2025. The MCA, however, suggests that option 2 would have a yard capacity of 2.64 million TEU per annum. Therefore the *Analysis* suggests that option 2 would provide an additional 32.7 ha but would only contribute an additional 264,000 TEU yard capacity.

Road Traffic Amenity (4.2.3.3)

- Page 105 of the *Analysis* indicates that traffic forecasts and intersection analyses were undertaken for options 2 and 7 based on total terminal throughput scenarios of 3.2M TEU pa and 3.08M TEU pa. However, table 16, page 74 of the *Analysis* indicates that these throughput scenarios are not possible for option 2 which is reported to have an overall capacity of only 2.64M TEU pa. A consistent assumption of overall capacity of each option should be used in the consideration of all criteria.
- Overall the road traffic amenity scoring needs review. Table 31, page 108 of the *Analysis* shows that Option 1 has received 7 points and option 2 has received only 3 points. The only obvious basis for this difference is because of a slight intersection performance difference at the intersection of Foreshore Drive and Botany Road.

Cost (4.2.5)

Terminal Construction Costs

- The Applicant needs to clarify the basis for the estimate of construction costs per TEU for Option 1 (\$455) and Option 2 (\$639). The text on page 116 suggests that these costs are based on overall capacity.
- The overall capacity figures on page 74 have been used to calculate total construction costs per TEU as shown in the table below. Costs per TEU based on overall construction and overall terminal capacity seem to be different (see table below). The calculation process used by SPC needs to be provided.

Option	Construction Cost	Overall Capacity TEU	Terminal Cost per TEU
Option 1	\$696000000.0	3130000.0	\$ 222.36
Option 2	\$664000000.0	2640000.0	\$ 251.52

The costs per TEU provided on page 116 of the *Analysis* shows Option 1 as approximately 71% of the cost of Option 2. The costs above indicate that Option 1 is approximately 88% of the cost of Option 2.

- Overall the Terminal Construction cost scores require review. There seems to be an inconsistency in scoring allocation. Table 38 on page 116 shows that the scores for option 1 as 6 points, option 2 as 7 points and option 8 as 5 points. However, the text on page 115 suggests that option 1 is slightly more expensive than option 2 but similar to option 8. However the scores indicate that option 8 and option 1 are not similar. As there is 1% difference in cost between options 1 and 8, it would appear that the scores would be the same.

Additional comments: terminal operator competition

- The Department notes that, since the initial exhibition of the EIS, terminal operator competition has emerged as an issue of significance in relation to the Applicant's proposal. P&O Ports' submission to the COI raised a concern that the Applicant's proposal would provide a competitive advantage to the second lessee at Port Botany. Additionally, one of the main issues raised by the Legislative Council's Inquiry into Port Infrastructure related to parity and competition at Port Botany. The Inquiry Committee expressed concern that "the proposed development may result in a competitive advantage for one stevedoring operator" and "the proponent of the current proposal may not have given sufficient consideration to alternate proposals, both in terms of environmental impact and facilitating competition." (Interim Report sections 2.18–2.22).

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- In the Applicant's letter of submission of the *Analysis* to the Commissioner, competition is highlighted as one of five "key strategic factors" which should underpin consideration of the proposal.
 - The Department notes, however, that in the *Analysis* itself, terminal operator competition is not a stand alone criteria or even sub-criteria, but is included under logistics in the sub-criteria "efficient use of existing port land and infrastructure" (4.2.1.3). This sub-criteria is given an overall weighting of 3.8 per cent. This appears to be inconsistent with the high level of importance attached to competition in the Applicant's letter of submission.
 - In the *Analysis*, Option 2 is rated as the poorest option in relation to terminal operator competition (page 77-78).
 - This finding is emphasised by the Applicant in its letter of submission of the *Analysis*. The letter states that Option 2 is uncompetitive and that this is "a significant disadvantage" of that Option.
 - It should be noted that the *Analysis* and the Applicant's letter of submission address the issue of competition in terms of providing potential for a third operator at Port Botany. While the Department acknowledges that this is a legitimate approach, it also notes that it does not address the concerns raised by the Legislative Council Inquiry that the Applicant's proposal provides one operator with a significant competitive advantage over another – ie an advantage that may result in a stevedoring monopoly at Port Botany.
 - The Department is also concerned that, given the strategic importance that the Applicant is now placing on competition, insufficient analysis has been undertaken of the actual potential for a third operator to enter Australia or of the particular advantages of the alternative Port Botany layouts in attracting a third operator.
 - The Applicant's submission states "Despite the fact that Australia is currently nationally serviced by 2 stevedores it is certainly possible that another operator (possibly a joint venture with a major shipping line) could enter the market and interest has already been expressed by a number of new players in establishing an operation at Port Botany. This interest is not dependent upon the establishment of simultaneous operations in other Australian ports and it is wrong to believe that a new operator...would need to gain entry into every major container port in Australia before it would be a viable operation..."
 - The Department is concerned that this statement (that a third operator would not need entry into other major ports to be viable) is not elaborated on, substantiated or discussed in the EIS, the COI submission, the *Analysis of Potential Feasible Options* or in any other reports or documents provided through the assessment process to date. The statement contradicts the claim made in P&O's submission that "a new entrant ...would be faced not only with the high incremental cost of an entirely new facility but would also be faced with the need to be able to provide a credible service through all four of the key Australian ports." (P&O submission page 4).
 - The Applicant's submission further states that "The 18 hectare option granted to Patrick, should the EIS proposal be approved, will in no way limit the option for either P&O or a new operator to utilise the balance of the newly developed terminal." This statement is not substantiated in any information provided through the assessment process.
 - The Department concludes that, given the importance it now explicitly places on terminal operator competition, the Applicant has to date not adequately analysed the likelihood of a third operator in Australia or supported its claims that the proposed layout will "in no way limit" other operators from establishing a viable terminal at Brotherson Dock North.

Conclusion

The Department concurs with the Applicant that Port Botany is the preferred location to accommodate the forecast trade in containers by 2025 compared with alternatives identified both within and outside New South Wales.

In relation to alternatives within Port Botany, the Department concludes that, because of the concerns with method and process identified in this section, the *Analysis* of alternative options undertaken by the Applicant does not enable the Department to conclude that Option 1, or any alternative considered in the *Analysis*, is the preferred option for Port Botany. The Inquiry process should clarify the issues raised so that a more informed outcome can be obtained.

7. CONSIDERATION OF ENVIRONMENTAL ISSUES

7.1. Traffic, Transportation and Infrastructure

The Department's initial submission to the COI, dated May 2004, was informed by the Applicant's traffic/transportation and environmental/amenity infrastructure position as presented in the EIS. Subsequently the Applicant has updated this position in the Supplementary Submission to the EIS dated August 2004. The Applicant's supplementary submission included the following additional reports:

- Draft Cumulative Traffic Impact Study (November 2002); and
- Supplementary Transport and Traffic Assessment (April 2004).

In addition the Department appointed Stepfair and Samsa to undertake an independent expert peer review of the EIS, Department's assessment and Applicant's supplementary information.

This section of the Department's submission is now informed by the EIS, additional information and the Stepfair-Samsa independent review.

Applicant's Position

The EIS provides an assessment of the road and rail impacts of the proposal in two components. One addresses the movements associated with the commercial Port aspect while the other addresses the proposed Boat Ramp facility. The assessment approach adopted in the EIS investigates the impacts in the Port Precinct and immediate subregion.

The Applicant has indicated that 75% of existing container movements through Port Botany are moved by road. This amounts to approximately 1,450 truck visits each day. The EIS notes that one truck visit is equivalent to two truck movements – inward and outward.

The EIS also provides a list of a number of initiatives to be adopted by the Applicant to reduce the proportion and growth of truck movements. These initiatives include:

- increasing the transport of containers by rail from the current 25% of container throughput to at least 40% by 2011, and
- encouraging the improved utilisation of trucks serving the port.

It is claimed by the Applicant that the above-mentioned initiatives will ensure the proposed Port Extension would contribute approximately 940 truck visits per day or 40% of the forecast port traffic, which is predicted to be 2,350 truck movements by 2021. The supplementary transport and traffic assessment predicts that the intersection of Botany Road and Foreshore Road is forecast to deteriorate to an unacceptable level of service in the absence of remedial works.

On a subregional level the EIS claims the proposed expanded Port would generate less than 2% of total (morning) peak hourly traffic flows at the subregional level by 2021.

Transport Forecasts

Transport Data Centre population and employment growth forecasts have been used for background traffic (former NSW Department of Transport Services, now a function of DIPNR). RTA forecasts have also been used up to 2016.

Rail Access

The proposal includes provision of rail access via the construction of three additional rail sidings (for loading and unloading) through the extension of the existing Botany Freight Rail Line around the northern edge of Penrhyn Estuary and into the new terminal. Two other sidings would also be provided along the northern side of the existing Patrick Stevedores terminal, parallel to Penrhyn Estuary to allow trains to wait and avoid congestion of the Botany Freight Rail Line. A 600m passing loop would be provided adjacent to Foreshore Road prior to the track entering the new terminal, to allow trains to pass each other.

Rail Mode Share

The EIS highlights that the Applicant's initiative to have 40% (1.3 million TEUs) of containers transported by rail by 2011 will be achieved when the NSW Government, through RIC, completes the full duplication of the dedicated freight rail line between Port Botany and the Enfield Marshalling Yards.

Stage 4 of the duplication (between Cooks River and Botany Yard) is the final remaining stage that needs to be completed to ensure the above-mentioned duplication is achieved. The EIS claims that the completed duplication would be required between 2011 and 2016 to ensure a 40% rail mode share is achieved.

The EIS also indicates that the increase in rail mode share would require development of additional intermodal facilities.

Intersection Analysis

The Applicant assessed existing and predicted future performance of key intersections in the core study area. Intersections investigated include:

- Foreshore Road /General Holmes Drive
- Foreshore Road /Airport Access
- Foreshore Road and Botany Road
- Botany Road and Beauchamp Road
- Botany Road and McCauley Street
- Botany Road and Container Park Access Road
- Botany Road and Bumborah Point Road

The EIS claims that all intersections currently operate with a good level of service with the only exception being the intersection of Foreshore Road and Botany Road which experiences acceptable delays.

The EIS claims that the forecast increase in traffic generated by the proposed Expanded Port would not result in unacceptable levels of intersection performance in the Port Botany precinct, except for the Patrick Stevedores terminal entry/exit at the Foreshore Road/Botany Road/Penrhyn Road intersection, where the level of service would deteriorate to a (Level of Service (LOS) E in the afternoon peak by 2016 based on a mode share of 20% rail. As a result duplication of the right turning lane from Botany Road (south) into Botany Road (north) and widening Botany Road (north) would be required to accommodate two lanes of northbound traffic to a distance of about 70m from the intersection. The Applicant's supplementary report has also indicated that if the EIS proposed 40% rail modal share was not achieved an additional right turn capacity (Botany Road (east) into Botany Road (south) will be required.

In addition the Applicant's supplementary transport and traffic assessment assessed the impact of the closure of Botany Road to truck traffic indicating consequent adverse impacts on the intersection operation of Foreshore/General Homes Drive under the worst case 20% mode share scenario.

The intersection works would not be required to be undertaken if the Applicant's proposed 40% rail mode share is achieved.

Proposed Mitigation and Management Measures

The Applicant proposes the following mitigation and management measures to reduce the impact of the proposal on the road and rail network:

- prepare a detailed Construction Traffic Management Plan to: identify preferred haulage routes, access routes and signage and access arrangement on site; measures to limit the impact on Foreshore Road by the various activities associated with the proposal;
- encourage a rail mode share of at least 40%;

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- increase truck utilisation;
 - spread movements throughout the 24hr operational period;
 - operating road servicing more evenly over the 7 days of the week;
 - encourage trucks to use alternative routes from local road networks;
 - regular reporting of the proportion of rail/road transport at 5 year intervals starting in 2011;
 - providing internal port rail facilities including five rail sidings;
 - work with RIC, logistics companies and intermodal operators to help achieve enhancements to cater for rail freight growth; and
 - develop and implement a truck driver code of conduct designed to increase truck drivers awareness of:
 - appropriate routes;
 - restrictions and constraints expected on routes;
 - facilities and amenities on routes;
 - approximate travel times and alternate routes;
 - noise sensitive routes;
 - dangerous goods transport routes; and
 - actions in case of emergencies.

Issues Raised in Submissions

Public submissions

Traffic, transportation and associated infrastructure issues have been raised by approximately 85% of submissions the Department has received during the exhibition period for the DA and EIS and overall re-exhibition of additional information. Key issues raised are:

Road:

- Increase in heavy vehicles.
- Existing traffic impacts.
- Existing road network is at capacity and has an inability to cope with increased heavy vehicles considering existing congestion issues.
- Cumulative traffic impacts associated with: existing Port and other major developments including airport expansion and Green Square development and population increases.
- Increased traffic flow in residential areas.
- Increase accident and safety risks associated with heavy vehicles.
- Impacts on M5, General Holmes Drive, Foreshore Road, Botany Road, Jennings Street, Hale Street, McPherson Street.
- Impacts on regional road network.
- Concern regarding transport infrastructure costs.

Rail:

- Night time rail impacts on residents.
- House vibration impacts from rail.
- Support increase use of rail. Further increases are encouraged.
- Possibility of double stacking trains.
- Need for further rail impact assessment.
- Impacts of increased rail share on the need for intermodal facilities.

Government Agency and Council Submissions

The Department initially received submissions from NSW Roads and Traffic Authority (RTA), Rail Corp, State Transit Authority, Botany City Council, Strathfield City Council, Randwick City Council, Rockdale City Council and the Southern Sydney Region of Councils regarding traffic and transport issues.

The Department also received additional submissions from Randwick City Council and Rail Corp at the time of writing in response to the re-exhibition of additional information.

In summary Rail Corp:

-
- provides in principle support of the proposal indicating that the proposal complements Government policy including the Ports Growth Plan, Action for Air and Action for Transport 2010;
 - supports the objective of achieving a 40% rail mode split;
 - has a conceptual infrastructure upgrade program for the main dedicated freight line that services the port;
 - concurs that duplication of the remaining rail line (Port Botany to Enfield) is required to achieve 40% mode split;
 - has undertaken concept planning for this duplication (Stage 4) although has not yet committed to the duplication;
 - expects duplication to be required between 2010 and 2016;
 - considers there is a need for source intermodal terminals to be determined to receive the 40% mode split to determine if additional infrastructure is required;
 - is clarifying with SPC the rationale behind rail movements;
 - has now provided recommended conditions of consent, if approved, regarding:
 - number of rail sidings required and lengths; and
 - the need for the grade separation of Penrhyn Road over the rail access to the proposed berth needs to include the grade separation of the inter-modal road over the rail access to Patrick's terminal to ensure efficient operation of both road and rail access to all existing and proposed new berths.

In summary the RTA's initial submission:

- considers that the target of 40% container transport by rail and other assumed improvements in container transport efficiency are highly dependent on variables external to the proposal;
- considers that the EIS does not consider the cumulative impacts of the port expansion in combination with other future developments eg Green Square and the Sydney Airport expansion which would impact on Southern Sydney's road network;
- considers that the EIS provides a lack of consideration of the traffic impact of the proposal on the wider road network in particular the M5 East and the need for improvements;
- requires traffic and transport modelling to be reviewed;
- requires consideration of funding contribution from SPC for a number of road network improvements and ongoing maintenance requirements required as a result of the proposal;
- identifies the need for a freight strategy;
- requires the preparation of a Traffic Management Plan prior to the commencement of any works; and
- identifies a need to review predicted intersection performance and required upgrading for all intersections.

In summary the State Transit Authority:

- supports efficient freight handling and an effective Port to serve NSW;
- supports the proposed increase in the use of rail as access mode for Ports;
- raises a number of concerns with the traffic analysis and inputs into the analysis including lack of consideration of employee, contractors, servicing and ship crew movements;
- suggests that the traffic analysis should go beyond foreshore drive including the capacity issues faced by the M5;
- requires truck queuing to be resolved as part of the proposal;
- questions how rail level crossings are to be dealt with in the assessment;
- requests that pedestrian movements and car parking on Foreshore Drive be addressed in the assessment;
- requests that the inability of freight to access the Sydney Orbital is addressed in the assessment;
- has concerns regarding the impact of heavy vehicles on Sydney Buses services;
- requires details of how SPC will assist public transport users; and
- is concerned with the impacts of the proposal on local bus routes.

Randwick and Strathfield Council have raised concerns with the proposal. Areas of concern include:

- reliance on assumptions external to the project to enable achievement of the 40% rail mode split;
- need to review the transport capacity of the metropolitan area;
- need for a supplementary report to address cumulative traffic and transportation issues.

Randwick Council

- Need to review the cumulative impacts of the Port expansion proposal within the sub-regional area and within the framework of a State Freight and Transport Strategy.
- Need to ensure appropriate measures aimed at minimising container truck traffic movements on residential streets and through commercial centres of Randwick LGA.
- Should the proposal be approved need for commitment to the associated infrastructure works, including funding and time frames required to ensure completion prior to the operation of any new terminal.
- Need for specific rail and road works, as detailed in Council's submission.

Botany City Council has objected to the proposal. Particular concerns raised by Council regarding traffic and transportation issues include:

- need to assess the proposal in the context of an up to date metropolitan freight strategy and South-eastern Sydney road network strategy;
- need for EIS to addresses matters deferred in the assessment of the recently approved Patrick's DA;
- traffic assessment conclusions being based on flawed data;
- need for a revised traffic assessment prior to determination of the DA to address specific omissions raised by Council;
- rail assessment lacks proper assessment as to whether or not the 40% rail mode can be achieved;
- EIS lacks assessment of intermodal terminal locations;
- Rail duplication impact should be assessed in the EIS.

The Department is still expecting a revised submission from Botany City Council.

Department's Position

Local and Regional Traffic Impacts

The Applicant argues that the local and regional road network, with some selected improvements at the intersection of Foreshore Road and Penrhyn Street, will be able to cope with the expected increases in traffic. The main points supporting this position are:

- the current road network generally performs at levels of service which are satisfactory for urban areas and that, consequently, capacity exists to absorb additional traffic; and
- the additional traffic generated by the port's expansion would represent a comparatively small proportion of even local traffic levels, and a very small proportion of traffic on the regional roads.

The Department recognises the logic of this position and broadly supports the EIS's conclusions in relation to regional and local traffic capacity. The analysis has been undertaken by appropriately skilled traffic modellers, and while the modelling techniques used do have some limitations (passenger traffic and AM peak focused), the Department considers that the assumptions used in the modelling process are sound and acceptable.

However, the Department believes that the proposed intersection upgrades, which are suggested for future implementation, should be undertaken within five years of any new container terminal opening. The rationale for such a position is that it is considered that the substantial investment in expanding the port should not risk being compromised by less than efficient land-side access arrangements. In addition, based on the findings of the Applicant's supplement to the EIS, there is potential for the need to provide additional right turn capacity (Botany Road (east) into Botany Road (south)). This need will occur if the Applicant's proposed

40% rail modal split objective is not achieved. The Department therefore considers that detailed monitoring of modal split achievements and intersection performance would be required regularly during the construction and operation of the proposal to determine the need and timing of such an improvement to the intersection. If monitoring determines that the local intersection works are required it is considered that the Applicant should contribute the works.

While both local Councils (Randwick and Botany Bay) have raised a number of concerns about localised traffic impacts, the Department considers that these issues are capable of being addressed through appropriate and detailed mitigation measures.

Finally, an important point to consider in relation to the traffic assessment is that it is all based on a conservative approach to road's share of the overall transport task at the port. While the rail mode share is currently above 20%, is increasing and is forecast to grow towards 40%, all of the traffic modelling has assumed that a 20% mode share is achieved. This assumption has the effect of generating additional levels of traffic for the road network, effectively allowing a margin of error to be factored into the traffic assessments.

Local Rail Network Impacts

The recent improvements to the Cooks River – Botany Yard rail line mean that sufficient capacity exists in the short term to continue to achieve increases in rail's mode share. Proposed improvements to the Patrick Terminal will also address localised rail issues, should that project proceed, by removing the conflict between truck and train movements. However, noise issues associated with additional rail activity should be carefully addressed (see section 7.2 for more detail).

Rail Mode Share

As noted above, both the Applicant and the NSW Government are committed to increasing the share of container transport to and from the port by rail. Increasing the rail container transport is clearly a supportable proposal. Expansion of the port has the potential to contribute to this by providing increased economies of scale for bulk rail movements, and by undertaking selected localised improvements which will support more efficient rail operations.

As noted in section 4, DIPNR strongly supports the increased reliance on rail, but is concerned that a number of strategic issues remain unresolved at this stage to warrant less than complete confidence in the Applicant's mode share target of 40% being achieved. While it is acknowledged that the Applicant's traffic analysis was based on a conservative approach to rail's mode share, it is considered that there are substantial remaining risks to achieving the target, and thereby achieving more efficient transport access to and from the port.

These risks, which are raised but not systematically addressed in the EIS, include:

- the need for changes to signalling systems and train headways on the metropolitan network;
- the need to provide increased reliability through provision of more freight train paths on the metropolitan rail network;
- the potential need for increased shunting capacity at Cooks River but, at the same time, the limited ability to provide this capacity;
- uncertainty over the timeframe for completing the fourth stage of the rail upgrade;
- the looming need for substantial increases in intermodal terminal capacity within the Sydney metropolitan area, and the apparent difficulties faced in either expanding the capacity of existing terminals or developing sufficient additional capacity at other locations; and
- the apparent need for longer passing loops in rural areas, but the limited ability of the metropolitan network to handle longer freight trains.

The Department is working closely with other government agencies (RailCorp and RTA) and industry to develop a comprehensive framework to address many of the risks identified above. It is appropriate that these risks are properly dealt with by Government in a wider strategic planning context (current investigations into the development of a Metropolitan Intermodal Freight Strategy, which is expected to be finalised for inclusion in the Metropolitan Strategy

(refer to section 4 for more detail). If these risks are successfully addressed through the current investigations into the development of a Metropolitan Intermodal Freight Strategy the Applicant could be required to enforce a plan to ensure the use of rail freight facilities to achieve the Applicant's proposed 40% rail modal split objective.

Cumulative Assessment of Development Proposals

The transport study supporting the EIS appears to have taken into account all the known (at the time of the report's preparation) major development proposals in the wider area. This was an important requirement given the high level of development activity in this dynamic area of Sydney.

The Department's initial submission to the COI indicated that some risks were considered to remain in regard to cumulative traffic impacts. Given the scale of proposals being considered, and the potential traffic implications, it was considered that further investigation of this issue by the Applicant was warranted prior to the Department finalising its assessment. Subsequently the Department's independent review of the EIS supplement identified that future problems at a number of intersections within the study network. However, these problems may not be caused entirely by Port generated traffic, being only a fraction of the traffic generated by other developments. The Department considers that these problems are therefore a broader issue for Government agencies generally to address. However, it is also considered that the Applicant would be required to agree on a suitable proportional contribution to the maintenance of these problems. The details of such agreement would need to be developed in consultation with the RTA as a minimum.

Road Based Transport Efficiencies

The EIS assumes that increased efficiency in road-based freight transport will enable transport impacts to be mitigated. These efficiencies are assumed to be delivered through increased backloading of trucks (and hence less traffic associated with container repositioning) and through an increased ratio of TEU to truck numbers, through increased use of 40 foot containers and higher capacity trucks.

DIPNR initially considered that these initiatives are supportable, but did not consider that sufficient evidence was provided in the EIS to support these assumptions. Backloading of containers is reportedly at low levels (8%), but is expected to nearly triple to 23% by 2021. The magnitude of this increase off a low base is sufficient to warrant a degree of caution. The Applicant has subsequently made a commitment to continue to work with stevedores, freight forwarders and the trucking industry to achieve a greater rate of backloading. In addition, it is argued that there are commercial incentives for operators to achieve these efficiencies. This response is considered acceptable.

Methodologies

The Department considers that methodologies used to assess both future rail and road demands are broadly supportable. The analysis of localised rail impacts is considered sound, and is based on a clear understanding of the rail operations both at the port, along the Cooks River – Botany Yard line and at both the Cooks River and Botany yards.

The traffic analysis techniques are also broadly recognised as being supportable, particularly given the conservative approach taken. However, there are a number of limitations in the traffic modelling, including the fact that the model focuses on the AM peak period when the port operations are expected to expand to 24 hours, seven days operation. The model is also largely based on trip tables which reflect commuter traffic flows, and which do not model freight movement as effectively. However, industry-wide limitations in this regard need to be recognised and acknowledged. DIPNR believes that concerns in this regard are able to be countered by both the conservative approach taken to the rail – road modal breakdown and the fact that while truck numbers are large, they still represent a small proportion of overall current, and importantly, future traffic levels in the region surrounding the port. In addition the Applicant has subsequently indicated that daily profiles of traffic activity were examined on selected roads.

Mitigation and Management Measures

The Department considers that the potential local and subregional traffic and transportation impacts of the proposal can be adequately addressed through the mitigation and management measures proposed by the Applicant only if those mitigation measures are complemented by the additional measures:

- the need for a Construction and Operation Traffic Management Plan to be prepared by the Applicant in consultation with DIPNR, RTA, Botany and Randwick Councils and the Southern Sydney Region of Councils. The detailed requirements of such a management plan will need to be discussed with these stakeholders.
- the need for detailed design plans to be developed by the Applicant and approved by the RTA that demonstrate a number of the local intersections would operate with optimum level of service, including:
 - Foreshore Road/Botany Road.
 - Foreshore Road/General Holmes Drive.
 - General Holmes Drive/Botany Road.
 - Botany Road/Container Road Access.
 - Botany Road/Bumborah Point Road.
 - Botany Road/Beauchamp Road.
- The need for the Applicant to provide a safety audit for any road works, traffic management facilities, provisions for pedestrian and cyclists. The audit would need to be undertaken in accordance with RTA guidelines upon completion of works but prior to their operation and use.
- The need for a comprehensive “handbook” to guide drivers of port related vehicles on accepted routes, constraints to traffic and preferred hours of use and amenities on such routes prior to completion of the construction.
- The need for the Applicant to establish a formal mechanism for continued liaison with the RTA, Botany and Randwick Council on matters relating to traffic control on heavy vehicle routes to ensure adequate enforcement of traffic management measures and optimum road operating conditions in the vicinity of the port area.

Conclusion

The Department supports the Applicant’s objective of a 40% rail mode split. It is also considered that a number of mitigation and management measures would need to be developed prior to construction. These measures are particularly listed in the mitigation and management section above, the detail of which would need to be developed in consultation with the RTA, State Transit Authority, Botany and Randwick Councils. In addition an agreed road infrastructure contribution package needs to be reached between the Applicant and the RTA.

As discussed in section 4 of this report the Department is also coordinating investigations into the development of a Metropolitan Intermodal Freight Strategy in partnership with the RTA, Railcorp and industry stakeholders. The investigations into the development of a Freight strategy directly addresses network and intermodal capacity issues associated with an increased rail mode share. The investigations into a Strategy are due to be completed for inclusion in the Metropolitan Strategy.

7.2. Noise Impacts

Applicant's Position

A construction and operational noise assessment for the proposed expansion of the container terminal facilities at Port Botany was conducted by Wilkinson Murray Pty Ltd on behalf of Sydney Ports Corporation (SPC). The key steps in the noise assessment were as follows:

- measurement of existing noise environment at receivers potentially affected by the proposal;
- establishment of project operational and construction noise assessment goals;
- prediction and assessment of future operational noise levels from the proposal with regard to rail, traffic and port noise;
- prediction and assessment of noise and vibration from construction activities; and
- consideration and recommendations to mitigate operational and construction noise levels.

Construction Noise

The construction phase noise impact assessment was assessed against relevant guidance in the Environmental Noise Control Manual (ENCM). The EIS indicates a range of construction activities will occur including earthworks, rock breaking, pile driving, and general construction of facilities such as the administrative building, dredging, etc. Typically the assessment suggests that daytime construction noise criteria can be met. However, there would be some noisier activities, particularly piling, that will generate noise levels which will exceed the construction noise criteria at the nearby residences.

It is proposed that the majority of construction activities would occur during daytime (SPC proposes construction hours of 7am to 6pm, 6 days per week). However, some activities, particularly dredging, would also be undertaken at night. The noise assessment suggests that dredging would meet night time noise criteria.

SPC recommend a construction noise management plan that would include:

- noise mitigation for piling works;
- noise mitigation for diesel powered machinery;
- provision of training to ensure that construction workers are aware of the noise created during construction and are appropriately trained to minimise noise where possible;
- complaints response process; and
- compliance checking through noise monitoring.

Operational Noise

The operational phase noise impact assessment was assessed considering the Industrial Noise Policy, the Environmental Criteria for Road Traffic Noise and sections from Environmental Noise Control Manual (ENCM) concerning sleep disturbance and rail noise.

The EIS has presented measurement data of the existing noise environment at receivers potentially affected by the proposal and established project operational goals. The operational noise criteria proposed in the EIS are presented in Table 1. The assessment has focused on night time criteria as the proposed Terminal would operate 24 hours.

Table 1: Noise Criteria Proposed in the EIS

	Intrusive Noise Criteria, $L_{eq, 15minutes}$, dB(A)			Amenity Noise Criteria, $L_{eq, 15minutes}$, dB(A)	Sleep Disturbance Noise Criteria, $L_{1, 1minute}$, dB(A)
	Day	Evening	Night	Night	Night
1. Chelmsford Avenue	54	50	41	40	51
2. Dent Street	52	48	41	40	51
3. Jennings Street	45	44	45	39	55
4. Botany Road (north of golf club)	62	55	48	40	58
5. Australia Avenue	47	45	47	38	57
6. Military Road	51	51	50	40	60

Noise level predictions for the proposed expansion of the Port Botany container terminal in the absence of noise controls show that the proposed expansion would result in noise levels which will significantly exceed noise level criteria (by up to 10dB) at residential locations to the north. As such Sydney Ports have assessed all reasonable and feasible noise mitigation. Using the preferred option of a 4 metre noise barrier located along the terminal boundary and noise controls to machinery, the predicted noise levels would be between 0 and 5dBA above the proposed noise criteria. The EIS states, however, that these predicted noise levels, even though they exceed the noise criteria, would be below existing high ambient noise levels in these areas and would only increase existing industrial noise levels by 1dBA, an increase which is imperceptible to the human ear.

Besides the noise controls mentioned above to mitigate the predicted impacts SPC recommended that a Noise Management Plan outlining Environmental Management procedures to assess and reduce noise levels (where possible) be developed for the operation of the proposal. This Noise Management Plan would include:

- Options for equipment alarm operation;
- Machinery noise control;
- Operator awareness and training;
- Complaints handling; and
- Noise monitoring.

The EIS states that traffic noise levels as a result of potential increases in truck movements from the proposed expansion of the Port Botany container terminal will comply with EPA traffic noise criteria. The contribution to overall traffic noise levels from all port trucks would not increase existing noise levels by more than 2dBA. The EIS recommends that a Port Traffic Noise Management Plan be produced. This plan should consider:

- Traffic re routing;
- Traffic clustering; and
- Traffic rescheduling.

Additional trains on the Botany Freight Rail Line, as a result of the Port Botany Expansion, have also been assessed in the EIS and it is stated it would not result in significant increases in noise at residential areas adjacent to the line.

Issues Raised in Submissions

Public Submissions

Of all submissions received by the Department during the exhibition periods (exhibition of the EIS and additional information), 73.5% of submissions specifically referred to noise issues. The key issues raised were:

- Currently high noise levels around the port, particularly at night; new proposal will increase noise levels;

- Increased noise impacts from road traffic; and
- Increased noise impacts from along rail corridor.

Government Agencies and Council Submissions

Randwick Council (initial and additional submission) suggests that the proposal:

- does not adequately address all noise impacts including operational, road and rail freight noise due to the fact that the EIS does not consider the intensification of the land use and the impact of the change from a 16 hour / 5.5 days to 24 hour operation;
- does not consider the movement of containers, and potential for dropping containers, in sufficient detail, particularly at night when ambient noise is low;
- potentially underestimates the noise impacts;
- that residential areas outside of Randwick City Council do not meet the relevant noise criteria and that the EIS noise mitigation is reliant on new technology that currently does not exist;
- the EIS only provides noise impact assessment for the Applicant's forecast 2011 40% modal split scenario. There is no assessment of increase noise impacts from trucks should the rail infrastructure be delayed or not proceed.
- inadequate assessment of the rail noise impacts particularly 24 hours freight operations are not adequately considered. Rail shunting has not been adequately assessed;

City of Botany Bay (COBB) in their initial submission stated the following:

- COBB have the following noise policy for the purpose of controlling industrial noise:
 - night-time planning goal of $L_{Aeq\ 15min}$ 50dB(A) for residential areas;
 - night-time noise contributions from new developments limited to $L_{Aeq\ 15min}$ 40dB(A);
 - daytime noise contributions from new developments limited to $L_{Aeq\ 15min}$ 50dB(A)
 - no 24 hour truck movements on local residential roads.
- Ambient background noise should have been recorded over a greater period of time to provide a more reliable source of ambient noise data.
- Noise Assessment (NA) not consistent with INP
- The NA identifies that residential properties would also experience noise levels that exceed the ENCM sleep disturbance criterion.
- The NA fails to consider the cumulative noise impact effects from the SPC construction activities, the Patrick construction activities and the operation of the existing port facility.
- The NA incorrectly applies the CoRTN noise model to calculate the increased level of noise as a result of the proposed development.
- The traffic noise modelling assumes that 40% of the containers would be transported by rail, but if this percentage is not achieved the truck noise could increase;
- Recommend the extension of the acoustic mounding along Foreshore Road. This could provide a significant noise reduction to road traffic noise from Foreshore Road and a reduction to operational noise from the port activities.
- The NA identifies that a total of 23 buildings (houses and units) will be exposed to rail noise levels that exceed the $L_{Aeq\ 24\ hour}$ 60dB(A) noise criterion.
- At the time of writing the Department had not received an additional submission from Council.

The Department of Environment and Conservation (DEC) in there submission generally concur with the Applicant's noise assessment. DEC notes, if requested, it could provide relevant terms of the environment protection licence (EPL) to assist formulation of appropriate consent conditions.

DEC has provided some issues that require clarification:

- DEC considers that the impact of construction noise on non-residential receivers (such as schools, nursing homes) should be evaluated with particular regard to impulsive noise from pile driving activities.
- Conditions of consent should limit construction hours to Monday to Friday 7am to 6pm and Saturdays 8am to 1pm. Audible construction activities outside standard hours should not be permitted.
- Ranking of noise sources should be provided to facilitate identification of noise mitigation.
- To better inform any determination, barrier option 3 should be modelled to demonstrate the

-
- effect the barrier would have on mitigating construction noise and traffic noise.
- DEC supports the combination of barrier options 1 and a potentially reduced horizontal extent of barrier option 3 (subject to modelling) as best practice feasible and reasonable noise barrier measures.
 - The Commission should consider the most appropriate means for an assessment of potential Port-related traffic noise 'hot-spots' further along the road network to be undertaken.
 - Designated truck routes should be considered to avoid new residents being introduced to truck noise.
 - DEC considers the impacts of rail noise on sensitive receivers on the Botany Yard to Cooks River section of the freight rail line has not been fully assessed and this should be redressed by the proponent and/or Railcorp.
 - The noise assessment may have underestimated rail noise impacts arising from the proposal on the basis that increases in maximum noise impacts were not considered and the potential increase in LAeq,24hr levels may have been underestimated due to introduction of older, noisier locomotives. This should be redressed by the proponent and/or RailCorp.
 - The Commission should consider the role of planning instruments to avoid rezonings that introduce new residents to areas adversely affected by noise from Port-related rail movements without appropriate mitigation.
 - At the time of writing the Department had not received an additional submission from DEC.

NSW Health in their submission raises a number of noise issues. In summary the key comments include:

- That the EIS highlights some significant operational noise issues that are likely to impact the local community. While an operational noise management plan may assist in reducing some impacts, there is still likely to be noise impacts on residences from the proposed development.
- Considers basis for specific noise management plans for road traffic and rail traffic noise.
- Considers that to better understand population health outcomes to marginal changes in noise levels, the occurrence and severity of the noise impacts on health of the potentially affected population could be further investigated and defined.

Department's Position

Construction

The Department considers that the construction noise impact assessment presents a reasonable description of the construction noise impacts.

The construction hours proposed by SPC exceed standard DEC construction hours. The Department considers that standard construction hours should be maintained, namely:

- Monday to Friday 7am to 6pm; and
- Saturdays 8am to 1pm.

The Department considers that dredging could occur at night as long as all night time construction noise criteria are met.

The Department supports the SPC's commitment to the development of a construction noise management plan.

Operation

Subsequent to the Department's initial review of the EIS, it required additional information or review from SPC on the following issues:

Background Noise

DIPNR requested the review of existing noise data for locations 2, 4 and 8. This was to ensure applicability of the proposed noise criteria (particularly sleep disturbance criteria) to the closest

residential receivers (houses neighbouring the golf course and the houses backing the Sir Joseph Banks Park).

Equipment Sound Power Levels

DIPNR requested possible methodologies to reduce existing equipment noise levels by the suggested 6 dB.

Ship Auxiliary Power Units

DIPNR requested review of assumed sound power levels and assumed modelling locations for the APUs (6 metres above ground).

Noise Modelling

- DIPNR requested justification for the use of 90 percentile approach to predict noise levels from the Terminal including the appropriateness of the correction for equipment down time - 1.25 hours.
- DIPNR requested confirmation of noise modelling, in particular whether it was based on 15 minute Leq or Leq period levels.
- DIPNR requested the barrier option analysis to be expanded to include possible net benefits from option 3 in terms of reduced traffic noise from Foreshore Road. The assessment of sudden noise impacts on bird habitat should also be considered. This analysis should also extend to the potential for option 3 to mitigate construction noise.
- DIPNR requested details (wind roses and tables) of the meteorological assessment which concluded North Westerly winds greater than 30% and temperature inversions less than 30%.

Amenity Criteria

DIPNR requested Sydney Ports to consider exacerbation of already high ambient noise levels in the area. That is ambient levels exceed “maximum amenity criteria” in INP.

Rail Noise

DIPNR requested review of the rail noise assessment, as the assessment relied upon a noise assessment (conducted by RailCorp for the purpose of a REF for duplication of the rail line) that is flawed in terms of rail noise criteria it used. The EIS does not identify impacts associated with increased rail traffic movements in the absence of the duplication.

Traffic Noise

DIPNR requested review of the traffic noise assessment using absolute noise levels Leq 1 hour and Leq (day and night) at the three assessment locations shown in the EIS.

SPC has provided the following documents to respond to DIPNR’s concerns:

- April 2004 letter from SPC ‘Port Botany Expansion – Response to issues raised by DIPNR, DEC and Department of Health on the noise assessment for the Port Botany Expansion’; and
- Correspondence from Wilkinson Murray – ‘Response to DIPNR / DEC Comments from Meeting on Wednesday, 3/3/04’ dated 31 March 2004.

The Department generally concurs with the background noise levels and the noise criteria presented in the EIS. It is acknowledged that SPC have tried to consider reasonable and feasible noise mitigation to minimise impacts on sensitive receptors in the spirit of the Industrial Noise Policy. However, the Department still identified some concerns with regard to the noise impacts presented in the EIS which require further clarification.

Amenity Criteria

It is clear from the noise assessment that the new terminal would increase industrial noise levels in an area where existing industrial noise levels are already high. The EIS downplays this increase by stating that the predicted noise levels would be below existing high ambient noise levels in the area and would only increase existing industrial noise levels by 1dBA, an increase

which is imperceptible to the human ear. The predicted noise levels are presented in Table 2 below.

Table 2. Predicted LAeq, 9hours for the Proposed New Container Terminal Operations Compared with Future existing Port Operations (Reproduced from Wilkinson Murray Noise Assessment Table 5-4)

Location	Weather Conditions	Future with Expansion L _{eq, 9hour}	Future without Expansion L _{eq, 9hour}
Location 1 Chelmsford Avenue	Isothermal	44	43
Suburban	Wind 3m/s from NW	42	41
Location 2 Dent Street	Isothermal	49	48
Suburban	Wind 3m/s from NW	47	46
Livingstone Avenue	Isothermal	46	45
Suburban	Wind 3m/s from NW	44	43
Tupa Street	Isothermal	47	46
Suburban	Wind 3m/s from NW	45	44
Waratah Road	Isothermal	48	47
Suburban	Wind 3m/s from NW	46	45
Location 3 Jennings Street	Isothermal	41	41
Suburban	Wind 3m/s from NW	44	43
Location 4 North of Golf Course	Isothermal	53	52
Urban	Wind 3m/s from NW	51	50
Location 5 Australia Avenue	Isothermal	44	44
Suburban	Wind 3m/s from NW	46	46
Location 6 Military Road	Isothermal	47	47
Suburban	Wind 3m/s from NW	54	54

The SPC comments need to be put into context with the recommended noise levels from industrial noise sources presented in the INP. The INP recommends the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 3. Table 3 also includes recommended maximum noise levels for different land uses where the recommended maximum values provide guidance on an upper limit to the level of noise from industry.

Table 3. Amenity Criteria (Reproduced from Industrial Noise Policy)

Type of Receiver	Indicative noise Amenity Area	Time of Day	Recommended LAeq Noise Level dB(A)	
			Acceptable	Recommended Maximum
Residence	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50

Comparing the predicted night time $L_{Aeq,9hour}$ levels with the ambient criteria presented in the INP it can be seen that most areas are above acceptable recommended $L_{Aeq,9hour}$ levels if not above the recommended maximum levels. Therefore the proposed 1 dB increase in industrial noise around the Port Botany area could be more severe than suggested in the EIS. The Department's initial submission considered that this issue requires further investigation by SPC. For example, the INP suggests that acceptable and recommended maximum L_{Aeq} noise levels can provide a guide to applying the negotiation process set out in Section 8 of the INP. While negotiation between the proponent and the community for an agreed noise level can occur at any time, typically the proponent would negotiate with the EPA where noise-level emissions fall between the acceptable and recommended maximum. For site levels beyond the recommended maximum levels, the proponent would need to negotiate directly with the community.

The Department has now reviewed an additional response by the Applicant and DEC's initial submission to the COI. The Department supports DEC's view that on the basis that all feasible and reasonable mitigation is being incorporated into the proposed activity, the exceedances of $L_{Aeq,9hr}$ criteria are not such as to require negotiated agreements provided for in the INP. This support is subject to compliance with predicted operational noise levels and implementation of proposed mitigation measures. The Department would also need to be satisfied that all feasible and reasonable mitigation measures are developed.

Noise Modelling

- The Department initially raised concerns regarding the noise assessment assumptions of 90th percentile operational capacity for the new terminal as representing 'typical worst case scenario' and the equipment down time. The Department sought additional information, including that assumptions need to be supported by actual Port operational statistics. The Applicant has subsequently provided operational statistics as follows:

Analysis has been performed on the berth occupancy of Patrick Port Botany terminal, which is considered to be most similar to the new terminal. The analysis was performed on ship visits to the Patrick berths during the 2003 calendar year to determine the number of days which had 1, 2, 3, or 4 vessels berthed at any one time. It showed that there were 58 days in the year (16% of the year) which had 4 vessels berthed simultaneously for some part of each 24 hour period.

Analysis was then performed on the 58 days when there were 4 vessels berthed to determine how long all four berths were occupied simultaneously. The results showed that there were 11 days where the 4 berths were full for greater than 12 hours (ie 3% of the year) and that there were 31 days where the 4 berths were full for greater than 6 hours (about 8% of the year). On the basis that on approximately 8%

of days the berths were occupied at capacity for over 6 hours simultaneously, the assumption that a 90% operation capacity is considered appropriate.

DEC in its initial submission to the COI recommended a consent condition requiring an operational analysis informed by long term operational statistics from the existing Ports manager to confirm the adequacy of the 90% operational capacity. The Department considers the Applicant's response is generally an acceptable basis for the assumptions of 90th percentile operational capacity for the new Terminal as representing 'typical worst case scenario' and the equipment down time. However the Department supports DEC's recommendation for an ongoing operational analysis.

- A noise Barrier Option 1 is presented as the preferred noise mitigation option in the EIS on the basis that it would provide the greatest level of attenuation from port activities, was situated on port owned land, close to the noise source and afforded a level of protection to the Estuary and beach. Barrier option 3 would have the additional effect of mitigating noise from Foreshore Road in the order of 7-10 dB(A) and also has the potential to mitigate construction noise if built early in the construction phase. The Department initially considered that a combination of barrier options 1, 2 and 3 could provide a better holistic outcome than that provided by the SPC preferred option 1 only. The Department considered that this issue requires further investigation by SPC. The Applicant subsequently replied to the Department as follows:

Sydney Ports would consider a reduced extent of barrier option 3, together with barrier option 1, such that the barrier would be placed at the location of the proposed intersection to the new terminal, to mitigate noise arising from the use of the new intersection. Agreement to such an option is subject to confirmation of the cost-effectiveness of the barrier in this location and agreement by the community of the associated visual impacts.

The Department has considered the Applicant's response above and DEC's initial submission to the COI. The Department supports the DEC recommendation that to better inform any determination, barrier option 3 should be modelled to demonstrate the effect the barrier would have on mitigating construction noise and traffic noise and that a combination of barrier options 1 and a potentially reduced horizontal extent of barrier option 3 (subject to modelling) as best practice feasible and reasonable noise barrier measures.

- The noise modelling has been based on amenity noise criteria of $L_{Aeq, 9hour}$ which is quite appropriate for an area where existing noise levels are high. However, the assessment has not considered intrusive noise criteria ($L_{Aeq, 15minute}$) which are recommended in the INP as well. The Department initially considered that SPC should assess short term intrusive noise impacts from the proposed Terminal. The Department has reviewed the following response provided by the Applicant:

Sydney Ports did consider the intrusiveness criteria for the area which is presented in section 4.1.1 of the Noise Impact Assessment (refer Appendix Q of the EIS). As the intrusiveness criteria are in all cases greater than the project specific amenity criteria, the amenity criteria become the project specific criteria (and are the more conservative criteria).

The DEC stated in their submission that "DEC concurs with the presented PSNL (project specific noise levels), which consistent with the INP are based on the amenity criteria as this represents the more stringent noise level requirement."

The Department considers the above response from the Applicant to be acceptable.

Road Traffic

The EIS has correctly identified the appropriate criteria from the NSW Environmental Criteria for Road Traffic Noise (ECTRN). The Department considers that the proposed Port expansion has the potential to increase traffic noise impacts. The Department notes that the traffic noise increments attributed to the proposed development are less than the 2dB(A) incremental recommended for existing traffic noise levels exceeding 60 dB(A) by day and 55 dB(A) at night.

The Department supports the SPC commitment to the development of a Port Traffic Noise management plan which would consider:

- Traffic re routing;
- Traffic clustering; and
- Traffic rescheduling.

The Department considers that such a Port Traffic Noise management plan should, to avoid future land-use conflicts, holistically review traffic noise impacts for the Port Botany Area in consultation with all relevant stakeholders, to identify long term solutions for the area.

The traffic noise modelling in the EIS assumes that 40% of the containers would be transported by rail. If this percentage is not achieved more freight would be transported by truck thus potentially increasing noise. The Department considers that the traffic noise assessment should consider the traffic noise impacts if the Applicant's goal of 40% of containers transported by rail is not achieved. The traffic noise assessment should consider the impacts under both current levels of freight moved by rail and road and also an intermediate level of freight moved by rail and road. The Department has now reviewed additional information provided by the Applicant as follows:

..... the following response gives consideration to traffic noise impacts should the 40% rail mode share goal not be achieved. In general terms, in order for there to be a 2dB increase in truck traffic noise due to the new terminal, truck traffic from the new terminal would need to increase the total vehicle movements from all truck traffic sources in the area at the time by approximately 60%. Such an increase is unlikely to occur. It should be noted that this assessment does not include other traffic sources, which would reduce the overall impact of change in traffic noise from the new terminal.

Hence it is considered that should less than 40% of cargo travel by rail, changes to traffic noise levels attributable to the new terminal would still be likely to be less than 2dB and therefore barely perceptible.

The Department considers the above response from the Applicant to be generally acceptable.

Rail Noise

The rail noise assessment presented in the EIS was conducted by RailCorp for the purpose of a REF for duplication of the rail line. The rail noise assessment used "maximum levels" rail noise criteria presented in the Environmental Noise Control Manual ($L_{Aeq,24hr}$ 60dB(A) and L_{Amax} 85dB(A)) to assess rail noise impacts on the line.

The ENCM rail noise criteria also presents planning levels that are $L_{Aeq,24hr}$ 55dB(A) and L_{Amax} 80dB(A). The Department supports DEC's position that an assessment of impact should focus on seeking to achieve the planning levels through the application of all feasible and reasonable noise mitigation measures. If planning levels are not achievable then all reasonable or feasible noise mitigation should be provided.

The Applicant has responded to the Department's initial submission to the COI. However this response has not addressed the issues raised. Therefore the Department considers the issues remain as outstanding as listed in this submission. In addition, at the time of writing the Department had not received a revised submission from DEC. The Department initially

considered that DEC's review of the additional response provided by the Applicant through the Applicant's initial submission to the COI is required to enable the Department to finalise its assessment. DEC's initial submission to the COI provided this review with recommendations as listed below:

The Commission should note that DEC considers the impacts of rail noise on sensitive receivers on the Botany Yard to Cooks River section of the freight rail line has not been fully assessed and this should be redressed by the proponent and/or Railcorp.

The Commission should note that the NIA may have underestimated rail noise impacts arising from the proposal on the basis that increases in maximum noise impacts were not considered and the potential increase in LAeq,24hr levels may have been underestimated due to introduction of older, noisier locomotives. This should be redressed by the proponent and/or Railcorp.

The Department supports DEC's initial submission and considers the issue of rail noise requires further assessment. The Department understands that Railcorp is committed to working with the Applicant with scoping of any further noise assessment to enable Sydney Ports to work through these issues with DEC. The Department considers the Applicant should be required to assess the impacts of rail noise and identify appropriate noise mitigation measures to the satisfaction of DEC. It is considered that this additional assessment would be completed prior to construction as a minimum.

Conclusion

The Department considers that while many of the noise impacts associated with the construction stage of the proposal can be generally managed through the implementation of appropriate mitigation and management measures, additional information is still required before the Department finalises its assessment. However, as identified above, the Department has highlighted a number of additional information requirements regarding rail noise impacts associated with the operation of the proposal. The Department will finalise its assessment once the additional information is received.

7.3. Impacts of Flora and Fauna (Aquatic and Terrestrial)

This revised submission provides comments on the proposal and is specifically informed by the following additional information provided by the Applicant:

- Sydney Ports Corporation Port Botany Expansion Primary Submission to Commission of Inquiry (May 2004).
- Sydney Ports Corporation Supplementary Submission to EIS (August 2004).
- Sydney Ports Corporation Port Botany Expansion – Penrhyn Estuary Risk Assessment (September 2004).
- Draft Review of the Potential Impacts of the Proposed Port Botany Expansion on Shorebirds – A Report to Sydney Ports Corporation by Doug Watkins (August 2004).

Aquatic Ecology

Applicant's Position

The EIS identifies the proposed changes to the study area that will have an impact on aquatic ecology including:

- a large increase in the amount of solid artificial structure with opportunities to enhance some of the structures to increase their biodiversity;
- a significant increase in the amount of saltmarsh habitat representing an increase of about 4% in area in Botany Bay;
- an initial loss of about half the remaining seagrass in the core study area, but in the longer term creation of up to twice as much seagrass habitat as will be lost by the development;
- a small decrease in intertidal beach habitat, but a large increase in sandy intertidal flats at Penrhyn Estuary;
- loss of a small stand of mangroves in Penrhyn Estuary representing less than 0.1% of mangroves within Botany Bay; and
- loss of a previously dredged hole and some areas of shallow subtidal sand habitat with the corresponding creation of a deep basin as an extension to the existing navigation channel.

The EIS identifies 39 species of aquatic fauna within or in the vicinity of the proposal site that have some form of conservation significance. Seven specific Eight Part tests as required under section 5A of the EP&A Act have been applied by the Applicant to marine species. An additional two generic Eight Part tests have also been applied to two groups, namely marine turtles and marine mammals plus whale sharks.

The aquatic ecology assessment presented in the EIS and above-mentioned Eight Part tests conclude that a Species Impact Statement (SIS) was not required for the proposal in respect of threatened species, populations or communities, as listed under the NSW Fisheries Management Act 1994, the NSW Threatened Species Conservation Act 1995 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Seagrass and mangroves

The Applicant has acknowledged in the EIS that up to 4ha of seagrass in the study area would be cleared by the proposal. This is a reduction in area from 9.7 ha to 5.7 ha. Seagrass impacted includes predominantly *Zostera*, small patches of *Halophila* and mixed beds of these two species. In addition a small patch of several square metres of *Posidonia* would be lost in the middle of Foreshore Beach whilst two other patches of a similar size occurring nearer the mouth of the Mill Stream channel would be retained. It is possible that there may be other small patches of *Posidonia* in the area and this would need to be confirmed prior to commencement of construction.

The Applicant proposes that the loss of seagrass would be addressed by a combination of seagrass transplanting and creation of compensatory habitat as discussed previously in section 2 of this report.

Impacts on Botany Bay and surrounds (outside of the study area)

The EIS explains that apart from levelling some high spots within the existing navigation channel, there would be no physical changes to the Bay outside the study area. In addition, the EIS claims that aquatic habitats elsewhere in the Bay would not be affected by the Port Botany Expansion. Changes in wave energy and direction are predicted to be small, with negligible effect on sensitive habitats such as Towra Point Aquatic Reserve.

The Applicant argues that there would be no change to freshwater ecosystems associated with the Mill Stream or Sir Joseph Banks Park and fish passage would not be impeded. There would be no impact to commercial fishing; however, there would be a loss of about 1.5% of Bay waters for recreational fishing. The new boat ramp and recreational area would, however, enhance the fishing amenity in this area.

The EIS also suggests that the existing stand of mangroves within the Estuary will be removed to facilitate the growth of saltmarshes and enhance the value of the area for wader birds.

Mitigation and management

The EIS provides details of a proposed restoration, habitat enhancement component of the Port Expansion. The restoration area within Penryhn Estuary includes:

- expanding saltmarsh habitat to up to 6 ha (by levelling existing fore dune) and removing mangroves;
- expanding intertidal sand and mud flats to about 12.5 ha with a substratum suitable for prey species, created by filling deeper areas of the Estuary;
- creation of up to 8 ha of seagrass habitat, distributed along the main tidal channel to the Estuary and in the entrance area to the Estuary (the EIS also outlines a proposal to relocate some seagrass to the terrace adjacent to the Parallel Runway);
- ensuring suitable tidal flushing and provision for water dispersal during wet weather events; and
- limiting pedestrian access and preventing access by boat into the Estuary.

The EIS also identifies a proposed monitoring program during construction and operation to evaluate the ongoing success of the restoration area and impacts of the proposal on aquatic ecology.

In addition the Applicant proposes to prepare a Marine Mammal Management Plan to ensure occurrence of marine mammals in the vicinity of the proposal is appropriately managed. The plan would be prepared in consultation with NPWS.

The EIS suggests that the proposed port expansion has been designed with the aim of minimising damage to aquatic habitats and, where possible, enhancing habitats. Monitoring and feedback to manage impacts of the proposal would be undertaken before, during and after construction of the new terminal.

The Applicant's position has not substantially changed from that stated in the EIS. The above mentioned additional documents have been provided to clarify the Applicant's position and provide detailed management responses to address potential impacts of the proposal and issues raised by the Department and other submissions made during the initial DA and COI exhibition periods.

Issues Raised in Submissions

Initial Public Submissions

Of all the submissions received by the Department, during the initial exhibition period, and the re-exhibition period, approximately 5% refer specifically to aquatic ecology issues. Key issues raised included:

- Dredging impact on seagrass and the fact that the majority of the Bay's seagrass population has already been lost to past development.
- Proposed habitat enhancement risk of failure is a concern. There is a lack of contingency habitat enhancements in the event of failure of the proposed enhancements.
- Impacts on Penryhn Estuary including: increased sedimentation; reduced tidal flushing; increased faecal coliform and hydrocarbon concentrations; temperature increases; dissolved oxygen level changes; increased risk of algal blooms; and the subsequent impact on existing and proposed enhancement area seagrass.
- Impacts on fish and fish breeding ground.
- Increased ballast water impacts on ecology.
- TBT toxic impacts on sea life.

Government Agency and Council Submissions

The Department received a number of Government Agency and Council submissions during the initial exhibition of the EIS. Submission which addressed Aquatic ecology issues included the Department of Environment and Conservation (DEC) and Botany City Council. In addition the Department has now viewed the NSW Fisheries primary submission to the Commission of Inquiry (now part of the NSW Department of Primary Industries).

NSW Fisheries

The NSW Fisheries submission to the COI raised a number of issues regarding aquatic ecology. The issues addressed in the submission included, seagrass, intertidal habitat, dredging, stormwater management, contaminants, acid sulphate soils, pest species, infrastructure construction and management of waterways crossing and recreational fishing issues. The submission provides specific recommendations in terms of management and mitigation measures that would need to be developed and implemented prior to any construction activities occurring.

In addition NSW Fisheries also raised the need for the Applicant to obtain a permit to harm vegetation under section 205 of the Fisheries Management Act, 1994 in regard to any proposal to remove marine vegetation. The Applicant would be required to submit a detailed management plan with any application for a permit. Requirements for the management plan have been provided in NSW Fisheries submission.

DEC

DEC's submission focuses on species identified in the proposal SIS and also issues associated with marine mammals. No comments have been made on terrestrial flora as the identified threatened vegetation communities and species in the vicinity of the project area are considered unlikely to be significantly impacted by the proposal. Key issues raised by DEC include:

- Marine Mammals and Marine Reptiles:

It is acknowledged that Chapter 19 of the EIS provides a brief review of the Marine Mammals that may be present in Botany Bay however the SIS does not address potential impacts from the proposal on marine mammals or marine reptiles. Although the Director-General's requirements for the SIS provided a list of species to be considered in the assessment that focussed on bird species, it was stated that the list is not exhaustive. DEC suggests that the following species should have been considered as these species, with the exception of the Sperm Whale and Blue Whale, have all been recorded in Botany Bay with increased frequency in recent years.

Table 3.2: Marine mammal and reptile species to be considered

Species	TSC Act Status
Australian fur-seal (<i>Arctocephalus pusillus doriferus</i>)	Vulnerable
New Zealand fur-seal (<i>Arctocephalus forsteri</i>),	Vulnerable
Blue Whale (<i>Balaenoptera musculus musculus</i>),	Endangered
Humpback Whale (<i>Megaptera novaeangliae</i>),	Vulnerable
Southern Right Whale (<i>Megaptera novaeangliae</i>)	Vulnerable
Sperm Whale (<i>Physeter catodon</i>)	Vulnerable
Loggerhead Turtle (<i>Caretta caretta</i>)	Endangered
Green Turtle (<i>Chelonia mydas</i>)	Vulnerable

DEC recommends that if the proposal is approved, a Marine Mammal and Reptile Management Plan be developed in consultation with the Department of Environment and Heritage and DEC.

DEC considers that any determination should examine the need for consent conditions that require contingency plans to be identified should the transplant of seagrass not be successful, including contingency offsets outside of the immediate study area.

DEC's concern is that if macroalgal blooms are likely then dangerously low DO levels are also likely. The increased risk of algal blooms, reduced light penetration and possible diurnal fluctuations in dissolved oxygen (DO) levels leading to very low night time levels all pose risks to maintenance and recolonisation of aquatic fauna. DEC provides a number of recommendations in this regard.

Botany City Council

Council's submission raised a number of key issues regarding potential aquatic ecology impacts, including:

- Previous attempts to transplant seagrass have achieved limited success.
- Sedimentation associated with disturbance of the seabed will significantly affect fragile seagrasses and also fish which have only recently received protection from commercial fishing.
- The EIS does not address:
 - Potential for displaced aquatic life to re-inhabit the transplanted seagrasses.
 - Will the time between removal and planting have short or long term impacts on aquatic life?
 - Is the compensatory seagrass habitat adjacent the parallel runway sufficient?
 - What is the likelihood that fish will seek out the seagrass in the enclosed channel when they are used to the open Bay?
- The impacts of maintenance dredging requirements on seagrass is not discussed in the EIS.
- The EIS is not supported by a strong enough argument that mangrove removal is required. Perhaps management of mangroves is a better solution.
- Council is concerned regarding habitat loss as a result of mangrove and shrubland removal.
- Increased sediment in the Estuary will affect all habitat including mangroves and saltmarsh.
- Council believes that the above issues should be addressed prior to determination of the proposal.

At the time of writing the Department had not received a revised submission from Council or DEC.

Terrestrial Ecology

Applicant's Position

The Applicant's position regarding terrestrial ecology is presented in the EIS. This position was summarised in the Department's primary submission and is provided below. The Applicant has

subsequently prepared an EIS supplement, Penrhyn Estuary Risk Assessment and Draft Review of the Potential Impacts of the Proposed Port Botany Expansion on Shorebirds (SIS peer review).

The Applicant's position has not substantially changed from that stated in the EIS. The above mentioned additional documents have been provided to clarify the Applicant's position and provide detailed management responses to address potential impacts of the proposal and issues raised by the Department and other submissions made during the initial DA and COI exhibition periods.

The EIS acknowledges that the proposed Port Botany Expansion would cause changes to the terrestrial environment on the northern shoreline of Botany Bay between the Parallel Runway and the existing port.

The EIS also reports that the findings of an Eight Part Test assessment on threatened and migratory species concluded that a Species Impact Statement (SIS) was required in respect of 23 shorebirds and one seabird that may be significantly affected by the proposal.

The SIS identified potential impacts from the proposal on these species as disturbance to feeding and roosting from a change in lighting regime, increased movement, noise from construction and operation of the proposed port expansion and potential flyway barriers due to the enclosure of Penrhyn Estuary. The SIS was undertaken for the following shorebirds and seabird (only common names are listed below):

<ul style="list-style-type: none">• Common Sandpiper.• Ruddy Turnstone.• Sharp-tailed Sandpiper.• Sanderling.• Red Knot.• Curlew Sandpiper.• Red-necked Stint.• Great Knot.	<ul style="list-style-type: none">• Double-banded Plover.• Greater Sand Plover.• Lesser Sand Plover.• Pied Oystercratcher.• Broad-billed Sandpiper.• Bar-tailed Godwit.• Black-tailed Godwit• Eastern Curlew.	<ul style="list-style-type: none">• Whimbrel.• Pacific Golden Plover.• Grey Plover.• Little Tern.• Grey-tailed Tattler.• Common Greenshank.• Marsh Sandpiper.• Terek Sandpiper.
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To compensate for potential impacts to shorebirds, the Applicant proposes to carry out measures to protect shorebirds and enhance their habitat at Penrhyn Estuary. These measures would entail substantially enlarging the existing area of feeding and roosting habitat as well as securing the site from disturbance from people, dogs and vehicles and shielding the estuary as far as practicable from the impact of port operations.

The Applicant also proposes to implement a range of shorebird and other monitoring studies to assist in both the assessment of impacts on shorebirds and their habitats at Penrhyn Estuary and provide a means for gauging the success of the enhanced shorebird habitat.

The EIS details proposed enhancements as:

- removal of 10.5 ha of planted shrubland from Penrhyn Estuary and approximately 1.0 ha of mangroves in Penrhyn Estuary; and
- creation of an additional 11 ha of intertidal flats and up to 5 ha of saltmarsh habitat, and up to 8 ha of seagrass habitat.

The Applicant also suggests that the removal of vegetation and mangroves in Penrhyn Estuary is a trade-off to enhance a recognised important migratory shorebird habitat site in Botany Bay and suggests that the removal should be viewed in this context.

Issues Raised in Submissions

Public Submissions

Of all the submissions received by the Department, during the initial exhibition period, 81.1% refer specifically to terrestrial ecology issues. Including submission received during the re-exhibition approximately 80.5% of submissions refer specifically to terrestrial ecology issues. Key issues raised include:

- Potential damage to bird life. Damage to habitat of migratory wader birds.
- Existing Port has already impacted on ecology.
- Impacts on Towra Point Nature Reserve.
- Support extension of shorebird habitat as a compensatory area.
- Suggestion for changes to proposed boardwalk area and need for an interpretation centre. Japanese examples referenced.
- Proposed habitat monitoring is considered unacceptable and there is a suggestion of extending habitat monitoring to ten years.
- There is a need to consider other compensatory habitat prior to development.
- Suggestion for qualified specialists is required to design, construct, monitor and manage compensatory habitat area.
- Suggestion compensatory habitat expenditure would be better spent on Towra Point.
- There is a need for contingencies if compensatory habitat is shown to fail.
- Suggestion of a need for more research of examples of similar compensatory habitat.
- Compensatory habitat should be provided at a ratio of 10:1.
- Potential for cumulative and indirect impacts on bird habitat at Shell and Taren Point.
- Ecological enhancement of Penrhyn Estuary should consider both foraging and roosting requirements of shorebirds.

Government Agency and Council Submissions

The Department received a number of Government Agency and Council submissions during the initial exhibition of the EIS. Submission which addressed Terrestrial ecology issues included the Department of Environment and Conservation (DEC) and Botany City Council.

DEC

DEC's submission focuses on species identified in the proposal SIS and also issues associated with marine mammals. No comments have been made on terrestrial flora as the identified threatened vegetation communities and species in the vicinity of the project area are considered unlikely to be significantly impacted by the proposal. Key issues raised by DEC include:

- Significance of the Bay for Wader birds:
 - DEC re-emphasises that the Bay represents one of the most important wader bird wetlands in NSW.
 - Acknowledges that past practices have significantly impacted on these important wetlands.
 - Cumulative impacts in the EIS does not address the impacts of past activities on these wetlands.
 - DEC considers that if Penrhyn inlet is lost, it is highly likely that some bird species may become locally extinct.
 - Penrhyn Estuary is both an important roosting and foraging site for Botany Bay shorebirds, as evidenced by the similar abundance and species occurrence patterns recorded at high tide and low tide respectively during the recent DEC surveys.
- Species Impact Statement Review:
 - SIS requires a signature from the applicant and the author.
 - DEC supports the likelihood of the species addressed in the EIS occurring at Penrhyn Estuary with the exception of the Little Tern. DEC understands that the Little Tern has been recorded using the site and it should therefore be considered as one of the subject species for the SIS.
 - DEC considers that the SIS meets the Director-General's requirements as issued and provides a sufficient basis on which to assess the proposal.

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- If not successfully ameliorated, the proposal will result in the loss of foraging and roosting habitat for the 24 threatened bird species listed in the SIS. Penrhn Estuary is an important roosting and foraging site for Botany Bay shorebirds. DEC notes that the SIS does not discuss the loss of foraging habitat for the Little Tern. Little Terns regularly forage at the entrance to Penrhn Estuary and DEC notes that the proposed changes to Penrhn Estuary may result in a loss of foraging habitat for this species.
 - DEC is concerned that birds currently using the sand spits within Penrhn inlet may not continue to do so in such close proximity to the proposed terminal wall and road.
 - It is considered that the proposal needs to address and discuss the issue of roost sites during and after the construction period. This includes the creation and maintenance of roost sites.
 - DEC is concerned about the status of the sand spit at the end of Penrhn Rd on the inside corner of the proposed new terminal. DEC highlights some inconsistencies in the SIS that need to be resolved in this regard.
 - DEC considers that the development, both during and post construction, is likely to result in disturbance to the birds that utilise Penrhn Estuary. This can have an effect on the ability of these migratory birds to fatten adequately during pre-migratory periods and may result in increased mortality during migration.
 - The proposed mitigative strategies detailed in the SIS and additional measures by Bassett (2003) regarding lighting impacts, should be required as conditions of consent, should the proposal be granted approval.
 - DEC is concerned about the impact of these increases in noise during the construction and operation phase on the continued use of retained and enhanced habitat by shorebirds. DEC questions whether the increased noise, particularly sudden noises, may result in the displacement of the shorebirds to sub-optimal habitat elsewhere. If the proposal is to be approved, the Applicant should address this issue more comprehensively. (Refer to noise section).
 - DEC is concerned about the potential entry/exit flyway barrier to shorebirds created by the proposal. The current wharf design combined with the presence of the adjacent rail line, stacked shipping containers and large cranes may present a significant deterrent to the shorebirds currently using the site by resulting in a 'boxing-in' of the estuary. The Applicant should address this issue in relation to the relative significance of species using the site.
 - DEC considers that the quality of water in the estuary is likely to be a critical factor in determining the success of the habitat enhancement works in the estuary. It is likely that water quality and tidal flushing of the estuary will be greatly reduced and may therefore substantially reduce the quality of shorebird habitat. DEC also considers that proposed works in Penrhn Estuary may dislodge environmental pollutants in the area which will add to the poor water quality and further impact on the estuary's ability to provide suitable foraging and roosting habitat for waders.
 - Furthermore, the EIS and SIS have not considered the increased chance of oil and chemical spills in Botany Bay due to increased boat activity from the port expansion and the consequent impacts on aquatic and terrestrial habitat. The applicant should also address this issue in greater detail in order to identify appropriate mitigation and management mechanisms.
 - DEC considers that the EIS does not adequately discuss alternatives to the proposal or justify the proposal in its current form. Although the EIS discusses the feasibility of using other ports in NSW and interstate, DEC considers that it has not fully addressed alternative sites or dock designs within Port Botany and has therefore not provided adequate justification for the preferred option.
 - Additionally, DEC considers that alternative reconfigurations of the proposal in its current form which may reduce the likelihood of impacts on shorebirds have not been adequately discussed. For example, reducing the northward expansion of the terminal, thereby providing a wider channel between the new terminal and Foreshore Beach, would allow for greater tidal flushing, provide a more open aspect for shorebirds and increase flyway width. Other options to investigate include provision of a tunnel or culverts under the terminal to allow greater freedom of tidal movement and the relocation of the tug boat and public boat

ramp facility which, as proposed, further narrows the entrance to the estuary. The applicant should address the feasibility of these alternative options.

- DEC provides a number of suggestions regarding the proposed enhancement of existing shorebird habitat.
- DEC has raised a number of issues regarding proposed construction sequencing. These comments relate to habitat works, the port facility, saltmarsh protection and transplantation, mangrove removal and control.
- DEC also provides recommendations regarding the proposed vegetation visual buffer and control of public access.
- DEC have made a number of monitoring and management measures in addition to those provided in the EIS.
- In addition DEC provide a detailed need for a peer review of the SIS and the need for a risk analysis a Risk Analysis on the maintenance of migratory shorebird habitat, water quality and seagrass transplantation in the estuarine system is also being prepared by the proponent in response to State agency concerns. DIPNR expands on this need in the Department's Position component of this section.
- DEC provides a summary of threatened species conservation recommendations. The Department understands that these are available in DEC's submission to the COI.

Botany City Council

Details of Council's initial submission was provided in the Department's submission to the COI dated May 2004. At the time of writing, the Department had not received a revised submission from Council or DEC. It is understood that a revised submission will be provided to the Department prior to the hearing of the COI.

Department's Position (Aquatic and Terrestrial Ecology)

Through a preliminary assessment of the DA and supporting EIS the Department established a detailed list of additional information requirements of the Applicant. As a result the Department coordinated a specialist estuary and ecology meeting between the Applicant, the Department and other Government agencies with interest in ecology including DEC, the Commonwealth Department of Environment and Heritage (DEH) and Fisheries. The specialist meetings were held on 16 and 18 March 2004. Additional information requirements raised by Government agencies and the Department are discussed in this Section. A number of these issues concur with those raised in public submissions and Council submissions.

Subsequent to the meeting the Applicant provided additional information to the Department and Government agencies in two letters of 20 April and 3 May 2004. The specifics of the additional information requirements are outlined in detail below. In summary additional information requirements related to:

- The need for a peer review of the proposed habitat enhancement plan and migratory bird impacts. The Applicant has subsequently engaged Wetlands International to undertake the work. At the time of writing the Department had reviewed a draft report.
- Success factors for saltmarsh transplanting and colonisation.
- Compensatory habitat offset package.
- Likelihood of success of the proposed Habitat Enhancement (development of a detailed risk assessment). The Applicant has subsequently undertaken the risk assessment.
- Marine mammal management plan requirements.
- Consultation with the Aboriginal community.

The Department has reviewed additional information provided by the Applicant, including the Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany. This review has concluded that there are still some outstanding issues that require further clarification from the Applicant. The outstanding issues relate mainly to the Penrhyn Estuary Risk Assessment and SIS Peer Review. The Department's position therefore focuses on these two documents.

In addition this section also provides summary comment on the status of issues raised in the Department's initial submission to the COI.

Aquatic and Terrestrial Ecology

Status of Comments Department's Assessment

The status of the Department's assessment is summarised in the table below. The majority of these comments relate to Aquatic ecology. The Department's comments regarding Terrestrial ecology have been addressed through the Applicant's preparation of a Risk Assessment for Penryhn Estuary and the SIS peer review. The Department's comment on the adequacy of these two documents is discussed specifically under the relevant subheading of this section.

Table 1: Department's Preliminary Assessment

DIPNR's Preliminary Assessment	Applicant's Response	Status
<p><i>Creation of saltmarsh/mudflat habitat for wading birds</i></p> <ul style="list-style-type: none"> Risks associated with the likely success of constructed wetlands. What is acceptable risk? <p>Lack of detail of proposed seagrass, saltmarsh and mudflat creation methodology. Secondary compensation details are required in the event that the saltmarsh and mudflat enhancement areas are not successful.</p>	<p>Penryhn Estuary Risk Assessment</p> <p>Committed to agree on the method with NSW Fisheries and DEC prior to undertaking works. Only small amounts of saltmarsh are to be transplanted, the remainder would be planted or naturally colonise. There is a high level of confidence that the saltmarsh planting would be successful as this has been undertaken successfully elsewhere within the local area and NSW. Examples where saltmarsh has been successfully grown and enhanced was provided in correspondence following lodgement of the EIS.</p>	<p>Additional information still required (details below).</p> <p>Need for an agreement supported by Department.</p> <p>Although the Applicant has provided examples of successful saltmarsh enhancement additional information is required regarding:</p> <ul style="list-style-type: none"> What level of saltmarsh cover is deemed acceptable? What is the likelihood of this cover being established in previously specified timeframes? What are the consequences of saltmarsh not being established? How will any risk be evaluated and mitigated?
<p>The areas of saltmarsh and mangrove to be rehabilitated and removed, respectively, are compared to estimates of bay wide areas of saltmarsh and mangrove areas cited in West et al 1985 p 93. More recent information is available in Watford, F.A. and R.J. Williams, 1998, Inventory of Estuarine Vegetation in Botany Bay, with Special Reference to Change in the Distribution of Seagrass. NSW Final Report Series No. 11., 50 pp.</p>	<p>This information would be unlikely to change the overall conclusion that the area of mangroves to be lost associated with the proposed habitat enhancement works is very small in comparison to the overall area of mangroves in Botany Bay and the area of saltmarsh to be created at Penrhyn Estuary is more significant than the area of mangroves lost given the much smaller area of saltmarsh in Botany Bay.</p>	<p>Additional reference to the more recent information available is still required to confirm the Applicant's expectation that conclusions are unlikely to change.</p>
<p>Ecological function. The former Department of Land and Water Conservation Discussion Paper on Compensatory Wetlands outlines principles for wetland compensation which highlight the need to replace not just a similar or larger area of wetland, but also ensure the wetland has the same values, services and functions as the wetland being destroyed by the development. The Applicant should address the principles and guidelines in this document.</p>	<p>The proposed development will not 'destroy' the values, services and functions of Penrhyn Estuary as it is proposed to retain the Estuary as part of the overall development. As such, a compensatory wetland is not being proposed as part of the development. The proposed habitat enhancement plan is aimed at improving the values of Penrhyn Estuary as a migratory and non migratory shorebird habitat.</p>	<ul style="list-style-type: none"> The Department considers the long term management and monitoring associated with the proposed enhancement works would need to make direct reference to the discussion paper. The proposed enhancement works in Penrhyn estuary will destroy existing areas of seagrass and estuarine habitat. The aim of the enhancement works (to improve habitat value) is consistent with the intent of statements in the DLWC Discussion Paper regarding the importance of maintenance of ecological function in constructed

DIPNR's Preliminary Assessment	Applicant's Response	Status
<p>The Department requires further assessment of whether the sand dune and fine sediments are suitable to form a new wetland.</p> <p>Saltmarsh Information that demonstrates there will be no changes to existing mudflat inundation levels due to the development is required.</p>	<p>During detailed design, further work will be undertaken in consultation with relevant experts on the appropriate sediment type and source for the proposed intertidal flats. The sediment would need to provide suitable habitat for benthic colonisation to allow foraging activities for shorebirds. The tidal pattern in Botany Bay and Penrhyn Estuary will not be affected by the proposed development. The existing intertidal flats will continue to be inundated twice a day and the proposed intertidal flats, to be constructed as part of the habitat enhancement plan, will also be inundated twice a day.</p>	<p>wetlands. Therefore the relevant principles outlined in the DLWC document should be followed.</p> <ul style="list-style-type: none"> • It should be noted that saltmarsh has recently been listed as a Threatened Ecological Community. Any removal will be subject to appropriate permits and recovery plans through DEC. • This detailed design would need to be agreed with the Department and DEC prior to construction. • Monitoring of inundation levels will be required to ensure levels are not affected. Details of appropriate monitoring would need to be determined prior to construction.

<p><i>Source of sediment for construction of mudflats</i></p> <p>The Department requires further detail of the amount of each sediment type needed, its source, its contaminant concentration and likely value as constructed habitat proposed to construct the intertidal areas of Penrhyn Estuary.</p> <p>The Department requires further information and prediction of the long term stability of the intertidal flats. In addition the Department considers that the risk of resuspension and movement of sediment from the mudflat during flood events and during rainfall which has tremendous erosive capacity, has not been addressed adequately.</p>	<p>Further detail of sediments to be used in the habitat enhancement works in Penrhyn Estuary would be developed during detailed design of the area, subject to approval of the proposed development.</p> <p>In determining a suitable sediment composition for the proposed intertidal flats, consideration will be given to the potential for re-suspension and erosion of the sediments.</p>	<p>Appropriate response.</p> <ul style="list-style-type: none"> • Appropriate response. • A contingency plan is required in the event that the sand/mud flat is eroded to a level which reduces its ecological value or role in the habitat enhancement works.
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DIPNR Preliminary Assessment	Applicant's Response	Status
It is not clear that the entire 4ha of seagrass that will be transplanted before construction will be accommodated at the terrace adjacent to the Parallel Runway. In addition, the Department requires further information on the consequences of increased turbidity on the light climate in areas of existing and proposed transplanted seagrass.	Transplanting of seagrass would preferably be through direct transplantation from its existing location to the final location as shown on the habitat enhancement plan (ie. within the channel between the new terminal and Foreshore Beach). However, depending on the sequence of construction some of the seagrass may need to be transplanted on the terrace on the eastern side of the Parallel Runway to allow for the compensatory habitat to be prepared. (Refer to Section 19.7.1 of the EIS) It is only proposed to transplant a small amount of seagrass to the terrace.	Further information on the consequences of increased turbidity on the light climate in areas of existing and proposed transplanted seagrass is still required.
Sandy subtidal habitats		
The impact of removal of shallow sandy subtidal and intertidal habitats within Port Botany and replacing with either deep channels or shallow mudflats has not been adequately addressed in the EIS. This development will cause the loss of over 130 ha of shallow sandy habitat from Botany Bay. The relative and cumulative impact of this has not been assessed with other past and potential development within Botany Bay.	<ul style="list-style-type: none"> The proposed development will result in the net loss of about 39ha of shallow sandy habitat (being that habitat between mean high water mark and -3.5m LAT). Following development there will be 44ha of shallow sandy habitat within the north-eastern embayment. It is estimated that there is at least 1610ha of shallow sandy habitat in Botany Bay (Nb-this excludes Quibray Bay). This loss of shallow sandy habitat due to the port expansion is small on a Bay wide scale, less than 2.4%. 	<ul style="list-style-type: none"> Although the Applicant claims this loss of shallow sandy habitat due to the port expansion is small on a Bay wide scale, less than 2.4%, the Department still requires information on the consequence of the 2.4% loss. The subject of the Departments comment is the area to be dredged and reclaimed within Botany Bay and does not refer to intertidal areas. Therefore the applicant's response needs to be modified to address the appropriate habitat and its full extent.
Marine Mammals		
The Department considers that the risk to marine mammals from increasing port operations requires further assessment. It is important that assessment of the risk of impact is not only based on current conditions and experience but also likely future scenarios	Sydney Ports Corporation has committed to the development of a Marine Mammal Management Plan (refer to Section 19.7.1 of the EIS and Section 9.4.4 of the Primary Submission). This plan would be developed in consultation with DEC and DIPNR and would be informed by similar plans prepared for other ports such as Port Jackson. Further assessment of this issue is not required as the	Response is acceptable.

DIPNR Preliminary Assessment	Applicant's Response	Status
	development of an appropriate management plan (prepared in consultation with experts from DIPNR, DEC and NSW Fisheries and other relevant stakeholders) would effectively minimise the risk to marine mammals associated with an increase in the numbers of ships entering/exiting Botany Bay.	

Species Impact Statement Peer Review

The Department and other Government agencies have considered a draft version of the Applicant's SIS peer review as prepared by Wetlands International. At the time of writing the Department was awaiting the Applicant's response to a list of detailed information requests provided by DEC. As DEC is the lead agency regarding conservation in the State, the Department considers it appropriate that outstanding issues regarding the SIS review are resolved before an assessment and subsequent recommendations regarding conservation outcomes can be finalised.

In addition the Department also has the following comments, which require response from the Applicant, regarding the peer review:

- The review discusses management plans and monitoring but does not discuss: i) What are satisfactory numbers of each bird species that should be present to indicate whether the objectives have been satisfied or failed? ii) Timeframe should the wetland creation enhancement be completed in to allow the best use by birds? iii) What levels/concentrations of food organisms are required for birds to be able to use the area effectively for feeding?
- The paper underlines the importance in getting the wetland creation restoration right. This makes the preparation of a long-term management strategy, management plans which are closely linked to well funded and supported monitoring programs, essential.

Penrhyn Estuary Risk Assessment

The Department has reviewed the risk assessment undertaken by the Applicant. At the time of writing it is considered that a number of additional areas of clarification are still required from the Applicant to enable the Department to finalise its assessment.

In general the Department would like the risk assessment to be more focused at providing an indication of the likelihood of various outcomes being achieved which would enable a focused monitoring and management plan to be developed that could mitigate potential risk.

General additional information requirements include:

- Detailed definition of the various risk levels.
- Detailed reference to previous studies and literature values.
- Detailed definition of likelihood descriptors.

Specific additional information requirements include:

Eutrophication risk

Stormwater treatment and Eutrophication risk may be improved by the Applicant's proposed Stormwater Quality Improvement Devices (SQID). However this will be dependent on the type of SQID used, and will require long term maintenance. The Applicant is required to confirm long term maintenance will occur and identify the responsible body for this long term maintenance.

In addition increased frequency of shipping to the area and associated likelihood of microalgae being brought into the area by ballast water transfer is required to be addressed by the Applicant in the risk assessment. The Department considers it is appropriate that ballast water management be listed as a key management outcome.

Shorebird habitat

The Department considers that issues with mangrove colonisation need to be expanded in the risk assessment, including:

- What are the time frames within which the likelihood has been determined? These need to be considered to enable a realistic indication of risk to be assessed.
- The risk register and the comments should provide an indication of the level of habitat enhancement that is considered to be successful.
- The register should also provide an indication of the frequency that mangroves will need to be removed and what levels of mangroves are acceptable without removal.

Failure of Seagrass

The Department considers that the comment on page 3-7 of the risk assessment that 'existing seagrass appears to have limited ecological value' needs to be expanded including a basis for this conclusion. In addition the Department requires additional information on:

- how transplanted seagrass will result in improved ecological value;
- what level of seagrass establishment is considered successful, including what abundance and composition of fish using the site as a nursery ground; and
- Justification of why the likelihood of failure of seagrass transplanting is given as low.

Introduced species

The Department considers the Applicant should provide details of measures proposed to monitor introduced species and risk associated with such species. This will ensure a quick response is possible to treat/eradicate any such threat.

New intertidal flats unable to support migratory birds

The Applicant is required to provide a clearer definition of levels of acceptable erosion (ie what is normal estuary erosion and deposition). The main issue is not whether erosion is a natural process in estuaries, but whether erosion (caused by 'natural' conditions or extreme events) is likely to affect the ecological value and function of the estuary habitat enhancement in Penrhyn Estuary. The Department requires an indication at what stage is management intervention required.

Additional aspects that need to be addressed include subsidence of constructed banks and beds. This could result in pooling and create areas with poor water quality. This would require some management intervention. The potential for this to occur should be acknowledged and the balance between what level of subsidence is considered acceptable should be defined. The way that risk will be mitigated should also be outlined by the Applicant.

Saltmarsh vegetation

The Department considers the risk assessment needs to address the establishment of saltmarsh vegetation in more detail. What level of saltmarsh cover is deemed acceptable? What is the likelihood of this cover being established in previously specified timeframes? What are the consequences of saltmarsh not being established? How will any risk be evaluated and mitigated? How will successful ecological function of saltmarsh be defined?

Environmental Mitigation, Management and Monitoring

The Department's initial submission considered that there is insufficient detail provided in the EIS to be able to properly assess whether the monitoring program is adequate. The Applicant has subsequently provided an outline environmental management and monitoring plan in the EIS Supplement. The Department has reviewed the additional information provided and considers that additional clarification is required as summarised below.

As a general principle, all monitoring should be strategic and adaptable to include extreme events such as storms, rainfall, spills, etc that may trigger environmental damage eg algal blooms after rain events. This will ensure managers can identify the cause of environmental damage and respond quickly to ameliorate the impact.

More detail is required in the following areas:

Monitoring plan

- Information about the spatial and temporal replication is required to monitor any of the activities sufficiently. These issues are important as the use of inappropriate timeframes and sites can lead to an increased risk of erroneous interpretation of data.
- Details of effective feedback mechanisms outlining specific management actions to be taken. Importantly an outline of specific levels/values at which management responses will be undertaken is required.
- The monitoring plan is not clearly linked to specific performance indicators that reflect the objectives of each action. This would help to focus monitoring design. The habitat creation / rehabilitation components need to be improved as these are likely to need adaptation in the short and long term to achieve success.
- Monitoring and subsequent management actions will be the most important components of any rehabilitation process as will enable adaptation of methods being used if unexpected outcomes arise.
- The need for suitable control locations during monitoring should also be discussed.

Aquatic Ecology

Monitoring of the extent, expansion and condition of seagrass in Penrhyn Estuary is needed. Consideration should be given to the following timeframes. In the first year after construction/transplantation this should occur on monthly to seasonal timescales and should continue at seasonal to annual intervals for 5 years.

Monitoring organisms in the soft sediments of the reconstructed areas in Penrhyn Estuary to determine if they are providing suitable feeding ground for wading birds should be a high priority for monitoring. It must be done at least monthly in the first year and then seasonally in subsequent years. Long term monitoring is essential to ensure that the area is not being degraded by longer term processes such as erosion/ sedimentation/ pollution effects. A strategic component should be built into the monitoring program triggered by certain events eg decline or loss of important species/abundance.

Methods of determining seagrass condition should be outlined. Control locations are essential.

Monthly monitoring of macroalgal presence is probably sufficient if there is no macroalgae present. When/if it does occur, the species composition and extent should be monitored on a weekly basis.

Terrestrial Ecology

It will be important to monitor the extent, species composition and condition of constructed and retained saltmarsh and mudflat areas. In addition to assessments of flora and fauna, monitoring should include soil salinity, degree of tidal inundation in saltmarsh areas and usage by birds (feeding and roosting) of both saltmarsh and mudflats. It is recommended that monitoring of many of these parameters is done seasonally then every 6 months for at least 10 years to determine the long term viability of constructed saltmarsh and mudflat areas as habitat for migratory birds.

It will be important to monitor the integrity of the mudflat after heavy rain especially when this coincides with low tide to ensure sediments are not being washed away.

Conclusion

The Department supports the objective of providing compensatory habitat through the construction of the proposed enhancement area within Penryhn Estuary. However, as a minimum the Department requires that the applicant provide detail of alternative compensatory habitat options. The Applicant has undertaken a preliminary risk assessment to determine the level of risk of failure of the proposed compensatory habitat enhancement area in Penryhn Estuary. The Department has reviewed the assessment and has provided additional comment in this assessment for clarification from the Applicant. In addition the Department supports DEC in requesting additional information regarding the independent peer review undertaken of the SIS presented in the EIS.

Once the results of the risk assessment and SIS peer review are finalised by the Applicant, it is understood the Department will be in a position to make recommendations regarding the need for alternative offset compensatory habitat areas to be acted on by the Applicant. The Department will then be in a position to finalise its assessment of the proposal.

7.4. Impacts on Groundwater

Applicant's Position

Existing Groundwater Levels

Groundwater levels in the Botany Sands Aquifer are mainly influenced by rainfall and groundwater abstraction. The majority of the groundwater abstraction (20 ML/day) is used for industrial purposes (60%) while the remaining is used to irrigate parks and golf courses. The water levels immediately to the north of the study area is said to have variations of 1 metre. A natural variation of 0.54 metres was observed between April 2002 to Jan 2003.

Existing Groundwater Quality

The groundwater quality to the north of the Penrhyn Estuary and Foreshore Beach has been the subject of extensive investigations since the early 1990s. These have been mainly associated with Orica and not attributable to the existing port operations at Port Botany. The studies show that shallow and deep groundwater are contaminated as a result of historic operations at the Orica facility, mainly due to the presence of volatile halogenated compounds (VHCs). This is the subject of ongoing investigation and remediation. DEC has issued a Clean Up Notice to Orica to establish a containment area to prevent further discharge into Penrhyn Estuary and Botany Bay.

Orica and Woodward-Clyde reports identify three groundwater plumes:

- Southern Plume which consists of 1,2 dichloroethane (EDC) and trichloroethene (TCE) and is currently discharging to Penrhyn Estuary in a zone between Floodvale and Springvale Drains at a concentration of about 10 mg/L;
- Central Plume which consists of EDC with concentrations greater than 5,000 mg/L in the core of the plume. The core is expected to reach the Estuary in about 2009. The plume is expected to discharge into Penrhyn Estuary over a period of about five years (2007 to 2012); and
- Northern Plume which consists of EDC with concentrations between 100 mg/L and 200 mg/L. The plume is expected to reach Botany Bay and Foreshore Beach (northwest of the Estuary) by 2006.

Impacts on Groundwater Levels

Modelling carried out by the Applicant concludes that the new terminal area would not cause changes in the groundwater levels on the landward side of the present shoreline. A small groundwater mound would develop under the new container terminal with slight rises in the western end of the Patrick Stevedores terminal. The expected rise is less than 0.01m and would be negligible.

The proposed boat ramp and enhancement area would result in minor localised increases in groundwater levels in the range of 0.01 m and 0.10 m. The Applicant argues that when compared with natural variation levels in the order of 1 m and up to 5 m in some areas, the modelling results demonstrate that the impact would be negligible.

As part of the proposal, enhancement works would be carried out at Penrhyn Estuary. The sand dune west of Floodvale Drain would be removed and replaced by a strip of saltmarsh and intertidal sand/mud flats. These works would move the present shoreline in that area back towards Foreshore Road by a maximum of 200 m resulting in a decrease in the landward groundwater level as the groundwater flow path is reduced in length. This decrease in the groundwater level would be in the order of 0.01 m to 0.06 m.

It is proposed that the excavation and pile driving associated with the construction of the road and rail bridges would occur below the water table. The Applicant notes in the EIS that these works would not affect the groundwater levels.

The Applicant proposes to monitor the groundwater levels during construction and for a year after completion of reclamation to confirm the results predicted by the modelling. An additional three groundwater monitors have been recommended and established by SPC. These extra monitors would provide data to assess the impacts of the proposed foreshore works and habitat enhancement in the Estuary.

Impacts on Groundwater Quality

The Applicant concludes in the EIS that the dredging of the Bay would not lead to the release of groundwater contaminants into the Bay but the construction of the proposed expansion has the potential to cause minor localised contamination of groundwater from fuel and oil spills/leaks from construction equipment or machinery.

The construction of the boat ramp and beach enhancement works would lead to a slight reduction in groundwater discharge volumes of about 20% in these areas but, as a corresponding increase in groundwater discharge volume would occur in adjacent areas, the total groundwater discharge volume to the Bay would remain the same.

The Applicant advises the reclamation would not change the concentration of the groundwater contaminants heading towards the Penrhyn Estuary via the Central or Southern Plume but the Northern Plume would be impacted due to a 5% increase in the groundwater discharge volumes leading to a small reduction in contaminant concentrations.

The enhancement work to Penrhyn Estuary would reduce the length of the flow path of the Central Plume so that the Plume would arrive 6 to 12 months earlier than predicted.

The Applicant proposes to draft a Soil and Water Management Plan to ensure that adequate standards are applied to the control of contaminants which could impact on the groundwater quality during the construction phase. The Applicant proposes to:

- store and handle all dangerous goods in accordance with Australian Standards, NSW Dangerous Goods Regulations and NSW EPA guidelines;
- draft an emergency response plan to control fuel, oil and chemical spills;
- inspect all machinery regularly;
- provide spill containment equipment; and
- train staff in spill clean-up procedures.

Issues Raised in Submissions

Public Submissions

Of all submissions received by the Department during the exhibition period, 9.5% of submissions specifically referred to groundwater issues. The key issues raised were raising of the groundwater table, release of groundwater toxins, concerns with the impact of the groundwater plumes and groundwater contamination.

Government Agencies and Council Submissions

Botany City Council

The City of Botany Council's submission mentions some omissions in the background section. There is lack of or limited information on:

- the principles outlined in the various State Groundwater Policy component documents and implications for this development;
- groundwater protection zone initiatives currently in place by DIPNR;
- beneficial use of groundwater;
- private water bores which may be affected or Groundwater Dependent Ecosystems which may also be affected;
- groundwater management and monitoring requirements.

Botany Council is concerned that there is no baseline data to assess Groundwater Dependent Ecosystems (GDEs) and that additional data may be obtained from the existing monitoring

bores. A more in-depth assessment is required given the profile and importance of the groundwater quality issue and the fact that one contaminant plume has already reached Penrhyn Estuary. More recent water quality data and plume interpretations are provided in Orica, 2003 suggesting that the Central EDC plume has moved further to the southwest and that detectable concentrations of this contaminant are evident near Foreshore Rd (although the main plume is still some 400 to 500m up gradient).

Also, groundwater quality is only addressed in the sense of potential impacts associated with the construction of the port facility. There is no information presented either on the quality of groundwater in the shoreline areas where there may be substantial habitat enhancement (for example, in the proposed new mud flat and salt marsh areas) or regarding mitigation measures if contaminated groundwater is found near surface. There is also no information on GDEs.

Mitigation measures may be required depending on the results of site specific groundwater quality data and GDE studies, and the construction/dredging activities in the area of the proposed mud flats and salt marshes. An outline of a more comprehensive groundwater management and monitoring plan is an important omission, and is required to address the risks to all quantity, quality and GDE issues that have been raised.

Randwick Council

Randwick Council also supports the need for a current review of the actual positioning of the plumes, in particular, making reference to the latest sampling program conducted by ORICA in 2003. The Applicant should further assess the potential effects on groundwater migration, entry points to the aquatic environment, and quality and quantity concentrations of contaminants.

There is minimum discussion of the major earthworks activities (eg excavation, filling and dewatering) associated with this proposal. This is particularly important to allow a considered assessment of the impacts, if there are any, that the project will have on groundwater discharges, flow patterns, quality, concentration of contaminants and existing sediment dispersal.

Prior to any approval of the proposed Penrhyn Estuary habitat, further testing should be considered to confirm groundwater quality and existing contamination levels (coupled with the effect on organisms within the region). This will allow qualified assumptions to be made with respect to any required ongoing monitoring during and post construction.

DEC

- DEC accepts that reliance on successful remediation of groundwater is reasonable but considers that the proposed Penrhyn Estuary works would result in an environment less likely to accommodate elevated levels of any pollutant of concern due to decreased dilution.
- DEC also notes that proposed relocation of the shoreline inland increases the need for effective groundwater remediation, because otherwise it would result in chlorinated solvent plumes impacting on the Penrhyn Estuary at higher concentrations 6-12 months earlier than currently envisaged.
- Through joint agency meetings, the proponent agreed to provide written clarification of the currency of both the source data and risk assessment analyses reported in EIS Appendix AA. Further information provided by the proponent includes advice from their consultant that their conclusions were based on a 1999 health risk assessment undertaken for Orica which has been confirmed in a 2003 ground and surface water monitoring report. It still does not indicate, however, the potential effects of these chemicals on the ecosystem by a straightforward comparison of current levels with the relevant ANZECC water quality guidelines.

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- Overall, the limiting of public access to the Estuary will be likely to result in a lower risk to human health associated with sediment contamination than already exists. The proposed reforming of the Estuary to promote salt marsh would cap sediments known to contain elevated levels of contaminants such as hexachlorobenzene (HCB) and mercury.
 - DEC considers that the conclusion that the proposed works would have no significant effect on groundwater elevations is likely to be valid for both transient and steady state conditions. As such, the works should not significantly affect groundwater flow velocities, discharge volumes or flow directions.
 - The EIS includes a precautionary recommendation to monitor groundwater levels during construction works, and for one year after construction, "to check that there is no discernible change in the pattern of groundwater level variations". DEC supports this and would include it as a condition on the EPL which should also be a consent condition.
 - The EIS predicts that dredging would have negligible impact in terms of contamination as "very little (if any) groundwater would flow under the Bay seabed to the zone of dredging". The EIS provides only limited information on the potential impacts of dredging works on groundwater behaviour. In particular, more data is needed to support the assumption that the freshwater/saltwater interface occurs right at the coast causing negligible transport of contaminants under the Bay seabed to the zone of dredging. The modeling study does not support this assessment as the model did not incorporate density driven flow. Measurements to identify the location of the freshwater/saltwater interface are not provided. Accordingly, conditions of consent should require further information on these matters be obtained before commencing dredging operations.

Department's Position

Groundwater Quantity:

The hydrogeology of the area is adequately conceptualised in the EIS.

Two separate numerical modelling techniques have been used to estimate the likely groundwater impacts of the proposed reclamation works. A single-layer regional finite element model based on AQUIFEM -1 software simulates the areal behaviour of the aquifer. A multi-layer finite difference model based on MODFLOW software simulates two detailed cross sections.

Both modelling approaches used in this study meet the current best industry practice. Furthermore, the finite element model has been previously used for groundwater management applications associated with a number of infrastructure developments in the Botany Sands Aquifer area.

The water levels immediately to the north of the study area is said to have variations of 1 metre. A natural variation of 0.54 metres was observed between April 2002 to Jan 2003 as discussed in Section 17.4.2 of the EIS.

The impact from the development is modelled to be less than 0.06 metres with the distribution given in Figure 17.5 of the EIS.

Licensed users in the vicinity of the proposed development have not been identified in the EIS. Notwithstanding this omission, the marginal impact is not likely to affect access to the groundwater resource.

It is noted in Appendix L (Figure 4 of the EIS) there is a plan showing locations of bores. This figure shows known monitoring locations (past and present). Note that the figure does not show all licensed groundwater works in the area and may be misleading.

The Applicant's monitoring response is for 3 new piezometers in which the water levels will be monitored monthly (Tables 38.2 and 38.3 of the EIS).

The Applicant's proposed monitoring seems inadequate given:-

- the event based nature of the natural variation (rainfall and tides as well as groundwater abstraction as discussed in Section 17.4 of the EIS);
- the potential impacts on infrastructure, the shoreline and lake ecosystems;
- the mitigation measures proposed for this aspect in Table 37 of the EIS.

The layout of the groundwater monitoring network for the proposal is considered to be satisfactory for detecting any impacts on groundwater levels.

However, the continuation of groundwater monitoring following completion of the proposed port expansion should be extended beyond the twelve (12) months indicated in the EIS. Given the current drought conditions, the short timeframe proposed by the applicant may not adequately assess the potential impacts predicted in the modelling. Also, continuous groundwater level recorders should be utilised instead of monthly manual readings.

The Department recommends monitoring during construction and for a minimum period of five (5) years following completion. A data review should be undertaken immediately following construction and again at the end of the five (5) year period.

Groundwater Quality:

The Department accepts the groundwater modelling results as described in the EIS in regard to the migration of contaminant plumes towards the foreshore and estuary of Botany Bay. However, it is noted that specific solute transport modelling was not undertaken.

Any construction activity associated with the proposal must not affect the path of the known contaminant plumes, containment and clean-up operations or lower the assigned beneficial use of the groundwater resource in the foreshore area near the bay.

The Department is currently preparing a Groundwater Beneficial Use Map for the Botany Sand Beds aquifer. The Department also considers the groundwater beneficial use in the northern foreshore of Botany Bay to be categorised as "Recreation and Aesthetics". This category is designed to preserve groundwater quality appropriate to primary and secondary body contact and reduce visual impacts. The groundwater quality objectives applying to this category are provided in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)*.

The Department recommends in order to demonstrate that the beneficial use is not altered as a result of the proposed port development activities, groundwater quality monitoring should be undertaken in conjunction with surface water monitoring. A suitable groundwater quality monitoring program should be prepared by the applicant in consultation with the Department.

Groundwater Dependent Ecosystems:

The Department considers that the EIS has not adequately addressed issues relating to presence of any groundwater dependent ecosystems at or in the vicinity of the proposed port expansion area.

The Department therefore recommends assessment of ecosystems in the vicinity of the proposed development be undertaken to establish the degree of dependence on the groundwater system. Once identified, monitoring of these ecosystems should be undertaken during and after construction. This will allow the detection of changes in ecosystem status and measures to mitigate impacts to be undertaken.

Groundwater Embargo and Extraction Exclusion Areas:

It is noted that the "Designated Groundwater Protection Zone", identified in both Figure 7.2 of the EIS and Figure 17.2 of Appendix L, are out of date. The identified area has been amended by the Department in response to the detection of a greater spread of contaminants than previously known. This amendment was undertaken in August 2003, in consultation and following advice from, the NSW Department of Environment and Conservation.

The intent of the Extraction Exclusion Area is to protect groundwater users from potentially contaminated groundwater and enable clean-up and remediation activities to occur under stable groundwater conditions.

The amended area, known as the Groundwater Extraction Exclusion Area, is illustrated in Appendix D of this submission.

In addition, on 22nd August 2003, the Department declared an embargo on the issue of new groundwater licences for a large area of the Botany Sand Beds Northern Zone.

The embargo area is identified in Appendix D.

Conclusion

The Department considers that the impact of the proposed Port Botany Expansion on the groundwater system of the sand bed aquifer may not pose any significant risk to the resource. Notwithstanding that, a comprehensive monitoring program should be established during construction and operation to confirm the predictions of minimal impact.

The monitoring program should cover groundwater quantity, quality and, if present, dependent ecosystems. Contingency measures should be designed to address any anomalous impacts of greater magnitude than those predicted.

The Department is prepared to assist the applicant in preparing an appropriate groundwater resource monitoring program.

In addition the issue of the ongoing investigation and remediation of groundwater at Penrhyn Estuary and Foreshore Beach is being progressed through a separate process between DIPNR, EPA and Orica.

7.5. Impacts on Geology, Soils and Geotechnical

Applicant's Position

The EIS presents the findings of an assessment of estuarine sediment in the area to be dredged indicating that contaminant concentrations are generally low compared to sediment quality guidelines. As a result the Applicant considers that the disturbance of sediment during the proposed dredging operations and remobilisation of existing low concentrations of contaminants are unlikely to cause a significant risk to human health or the environment (human health risks are also discussed in section 7.7 of this report).

Findings of geotechnical investigations presented in the EIS indicate that the area to be reclaimed is suitable for the proposed expansion. The sand fill to be dredged from Botany Bay is also considered by the Applicant to be suitable for reclamation.

The EIS also claims that dredging would not affect the stability of the existing Parallel Runway.

Acid Sulphate Soils

The Applicant has identified that some limited disturbance of potential acid sulphate soils may occur as a result of construction of the proposed Port Expansion. However, with the implementation of appropriate mitigation measures the EIS claims any impacts would be minimal. Proposed mitigation measures that would be implemented include:

- ensuring that large areas of organic-rich, fine grained sediment Potential Acid Sulphate Soils (PASS) identified from the geotechnical assessments would be returned below water level in Botany Bay under stable anoxic conditions; and
- sediment with high acid generating potential, if any, would not be allowed to oxidise in onshore stockpiles (e.g. any material set aside for Penrhyn Estuary enhancement works).

Soil Erosion

The Applicant acknowledges that there is a possibility of soil erosion associated with construction activities specifically related to the infrastructure in the Penrhyn Estuary location. These activities include:

- road infrastructure;
- rail infrastructure;
- recreational areas;
- movement of equipment in the construction zone; and
- installation of services.

Sediment Contamination

The EIS claims that as sediment-bound contaminants in the proposed dredge area are generally low in concentration, disturbance of sediment during the proposed dredging operations and remobilisation of existing low concentrations of contaminants is not likely to cause a significant risk to human health or the environment.

The Applicant acknowledges that significant contamination of sediment has been identified in Penrhyn Estuary. However, the EIS also indicates that contaminated sediment in Penrhyn Estuary would not be disturbed by the reclamation of the new terminal, although some construction activities would be undertaken within Penrhyn Estuary.

The Applicant also acknowledges that some activities may result in disturbance to sediment below the mean high water mark. These activities would include construction of culverts at Springvale and Floodvale Drains and creation of the main flow path through the Estuary. It is claimed that disturbance of sediment during the proposed construction activities would result in localised and temporary remobilisation of contaminated sediment and is therefore not likely to cause a significant risk to human health or the environment.

The EIS suggests that reduction of ambient energies in Penrhyn Estuary associated with the operation of the proposal would likely increase the total area of the estuary enriched in sediment-bound contaminants. As a result sediment bound contaminants such as mercury and HCB have potential to accumulate in biota and are considered to be contaminants of concern in Penrhyn Estuary. However, the Applicant claims that the risk to human health is low due to the limited exposure of pathways. The EIS suggests that sediment traps being considered in Springvale and Floodvale drains may assist in reducing any sediment bound contaminant influx to the Estuary.

Proposed Mitigation Measures

The applicant proposes to adopt a number of mitigation measures to ensure that potential impacts are reduced. Measures proposed include:

- Ensuring that large areas of organic-rich, fine grained sediment (PASS) identified from the geotechnical assessments would be returned below water level in Botany Bay under stable anoxic conditions; and
- Sediment with high acid generating potential, if any, would not be allowed to oxidise in onshore stockpiles (e.g. any material set aside for Penrhyn Estuary enhancement works).
- Preparation of an Acid Sulphate Soil Management Plan.
- A preliminary assessment of the risks associated with the disturbance of soils within Penrhyn Estuary would be conducted prior to the development of any excavation works to: obtain an indication of the severity of PASS and ASS in soils potentially disturbed by habitat enhancement and along the rail line route; and provide appropriate procedures for testing and disposal (if required).
- A Soil and Water Management Plan (SWMP) would be developed in the detailed design phase to ensure an adequate standard is applied to erosion and sediment control for the construction and operation of the proposed Port Botany Expansion.
- Disturbance of sediment would be limited in Penrhyn Estuary. Construction works would not be undertaken during periods of high flow in Floodvale and Springvale Drains, or during heavy rainfall events.

Issues Raised in Submissions

Public Submission

The Department received 4.7% of submissions that specifically raised issues regarding Geology, Soils and Geotechnical issues. Key issues raised include:

- Erosion, including wider Bay impacts as a result of dredging (Towra Point for example).
- Loss of sand on beaches.
- Dredging disturbance of heavy metals and other contaminants.
- Risk of collapse of existing sand retention controls within the Bay.
- Can't ignore impacts of previous similar projects on erosion within the Bay.
- Increased sedimentation in Penrhyn Estuary.
- Need for further investigation regarding PASS.

Government agency and Council submissions

Botany City Council

Council have raised concern with the lack of site specific sampling of sediments in critical areas of the port expansion to assess ASS characteristics or the current level of contaminants in soils or sediments that are likely to be excavated or reworked. Council suggests that these deficiencies should be addressed prior to determination of the proposal.

Randwick City Council

Although depositing ASS below the water table to prevent oxidation seems reasonable, Council notes that the EIS has not provided quality assurance measures to ensure the risk of acid generation to the environment is minimised. Mitigation measures will only work where a monitoring program is comprehensive.

DEC has raised a number of issues regarding sediment quality including:

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- The need for sediment quality outcomes to be based on ANZECC guidelines.
 - Because of the limited sample data set, DEC and SPC have agreed that a statistically representative sediment sampling program needs to be undertaken before dredging to confirm the EIS findings. A proposal for such a program was provided in further information from the proponent and is currently being evaluated by DEC.
 - Handling of organic-rich fine dredged materials unsuitable for use in the reclamation area will require further attention by the proponent. From joint agency discussions with the proponent, DEC understands that it is now considered unlikely such fine materials would be used for any works around Penhryn Estuary and that future detailed geotechnical investigations will determine whether it is appropriate to return fines to the bed of the Bay (refer EIS page 18-7).

A number of DEC's comments are also linked to water quality impacts and are referred to in more detail in section 7.13 of this report.

There have been no other Government agency submissions received during the formal exhibition period that have raised specific geology, soil and geotechnical issues.

Department's Position

DEC's view is that there was limited sediment quality information in the EIS to enable clarification of the proposed dredged material. DEC also indicated that further sampling would be required before an Environment Protection Licence can be issued. The Department coordinated a meeting with DEC and the Applicant to discuss this issue. The outcome of this meeting was for the Applicant to prepare a detailed sediment quality sampling program for DEC to use in the setting of the Environment Protection Licence requirements. The Applicant subsequently prepared a response regarding the detail for the required sediment quality sampling program in a letter to the Department dated 13 April 2004. A copy of the proposed sampling program is provided in Appendix A of this submission. The Department understands that DEC is currently in the progress of reviewing the proposed program.

The Department considers that additional information provided is sufficient to complete full assessment of the potential impacts of the proposal in regard to geology, soils and geotechnical issues. The Department understands that DEC also considers that the additional information is sufficient for DEC to finalise assessment in regard to these issues. A copy of all additional information provided to the Department appears in Appendix A.

Conclusion

The Department recommends that as a minimum the mitigation measures proposed by the Applicant in the EIS would need to be implemented. In addition the Department supports DEC and Botany City Council suggestion regarding the need for a detailed sediment sampling program to be undertaken prior to construction. The results of the program will need to be reported to the Department and DEC prior to construction, if applicable.

7.6. Hydrodynamics and Coastal Process

The primary drivers in the areas of hydrodynamic and coastal processes are the effects of the proposed Port Botany expansion on wave height and currents in the Botany Bay area.

Another area of concern is the effect of the proposed development on flushing times and the resultant effect on water quality. All of these processes have important implications for the movement of particles around the Bay, be they contaminants or sediment. As these issues closely interrelate with surface water quality impacts, section 7.13 of the Department's revised submission may also be referred to for information.

Applicant's Position

Botany Bay is a wide and shallow estuary exposed to winds from all directions and waves from the adjacent high energy coastal zone. Waves and currents determine the erosion, deposition, transportation of sediment in the Bay. The EIS acknowledges that changes to the Bays hydrodynamic conditions can affect transportation of sediment around the Bay and hence impact on the stability of beaches and infrastructure. However the EIS also states that Botany Bay is an example of an already heavily modified environment with large areas of natural foreshore having been replaced with human-made structures.

Wave Conditions

The applicant has identified three kinds of waves within the Botany Bay area – wind generated waves or local sea waves, swell waves and long waves. The Applicant has also briefly considered the effects of waves created by vessels operating out of the expanded Port. The Applicant has performed two numerical modelling simulations of wave conditions in Botany Bay. The Applicant has modelled wave conditions in the total Botany Bay area and has performed more detailed analysis of the north-eastern embayment between the Parallel Runway and Molineux Point.

Local Sea Waves

These waves are generated by the localised movement of wind over water. Over a large expanse of water such as Botany Bay these waves can be generated in any direction. The applicant acknowledges that these waves can have an impact on circulation and transportation of sediment. However, as the proposed Port expansion will reclaim a further 63ha of water body area, total wind fetch will be reduced and therefore overall wave height for wind generated local sea waves will generally be reduced.

The Applicant has recognised that there is existing westward transport of sand along the remaining exposed section of Foreshore Beach and has proposed a groyne to be built as an extension to the Mill Creek training wall to prevent impact on the Mill Stream from the accumulated sand. The Applicant has recognised that there may be a need for ongoing maintenance in this area.

The Applicant has estimated that wave height at the new boat ramp will be suitable for its effective operation.

Swell Waves

Swell waves are generated offshore as a result of disturbances in the open ocean. These waves enter the Bay from the east. However the Applicant has stated that they will have only a small effect on the proposed development as wave energy is redirected by entrance dredging or obstructed by the armoured revetment wall. The Applicant has supported this assumption by performed testing in 67 locations around the Bay. Existing wave heights are low and modelling has shown only a small increase as a result of the proposed development.

Long Waves

Long wave activity has a variety of sources including distant storms, changes in atmospheric activity and wave grouping. The EIS states that disruption from long waves has not been recorded within the Botany Bay area. The Applicant's modelling indicates that there will be an increase in wave height in the Brotherson Dock area of about 10%. The Applicant advises that this will not cause disruption as it remains below 2 cm/s.

Vessel Operations

The EIS states that wave action generated by vessels using the Port will not affect sediment stability or increase the overall wave climate in the immediate vicinity. A rock groyne is proposed to protect the new boat ramp.

Currents

The EIS states that as the proposed development is located in the northern embayment of the Bay it will not obstruct the predominant tidal flow between the entrance of the Bay and the Georges River. The Applicant asserts that the impact on currents in the Bay will not be significant. This has been supported by the development of two numerical models covering both the whole of the Bay and the northern region separately.

Flushing and Water Quality

Botany Bay

Flushing and the resultant effect on water quality has not been covered directly by the EIS. However, as it asserts that hydrodynamic and coastal processes in the Bay are not significantly impacted it can be assumed that the Applicant's position is that flushing in the Bay will remain unchanged.

Penrhyn Estuary

The Applicant supplied little initial information on the effect of the proposed development on movement of water in and out of the Penrhyn Estuary.

Issues Raised in Submissions

Public Submissions

Hydrodynamics and coastal processes have been raised as an issue in 70.7% of all issues raised in public submissions. Particular issues raised are:

- Increased risk of creating stagnant trapped water in Penrhyn Estuary.
- Erosion of rock walls and loss of beaches within the Bay.
- Changes to tidal current.

Government agency and Council submissions

DEC

DEC has made a number of recommendations relating to hydrodynamics including:

- The Commission should be satisfied that it is demonstrated to the community and all other concerned stakeholders that the wave and sediment transport modelling assessment stands up to detailed critical review.
- Any determination needs to address the scale and location of the incremental impacts from this development from overall human-made changes to Botany Bay hydrodynamics.
- Any determination needs to consider potential implications for the proposed beach nourishment works or future beach nourishment works required for Towra Point Nature Reserve in relation to wave refraction and sand movement changes in the Bay.
- Regular monitoring to determine the impact over time should be required to be conducted by the proponent as a condition of consent. This should be included as part of the Monitoring and Management Plan described in section 3 of this submission.
- Conditions of consent should ensure that the proponent takes a proportionate responsibility for any cumulative impacts caused by the proposal around the Bay and allocates adequate resources to mitigate and manage those negative impacts.

Fisheries (Department of Primary Industries)

- Recommends an adaptive monitoring and management plan to address sand movement and its potential impact on seagrass within the bay.

City of Botany Bay Council

- EIS has not looked at need for ongoing maintenance dredging of shipping channels and associated impacts, exacerbated by reduced wave action between Port and airport runway.
- No examination of sea level rise associated with global warming in the EIS
- Suggested that flushing of the Penrhyn Estuary will be adversely affected due to reduced wave action in the area and a restriction of water flow from the design of the proposed development. Pre-existing high rates of sediment have necessitated Council to relocating the boat ramp in Penrhyn Estuary.
- Reduced flushing effects on Estuary and channel such as increase in nutrient, sediment and toxins.
- Issue of erosion around boat ramp and channel is mentioned in the EIS but not addressed.

Randwick Council

- Need for a single management entity for the whole of Botany Bay.
- Sydney Ports should pay annually for restoration of hotspots around the Bay.
- Limited conceptual understanding of health and ecology of the Bay to make an informed decision.
- Does not consider impacts of previous developments on the Bay and accuracy of their predicted impacts.
- Does not demonstrate understanding of Bay wide hotspots.
- No details of dredging plans timeframes or predicted effects.
- EIS does not address obligations under international treaties with regard to new generation shipping that Australian ports are required to fulfil.
- Does not address if new generation shipping will require further dredging.
- No convincing assessment of long term viability of Penrhyn Estuary.
- EIS does not provide enough detail on Port use on bay over time, what are mitigative measures, what are the fallback positions should they fail.

Department's Position

The Department undertook a preliminary assessment of the EIS and subsequently coordinated a series of specialist meetings with the Applicant and various government agencies to raise additional information requirements with the Applicant.

General coastal processes and hydrodynamics

DIPNR is aware of pre-existing long term recessionary trends in the Silvers Beach, Lady Robinsons Beach and the Towra Point foreshore areas. DIPNR concurs with the assertion in the EIS that the proposed development would not be expected to have any significant bearing on the physical coastal processes and hydrodynamics of Botany Bay generally.

The fact that the proposed facility would take up a further 63 ha of waterway area adjacent to the northern foreshore would serve to limit the potential wind fetch and to an extent the corresponding sea state (locally generated wind waves) directed between the parallel runway and Brotherson Dock (north) toward the Silvers Beach/Towra Beach area of the Bay. By consequence, the overall wave climate impacting on this portion of the Bay could be expected to change by a relatively insignificant amount.

The general limit of impacts from coastal processes on and from the proposed work would be expected to be confined to the waterway area contained between Molineux Point and the Parallel Runway (referred to hereafter as the "northern foreshore region" of the Bay).

DIPNR accepts that the combination of configuration dredging and proposed terminal armouring is unlikely to result in any consequential increase in swell wave energy within the northern foreshore region of the bay.

The restoration and enhancement works proposed for the Foreshore Beach precinct have been designed to significantly improve the public amenity and useability of the limited beachscape available. It is noted that the restoration plans for the Foreshore Beach precinct have been developed following extensive stakeholder consultation ("Proposed Port Botany Expansion – Public Open Space Plan (May 2003)" detailed in the EIS at Appendix E.

It is considered that sand build up at the groyne at the northern end of the beach precinct may need to be relieved from the site at a 4-5 year interval and returned to the south-eastern portion of the beach. Whilst the general rationale is sound, adequate maintenance of the beach system and shoaling within the Mill Pond outlet will need to be governed by an appropriate monitoring program linked to a responsive remediation strategy. If in effect, additional sand is required in order to augment the proposed nourishment strategy, the source and appropriateness of the material should also be considered at this stage.

Penrhyn Estuary

DIPNR considered that the impacts on Penrhyn Estuary and the Channel between Brotherson Dock and the Parallel Runway were of greater concern – in particular, the secondary effects of reduced flushing times, created by reduced wave activity and the proposed development constricting water flow to the Bay from the Estuary.

Further Information requirements

The Department requested further information for DIPNR to complete its assessment. The issues raised are listed below:

- the use of a wider channel and /or culvert to facilitate water flow thereby decreasing flushing times;
- greater assessment of the effects of dredging including an assessment of need for ongoing maintenance dredging;
- further information is required on the impact of changes to the flushing of the estuary and resultant changes in water quality;
- mapping of changes to flushing regimes and times possibly based on particle movement over the whole of the development and adjacent areas of the bay;
- further information is to be provided eg. risk analysis, commenting on how possible surface contaminants such as oil spills and water column contaminants etc would be distributed through the Bay;
- need to map the effects of the development on the current activities of the bay – eg oil (surface) and/or full water column contaminant spills. There is currently no analysis of the development proposal effects on current uses of the bay, particularly with respect to water quality and flushing and retention time issues, particularly in light of the plume of contaminated groundwater to arrive in this area;
- a comparison of the current model results based on water level boundaries against a model using transfer boundaries. Are we getting the correct results for flushing processes? This is important for modelling the effects of the development on the existing bay uses which has not yet been done; and
- additional information regarding cumulative hydrodynamic impacts was requested by DEC, including comment on whether the development approaches any critical threshold limits for the Bay and Estuary; also document past predictions against outcomes and explain why this will be different.

In response, the Applicant provided additional information on the following:

- Water level boundary conditions
- Information on changes to flushing times in Penrhyn Estuary

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- Bay wide Flushing
 - Review of historical modelling predictions
 - Effects of proposed development on movement of spills in the Bay

Water Level Boundary conditions

The Department sought confirmation from the Applicant on whether the water level boundary conditions adopted for the northern fine grid model of the estuary area provided a realistic description of the flow structure or whether a transfer boundary condition should have been adopted. Lawson and Treloar provided advice that:

- a) When the processes of concern – in this case the changes in contaminant concentration in the Penrhyn Estuary – are distant from the model boundary area, any inaccuracies in boundary flow description do not impact on the subject process in the area of interest, provided that the water level time series in the boundary area is realistic. In this case the important processes are more than half the model domain away from the boundary area. Results from a plan plot of TN concentration taken from a simulation of the existing estuary run with tides and winds after about 10 days of simulation demonstrates that the high concentrations and greatest part of the TN mass are confined to the estuarine entrance areas.
- b) Notwithstanding this, the transfer boundary condition was applied to the fine grid estuarine model and the model re-run. As expected, there was a slight difference in the results. However the difference was not significant and does not alter any of the previous conclusions.

The Department is concerned that the boundary model applies to Penrhyn Estuary and therefore does not reliably describe the behaviour of the whole waterway and, in particular, the waterway between the proposed development and the Third Runway. The Department requires detailed modelling to extend beyond the development area by a substantial margin, incorporating the waterway between the proposed development and the Third Runway. The relevance and importance of this is detailed below in relation to flushing times.

Information on changes to flushing times in Penrhyn Estuary

In response to the Department's request, Lawson and Treloar advised that a model was set up with a marker contaminant of concentration 100 filling the whole estuary area for both the existing and developed model layouts. The results indicated that although the flushing times increased significantly from the perspective of relative times, they were not large in absolute terms. Comparisons with Lake Macquarie in NSW and Jervis Bay Northern Harbour in Western Australia were provided.

The Department remains concerned that, using transport-dispersion modelling, there is a danger that the dispersion and/or dilution processes are dominating. In the Penrhyn estuary where depths increase from 1-2m up to 10-16m, dilution (8-16 times) is a major process. To determine retention times – which are very important in this instance – some form of particle tracking method must be used. In many contaminant issues concentrations can be irrelevant, as a single particle can be important – so the transport of these particles is the issue to look at, not dilution (or concentration).

Retention times within the Penrhyn Estuary and the waterway alongside the runway are very important, as full mixing with Botany Bay (and ocean waters) will not be possible until parcels of water approach the end of the runway. The runway waterway will definitely increase retention times as the depth increases to 16m with an associated 16 times drop in velocities magnitudes relative to the Penrhyn Estuary itself. This means that parcels of water will leave the immediate vicinity of Penrhyn on the ebb tide but be drawn back in on the flood tide. This oscillation over many subsequent tides will slowly move the parcel of water towards the Bay proper. And this time will be well in excess of 2-3 days.

It is because of this retention in the runway waterway that the model boundaries are important.

Bay wide Flushing

The Department requested that in addition to a study of changes in flushing within Penrhyn Estuary, the Applicant address potential changes to flushing within the Bay beyond the port and estuary. Lawson and Treloar's advice was that the whole of Bay model was used in both pre- and post-development configurations with initial contaminant patches of concentration of 100 over areas of diameter approximately 200 metres. These patches were initially placed in Brotherson Dock, the Millstream area and near Kyeemagh and Kurnell. Time series plots of the concentration at each of these four sites showed that, with the exception of the Millstream exit area, there was virtually zero change in flushing capacity. The change in the Millstream area was minor and the consultants advised that it would not affect overall water quality in the region.

The Department still requires information on changes to the trapping mechanism of the northwest part of the bay (the development area) and, in particular, whether the proposed development works will affect how water moves into and out of the existing port area. This requires detailed modelling around the port area, with good boundary conditions.

Review of historical modelling predictions

The Department requested a review of the accuracy of historical modelling predictions within Botany Bay for previous major infrastructure works and a comparison with current modelling predictions. Lawson and Treloar undertook investigations focusing on the predicted and actual outcomes associated with the original Port Botany and the Parallel Runway dredging and reclamation activities.

For Port Botany it was found that in areas where wave direction changes were easier to measure, the predictions of the outcomes were accurate, whereas in areas where the wave direction changes were smaller the predictions – using technology available at the time – were made on wave height alone and were proved to be not as reliable.

For the Parallel Runway, computer modelling tools were available which were used to assess impacts along Lady Robinsons Beach and have produced results consistent with the actual outcomes. While the actual dredging that was carried out was different to that assessed in the EIS, the general beach change trends described in the EIS accorded with observed changes but the magnitudes were overestimated using the modelling techniques available at the time.

Modelling tools used both for the Port Botany Expansion EIS and for other major projects have improved in a number of ways

- Numerical models of wave, current and sediment transport have improved – they now include process descriptions, such as wave diffraction, and improved pre and post-processing software that enable more data to be considered which facilitates model comparisons;
- Computing improvements allow much finer grids to be applied in the numerical models, thereby providing greater resolution of seabed features and processes. Many more simulations can be undertaken.
- Data collection procedures have improved and more data is available.

The Department accepts the findings of the review of historical modelling predictions.

Effects on Movement of Spills in Botany Bay

The Department requested the applicant to provide further information on the likely impact of the proposed development on the movement of spills in the Bay, compared with the existing situation. Lawson and Treloar reviewed this issue by undertaking tracer modelling assuming a spill occurring at Kurnell or within Brotherson Dock. The results showed that, in the case of an ebb tide, there would be essentially no change in the fate of the spill. In the case of a flood tide

there would be minor changes in the movement of the spill but no additional environmentally sensitive sites would be impacted as a result.

The modelling was based on the calibrated whole of Bay numerical current model, driven by tides, with no wind influence. The spills were modelled until they reached the mouth of the Bay. However, in practice the spills would have been contained prior to this occurring as Sydney Ports has a responsibility under the Port Safety Operating Licence to respond to port related emergencies within 30 minutes of notification. Sydney Ports has met this licence requirement consistently since the licence was established in 1995.

The Department notes that all spills may not be oil/fuel, and hence are not monitored. While the approach used is satisfactory, particle tracking needs to be monitored from a number of source points and for a number of release times covering different stages of the tide, including different tide ranges. A single release at the beginning of the ebb or flood tide is not representative of possible scenarios. Use of the detailed model to compare trapping in the new development area should be undertaken.

Analysis of Potentially Feasible Options Expanding Container Terminal Facilities at Port Botany

In response to the impact on coastal processes of the alternatives discussed in the *Analysis*, the Department anticipates that the location of each of the five proposed options would not be expected to have any significant bearing on wave and sediment transport processes of the Port generally. It concurs with Lawson and Treloar's modelling predictions and its conclusions regarding the limit of impacts on coastal processes.

Conclusion

To finalise its assessment, the Department requires the Applicant to undertake further modelling in the wider Bay area, as detailed above.

The Department supports the recommendation from DPI (Fisheries) for an adaptive monitoring and management plan. This plan must relate to constructed wetlands, intertidal flats and Penrhyn Estuary and include long term commitments to resourcing. The Department will work with the Applicant to refine, as necessary, the actions in the plan relating to hydrodynamics and coastal processes.

7.7. Human Health Impacts

Applicant's Position

The Applicant undertook a review of human health impacts focussing on *changes* in risks which may arise due to the proposed development.

Existing human health risks

Recreational users of Penrhyn Estuary and Foreshore Beach may be exposed to contaminants by contact with surface water or sediments (eg while swimming) or by consuming fish caught from the Estuary. The volatile halogenated compounds (VHCs) which contribute most to health risks are 1, 2 dichloroethane (EDC), vinyl chloride (VC) and carbon tetrachloride (CTC). The most sensitive group is young children (5 to 12) due to their tendency to wade and swim, their potential sensitivity to chemicals and lower body weight. The consumption of fish represents a negligible risk.

The concentration of VHCs in surface water in the upper reaches of Penrhyn Estuary, upstream of the existing constricted area have approached values that exceed commonly accepted risk goals for recreational use given regular exposure. Recreational use near the existing boat ramp does not represent an unacceptable risk to human health since most of the recreational activities take place in the sandy and open area. The discharge of VHCs in groundwater plumes may result in increased concentration of VHCs in Penrhyn Estuary increasing risks to human health but the Applicant argues that this would occur irrespective of the proposal. In addition it is claimed that ORICA's contingency plan would prevent the contaminated groundwater from reaching the Estuary.

Orica's risk assessment concluded that the sediment-bound contaminants within the project area do not pose a significant risk to human health.

Changes in Human Health Risks

The Applicant notes in the EIS that the proposed development would change the risks to human health due to:

- the proposed confinement of a larger area at Penrhyn Estuary which would lead to a reduction in flushing and thus increase the detectable concentrations of VHCs and other contaminants;
- increased concentrations of VHCs within the upper reaches of Penrhyn Estuary; and
- increased concentrations of faecal contaminants in the upper reaches of Penrhyn Estuary post construction.

Also, Harbourwatch monitoring indicates that Foreshore Beach generally has poorer water quality relative to other monitored beaches. Faecal contamination from the Mill Stream currently poses health risks during recreational activities and moving the boat ramp to the proposed location would increase this risk but Sydney Water Corporation is undertaking works to reduce the events of sewer overflows into the Mill Stream.

Migration of fine sediments along Foreshore Beach into areas currently containing coarse sediments is likely to occur as a result of the proposed development but the Applicant advises that Orica's risk assessment indicates that exposure to sediments is insignificant. The Applicant also proposes to install stormwater quality improvement devices to treat stormwater from Floodvale and Springvale Drains to further reduce the influx of sediment-bound contaminants into Penrhyn Estuary.

The Applicant advises that the *overall* risks to human health would be reduced due to the proposed access restrictions to recreational use areas. This would result in a net reduction in human exposure to areas containing the highest concentrations of VHCs. The proposed changes include:

-
- access to the current road ramp would be removed;
 - access to Penrhyn Estuary would be restricted to a boardwalk and a viewing platform to observe the wading birds. Barriers and signage would be erected; and
 - no swimming in the new channel parallel to Foreshore Beach.

The Applicant concludes that the above measures would reduce the potential for exposure to VHCs in the areas with the highest contaminant concentrations (ie upper Penrhyn Estuary) and could result in an overall reduction of risks to human health.

Issues Raised in Submissions

Public Submissions

Of all submissions received by the Department during the exhibition period, 1.8% of submissions specifically referred to human health issues. The key issue raised related to health hazards due to increase in pollution.

Government Agencies and Council Submissions

A specialist meeting was held between representatives from the Department of Health (NSW Health), DIPNR, Sydney Ports and their experts and consultants on 24 March 2004. The meeting provided an opportunity for a number of issues to be analysed, clarified and further investigated. Sydney Ports provided further information addressing some of these issues on 5, 15, 16 and 21 April 2004. NSW Health and DEC particular areas of concern requiring further investigation include:

- Noise impacts, in particular:
 - need and responsibility for assessment of rail noise impacts;
 - need to readdress noise modelling;
 - need to incorporate sleep disturbance considerations;
 - appropriateness of noise monitoring;
 - detail of assessment of construction noise impacts;
 - consideration of noise impacts under certain wind conditions;
 - need of community involvement in the development of a noise management plan; and
 - significance of noise level changes.
- Contamination, in particular:
 - need for assessment to be based on the latest possible data.; and
 - risks associated with inhalation of vapours from the VHCs present in Penrhyn Estuary.
- Air Quality, in particular:
 - effects of the proposal on odour in Penrhyn Estuary;
 - need for additional air assessment information;
 - road and train traffic air emission assessments; and
 - review of modelling assumptions.

DEC is currently reviewing additional information provided by the Applicant.

NSW Health has considered the EIS and the further information provided by the Applicant and provided a comprehensive assessment into the proposed expansion highlighting air, noise and sediments as specific issues of concern. NSW Health also raises concerns over curtailing of open space for recreational activities, especially in relation to Foreshore Beach.

Botany Council

Botany Council requests further evaluation of human health impacts associated with major earthworks activities (eg excavation, filling and dewatering) associated with shoreline changes in the mud flat and salt marsh area.

Mitigation measures may be required to protect human health depending on the results of site specific groundwater quality data and GDE studies, and the construction/dredging activities in the area of the proposed mud flats and salt marshes.

Randwick Council

Randwick Council is concerned with the risk to human health from sediment bound contaminants and requires a detailed operational management plan to be developed with respect to dredging in the proposed area.

To ensure that the ongoing remediation strategies being carried out at the ORICA site are not adversely impacted by this proposal, consideration should be given to a more detailed and structured consultative process with those responsible for the contamination clean up. This is particularly important given a number of the remediation strategies (including hydraulic containment, bioremediation and reactive iron barriers) proposed are experimental.

The restriction of public access to the potentially affected Penrhyn Estuary does not provide sufficient minimisation of risk to human health due to that area having ongoing connection to the rest of Botany Bay. The migratory patterns of fish (edible) would also need to be considered further as the estuary forms a direct link to the rest of Botany Bay.

Department's Position

The Department concurs with NSW Health that there are a number of issues which require further investigation by the Applicant.

Air – Construction

The Department concurs with the Department's of Health's assessment and considers the Applicant would be required to prepare a Construction Dust Management Plan prior to construction commencing, if applicable.

Air - Operation

Due to the uncertainties and likely health impacts from nitrogen dioxide emissions, the Department supports NSW Health's request for further studies on the impacts due to offsite induced emissions, long term impacts and peak nitrogen dioxide impacts.

Also, refer to the general *Air Quality Impacts* section (7.11) for the Department's detailed position and preliminary assessment.

Noise - Construction

Further investigation on the noise impacts on sensitive noise receptors is required, especially data from the closest receptor – Sir Joseph Banks Park/ Golf Course.

The Department considers that a Construction Noise Management Plan would need to be drafted by the Applicant, in consultation with the local community and submitted to the Department prior to construction. The Department concurs with the proposal for a noise complaints handling mechanism as outlined in the EIS. As recommended by NSW Health, a 24 hour hotline operated by Sydney Ports would be appropriate. Also, the Department recommends that reports outlining frequency and nature of calls should be forwarded to the DEC on a monthly basis during the impact pile driving stage of the construction phase.

Noise - Operation

The Department concurs with the Department of Health's request for Port Traffic and Rail Noise Management Plans to be submitted for the Director-General's approval as part of the Operational Environmental Management Plan (OEMP) prior to operations commencing. An Operational Noise Management Plan should also form part of the OEMP.

Also, refer to the general *Noise Impacts* section (7.2) for the Department's detailed position.

Sediments

The Department supports NSW Health's request for a more substantial sediment sampling protocol; including more deep core sediment sampling and characterisation for the full range of chemicals in each sample.

Also, as indicated in the Groundwater section, the Department recommends that the latest information from Orica regarding groundwater be used in conducting further modelling including an assessment of the impact of VHCs on air quality particularly the potential effect on those using the proposed wetland boardwalk. A more thorough assessment of the potential impact of odours on both users of the boardwalk and on nearby residents is recommended.

Also, refer to the following sections for the Department's detailed position on sediments, groundwater and recreational issues: *Surface Water Quality Impacts* (7.13), *Impacts on Geology, Soils and Geotechnical* (7.5), *Impacts on Groundwater* (7.4) and *Socio-Economic Impacts* (7.17).

Conclusion

The Department concludes that while human health impacts associated with the construction and operation stage of the proposal have been substantially addressed, there are still some outstanding issues to be resolved. The Department supports NSW Health's requests for additional information and has highlighted a number of requirements regarding the impacts associated with the proposal. The Department will finalise its assessment once the additional information is received.

7.8. Hazards and Risk Impacts (PHA and Bird Hazard)

This section represents the Department's revised assessment of the Applicant's position regarding Hazards and Risk Impacts. It includes a detailed review of the updated Preliminary Hazard Analysis (PHA) provided by the Applicant on 9 June 2004.

Applicant's Position

Hazard Identification

In accordance with the requirements of *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development*, the Applicant prepared a PHA to demonstrate that risks associated with the proposed development could be adequately mitigated.

The hazard identification, to identify hazards and related credible incidents that may occur at the proposed development, considered each of the 9 Classes of Dangerous Goods as set out in the Dangerous Goods Code.

In summary the identified hazardous incidents were:

- Loss of containment due to handling at the terminal;
- Loss of containment during transport to and from the terminal; and
- Loss of containment due to impact from an external event.

Incident Consequences

The PHA provides an assessment of the consequences of each of the significant incidents identified to establish the impact of those incidents, should any occur. Incidents were divided into general groups depending on the type of impact each incident may represent – toxic gas release and/ or fire/explosion.

Consequences estimated in the PHA for hazardous incidents associated with the dangerous goods movements modelled in the PHA (seven types of movement were established through the hazards identification process) are summarised below. The scenarios selected by the Applicant as shown in Table 7.5.1 and Table II.2.1 are consistent with a representative range of worst case scenarios, except in relation to the screening of Class 6.1 toxic liquids and solids. However, the link between the tabulated scenarios and the example consequence calculation results comparing the toxicity of gases is not clearly presented and can lead to ambiguity as to what quantities were used in the consequence modelling and subsequent development of the risk contours.

Consequence modelling presented in the PHA: Distances to Impacts

Incident	Distance to Fatality (m)	Distance to Injury (m)
12 t Class 1 Explosives	350m	700m
5 t Class 1 Explosives	250m	500m
50mm leak and jet fire in Class 2.1 Flammable Gas tank (propane)	150m	180m
Failure of 10 t propane tank and explosion (BLEVE)	120m	240m
Flash Fire - propane leak.	200m person within the gas cloud is assumed to be a fatality	A person outside gas cloud is assumed to be unaffected
Toxic gas Class 2.3 Chlorine release.	240m (50% probability of death)	300m (20% probability of death)
Toxic gas Class 2.3 Hydrogen Sulphide release	280m (50% probability of death)	310m (20% probability of death)

Incident Frequencies

Since all cargo proposed to be handled will be containerised, the Applicant used historical (over a 10 year period) data used in a study for another Australian Port to estimate the likelihood of a dropped container on a per container handling from ship to truck/rail basis (i.e includes any intermediate set downs and pickups – typically up to 6 lifts) as 6.7×10^{-6} . The Applicant justified this figure by comparing it with the offshore industry frequency for a dropped object of 1×10^{-5} per lift. Probability of loss of outer containment (by damage to shipping container) was taken as 0.1. For drums inside the shipping container, the probability of a leak was taken as 0.5 given loss of outer containment. No actual data was provided for Port Botany.

Analysis of Risk

The Applicant used its computer software to calculate and combine the consequences for the identified hazardous incidents and the frequencies developed to map risk contours associated with the operation of the proposed development. From the mapping of those contours, the Applicant compared the estimated risks with the Department's land use safety criteria, as provided in Table 1 below.

Table 1 - Comparison of Risk Results in PHA with Land Use Safety Criteria – Proposed Development

Department's Criteria	Risk from Proposed Development	Risk from Associated Transport
< 1×10^{-6} per annum fatality risk level at residential and continuously occupied areas	1×10^{-6} per annum risk level does not reach residential areas.	1×10^{-6} per annum fatality risk level is limited to the Port area.
Risk of exceeding injurious toxic concentrations to be less than 10×10^{-6} per annum in residential areas	Risk of exceeding injurious toxic concentrations of 10×10^{-6} per annum encroaches on to residential areas to the north.- CRITERION EXCEEDED	Injury risk not calculated
Risk of exceeding irritating toxic concentrations to be less than 50×10^{-6} per annum in residential areas	Risk of exceeding irritating toxic concentration of 50×10^{-6} per annum does not encroach on residential areas.	Irritation risk not calculated

Based on the comparison provided above, the Applicant considers that the proposed development can be operated without exerting a significant risk impact on surrounding land uses even though the injury risk criterion is exceeded. The reasons given for suggesting acceptance of the exceedance are that the analysis was conservative and there was a margin of error.

Bird Hazard

The Applicant considers that with appropriate design and management, the proposed Port Botany Expansion would not increase the existing bird hazard to aircraft operating from Sydney Airport.

With better management and enclosed fish cleaning facilities, the Applicant considers that the replacement boat ramp at Foreshore Beach would be likely to attract fewer birds than the existing ramp at Penrhyn Estuary.

The enhancement of habitat for migratory shorebirds may increase the use of this area by shorebirds. However, as shorebirds currently pose a minimal threat to aircraft, the applicant claims that the habitat would not pose a significant bird hazard.

To reduce and manage risks associated with bird hazards, the Applicant proposes to prepare a Bird Hazard Management Plan for the proposed construction and operation stages. The proposed management plan includes monitoring of bird movements.

Issues Raised in Submissions

Of all submissions received by the Department during the exhibition period, approximately 80% of submissions specifically referred to risk assessment, contamination and emergency incidents. The key issues raised were increasing of volatile environment, safety and risks concerns and further contamination of the Bay.

Government Agencies and Council Submissions

Apart from an extensive submission from City of Botany Bay Council, and another from Randwick City Council and the Department of Environment and Conservation (DEC), other submissions received by the Department did not raise any specific hazards related issues. Botany Council's submission included a summary of a review of the risk related issues carried out by a Consultant commissioned by Council. The consultant's report was subsequently received by the Department.

Key issues raised in submissions were:

- Lack of transparency in the hazard analysis;
- Assumptions made were not adequately justified;
- Cumulative risk contours were not included for the site (i.e. for the total port);
- Cumulative risk contours for the proposed operations and transport were not developed;
- Given that the 0.5×10^{-6} fatality risk contour (for the site only) falls outside the cumulative fatality risk criterion (residential) contour shown as a limit in the Port Botany Study (1996) report recommendations, it is likely that a cumulative contour would exceed the criterion;
- If a comprehensive hazard analysis is carried out, the residential risk criterion may be exceeded;
- Exclusion of flammable liquid incidents; emissions of possible resulting toxic combustion products from the flammable liquids and also from other containers carrying Class 6.1 toxic liquids that may be impacted by an incident associated with a flammable liquids container, have therefore been excluded possibly resulting in an underestimation of risk;
- Failure to consider scenarios such as containers being dropped into the water and rail or truck related incidents on site; and
- Unclear if data used in road transport risk calculation was also used for rail transport risk calculations. If so, the results would be meaningless.

DEC

DEC acknowledges that it does not have a formal role in the review or implementation of preliminary hazard analyses as the framework prescribed by *SEPP 33 Hazardous and Offensive Industries* is overseen by DIPNR. However, DEC has drawn attention to the following matters:

- DEC recommends that should the Minister determine to approve the proposal, consent conditions should require public consultation to achieve community acceptance of the proposed *Emergency Response and Incident Management Plan*.
- The statement made in the EIS regarding 'Biophysical Risk' would appear to imply that the fuel storage tank at the new Port is just one more in an industrial area that has many, so that even if this storage tank isn't completely safe, it would not add significantly to the overall risk. It should be clarified whether the overall risk is considered to be insignificant in any determination.

Bird Hazard

Public Submissions

Up to 80% of submissions received by the Department raised issues regarding risk assessment, contamination and emergency incidents. A number of these issues raised particular concern with bird hazards and bird strike. The key issue raised related to the management of bird hazard and bird strike potential.

Government Agency and Council submissions

Department of Transport and Regional Services

Requires that the Bird Hazard Management Plan is to be coordinated with Sydney Airports Corporation Limited (SACL) to ensure compatibility with SACL's plan.

Botany City Council

Council has raised a number of concerns regarding Bird Hazards including:

- Concern regarding the consequences that may arise from bird strike.
- Need for an effective plan in place to minimise and reduce bird strike.
- Need for input into the debate from relevant Government agencies such as Airservices Australia, CASA or the Australian Transport Safety Bureau.

Randwick City Council

Council has raised a number of concerns regarding Bird Hazards, including the need for further detail on the suitability and integration of the management strategies for encouraging tidal wader birds whilst discouraging larger birds representing bird strike hazard to aircraft.

Department's Position

After consideration of the Applicant's revised EIS & PHA, the Department makes the following considerations.

Bird Hazard

The Department considers that adequate assessment has been provided by the applicant regarding potential bird hazards. However, the Department concurs with the Department of Transport and Regional Services (DOTARS), Botany City Council and Randwick Council that a detail management plan is required to be prepared in consultation with DOTARS and Sydney Airport Corporation to ensure the management plan is consistent with the Sydney Airport Corporation management plan. This could form a condition of consent should the Minister determine to approve the proposal.

Compliance with the recommendations made in the Port Botany Land Use Safety Study

The key aspects of the Department's initial submission to the COI addressed the relevance and applicability of the five main recommendations made in the Port Botany Land Use Safety Study. The Department's revised position, based on the revised PHA provided by the Applicant, is as follows:

- Recommendation 1. As stated above, the main issue raised by the Department in the primary submission was the exceedance of the injury risk criterion in the residential area to the north of the site. The PHA as submitted with the EIS used historical data from the period 2001/2002 when Orica was manufacturing and exporting the Class 2.3 dangerous good, chlorine. The chlorine plant was shutdown in 2002 and export ceased. The use of post 2002 data from Sydney Ports reflecting the reduced volumes of Class 2.3 dangerous goods (toxic gases) handled resulted in the reduction of the risk contours. The injury risk criterion is no longer exceeded. Further, the 1 in a million cumulative individual fatality risk for the Port area including the proposed expansion does not exceed the 1 in a million cumulative individual risk contour shown in figure 2 of the Port Botany Study. Therefore the Department now considers recommendation 1 has been met.
- Recommendation 1.1. The Department considers that regular updating of the cumulative risk contours using actual data should be carried out as per recommendation 1.4 of the Port Botany Study to facilitate monitoring of the increase in Class 2.3 dangerous goods and to ensure that there will be no significant increase in risk by the application of controls. Subject to the Department's recommendations above being carried out over the operating life of the proposed expansion, the proposal can be considered to have met the intent of recommendation 1.1 of the Port Botany Study.
- Recommendation 1.2. The Department considers a comparison of figures 10.1 (figure 2 from Port Botany Study) and 10.2 of the revised PHA shows that there will be no increase

in cumulative individual risk from the proposed port operations. The transport risk contours in figure IV.7.1 of the revised PHA demonstrate that the 0.5×10^{-6} per year fatality risk contours from transport of the forecast ultimate 3.4 million TEU port throughput is generally within the 1×10^{-6} per year risk contour in figure 2 of the Port Botany study and will **not** contribute to a significant increase in risk.

With regard to societal risk, figure 9.5 in the revised PHA shows the societal risk from the proposed expansion plus the Patrick operation as a F-N Curve. Comparison of this curve with figure 9 of the Port Botany Study indicates that there is no significant increase in societal risk although the curve has marginally encroached further into the As Low As Reasonably Practicable (ALARP) region.

The Department considers that additional risk reduction measures to reduce the risks to as low as reasonably practicable should be implemented. The Department considers the Applicant will need to prepare a Final Hazard Analysis (FHA) including risk reduction measures for implementation. Suggested risk reduction measures proposed by the Department for evaluation in the FHA would include the exclusion of class 2.3 toxic gases and class 6.1 toxics from the northern half of the proposed extension. Such a measure is expected to reduce societal risk and also shift the individual risk contours away from the residential areas to the north of the proposed extension.

The FHA would also be required to be updated at 5 year intervals to track actual trends in dangerous goods throughput and monitor risk levels. Subject to the above recommendations being adopted by the Applicant, the Department considers that recommendation 1.2 of the Port Botany Study will not be compromised.

Analysis of Risks

The Department notes that the port throughputs are measured in terms of twenty foot container equivalents (TEU). The revised PHA does not clearly indicate if a significant proportion of dangerous goods is likely to be transported in 40 foot containers; and if so, would the consequence calculations be affected. The Department asked Sydney Ports and its consultant to provide clarification if any increase in consequence distances would outweigh the reduction in frequency (reduced number of containers handled). No response has been received to date on this issue. The Department considers that if significant volumes are transported in 40 footers, then an initial sensitivity analysis may be necessary to verify if further analysis is required.

Other issues

The Department also requested details were requested regarding:

- the smoke from fires involving toxics;
- explosive potential of ammonium nitrate in accidents;
- derivation of probits for fatality, injury and irritation; and
- clarification of the 5 tonne unit used in the comparative analysis;

The additional details/clarifications included in the PHA (revision 7) have been reviewed and are considered to be satisfactory.

Conclusion

Subject to satisfactorily resolving the issue regarding risks associated with the proportion of dangerous goods likely to be transported in 40 foot containers; and the subsequent consequence calculations, the Department considers the revised PHA has adequately addressed the hazards related issues for the proposal as detailed in the EIS and the Department considers that the cumulative risks for the port will generally be within the recommendations of the Port Botany Land Use Safety Study (1996). Recommendations included above would need be adopted by the Applicant to further reduce the risks and to ensure that there will be no significant increase in risk with increases in throughput at projected rates.

7.9. Emergency Incident Management

Applicant's Position

The Applicant claims that future operator(s) of the proposed new terminal area would prepare an Emergency Response and Incident Management Plan (ERIMP), with advice from the Applicant, prior to the new terminal commencing operations. The purpose of the ERIMP would be to provide an organised and practised response to incidents and emergency situations to protect employees, the public and the environment.

The EIS suggests that the ERIMP would be considered in the context of the existing Port Botany Emergency Plan (PBEP), which was developed by the Applicant in conjunction with existing terminal operators and emergency services organisations. The ERIMP for the proposed expansion would essentially represent an extension of the existing emergency and incident management system which is argued to have been proven to be effective in the past.

Emergency response is among the port safety functions mandated by statute for Sydney Ports Corporation. To be able to respond to spills, Sydney Ports Corporation has the largest inventory of oil spill equipment of any Australian port. In addition, under national mutual aid arrangements, supplementary equipment is available from other states, the Navy and industry.

The proposed expansion area would be a Customs controlled area and would be equipped with security features consistent with the requirements of the International Maritime Organisation's *International Ship and Port Facility Security Code*.

The EIS concludes that that the combination of internal and external emergency response and incident management resources that would be made available to the proposed Port Botany Expansion and the terminal security measures would adequately minimise risks to employees, the public and the environment.

Issues Raised in Submissions

80.4 % of submissions received by the Department indicated the people are particularly interested in risk assessment, contamination and emergency incident issues associated with the proposal. In regard to emergency and incident management the following key issues have been raised:

- Concern with volatile environment.
- Increased risk of truck accidents.
- Problem with existing excessive concentration of hazardous industry in the area.
- High risk of catastrophic events.

Botany City Council

Council considers the emergency and incident management chapter in the EIS needs to be reviewed.

DEC

DEC considers that, were the project to proceed, it would be preferable to develop a single set of procedures, consistent with the existing *Port Botany Emergency Plan*, that can be scaled as appropriate for any incident or emergency. This may be appropriate to include as a consent condition. DEC recommends that, as a consent condition, *a single set of emergency procedures, consistent with the existing Port Botany Emergency Plan, should be developed that can be scaled as appropriate for any incident or emergency.*

It is not suggested that public consultation will occur. DEC considers, that were the project to proceed, consent conditions should require community consultation during the development of the ERIMP, which would be essential to achieve community acceptance of the plan.

DEC have emphasised that the statement in the EIS regarding the proposed ERIMP- “*the ERIMP would include an incident reporting system. Specific incidents and corrective action taken (where required) shall be registered. If an incident occurs that had caused, or would be likely to cause harm to the environment, the terminal operator(s) would report the event to the relevant authority and Sydney Ports Corporation as soon as practicable.*” is acceptable, and is in fact legally required under the ‘duty to notify’ provision of the Protection of the Environment Operations Act.

DEC summarises key issues through a series of recommendations, including:

- The appropriateness of the injury risk standards and methodologies used should be clarified.
- That the overall risk is of fuel storage tanks is considered to be insignificant should be clarified.
- Consent conditions should require detailed design to include a stormwater system capable of containing both spilled product as well as the run-off from fire-fighting or a reasonable storm event without flushing the product to Penhryn Estuary or Botany Bay.
- Consent conditions should require a procedure to be developed and implemented that ensures that dangerous goods loaded vehicles leaving the terminal comply with requirements of the *Australian Dangerous Goods Code*.
- A single set of emergency procedures, consistent with the existing *Port Botany Emergency Plan*, should be developed that can be scaled as appropriate for any incident or emergency.
- Consent conditions should require public consultation to achieve community acceptance of the proposed ERIMP.

There were no other submissions received from Government agencies or Councils that specifically address emergency incident management issues.

Department’s Position

Due to the size of the proposed construction stage, the Department recommends that the Emergency Response and Incident Management Plan should be prepared for both construction and operation stages.

The Department also supports DEC’s recommendations that:

- A single set of emergency procedures, consistent with the existing *Port Botany Emergency Plan*, should be developed that can be scaled as appropriate for any incident or emergency.
- Consent conditions should require public consultation to achieve community acceptance of the proposed ERIMP.

7.10. Operation Aviation Issues

Applicant's position

The Applicant states in the EIS that the proposed development has the potential to impact on the operations of Sydney Airport, in particular, the airport's protected airspace, radar capability and navigation systems. Also, light spills would be likely to affect the identification of airport makers for landing purposes.

The Applicant advises that there are potential impacts in both the construction and operational phases of the proposed development:

Construction

Protected Air Space

The Applicant notes in the EIS that there would be no anticipated impacts on the Obstacle Limitation Surface (OLS) which is the imaginary surface above ground designed to provide protection for aircraft flying into or out of the airport when the pilot is flying by sight. The Applicant would select equipment, including lighting masts and pile drivers so as not to intrude into the OLS.

Radar and Navigation System

The Applicant states that the potential impacts on radar and navigation systems would be negligible since no construction equipment would be of sufficient vertical and lateral dimension to mask radar signals, create significant radar reflectivity or cause signal interference.

Light Spill

The Applicant advises that construction lighting would not be expected to result in light spills into the restricted zones except during night dredging operations and reclamation work along the western edge of the new terminal. For night time operations, the Applicant proposes to mount lights at low levels and position them so as to avoid light spills.

Operation

Protected Air Space

The Applicant states in the EIS that there would be no fixed or mobile structures in the new terminal which would intrude on the Obstacle Limitation Surface (OLS). The most vertically prominent equipment would be the quay cranes but the Applicant has selected sliding boom type quay cranes which would at all times remain under the OLS.

Radar Services

The proposed development could affect Sydney Airport's radar services through the masking of the radar's line of sight and increased radar reflectivity from new structures and berthing ships. The potential impacts and proposed mitigation measures are summarised in Table 2.

Table 2 – Radar Services Impacts and Mitigation

Radar Service	Impacts (on line of sight and reflectivity)	Mitigation
Surface Movement Radar	<ul style="list-style-type: none"> Minimal adverse impacts on line of sight Primary reflection not likely to cause problems 	None required
Terminal Approach Radar (Primary)	<ul style="list-style-type: none"> Reduction in primary coverage at low altitudes. Masking by new structures would render targets below 1,200 ft at 20 nautical miles (nm) not visible. Vessels in transit to new berths would create a false target and reduce target detection sensitivity inside 10 nm 	<ul style="list-style-type: none"> increasing radar height or relocating the radar tuning of track processing equipment the existing facility likely to undergo a technological upgrade to a processing system which would improve performance prior to terminal operations
Terminal Approach Radar (Secondary)	<ul style="list-style-type: none"> Masking by new structures and vessels would render targets below 1,200 ft and 14 nm not visible. Increase in reflections due to large flat sides of ships and containers 	<ul style="list-style-type: none"> increasing radar height or relocating the radar system tuning to improve discrimination of real from 'reflected' tracks, enhance long range performance
Route Surveillance Radar (Mount Boyce)	<ul style="list-style-type: none"> Impact on the existing coverage likely to be minimal Increase in reflections due to flat sides of stacked containers and ships, especially when adjacent ships provide a wide target, but these reflecting signals could be detected and removed 	<ul style="list-style-type: none"> tuning of track processing equipment to mitigate impacts
Precision Approach Runway Monitor (PARM)	<ul style="list-style-type: none"> Coverage not likely to be affected Port structures and berthing ships could introduce errors and affect PARM capability to monitor simultaneous independent parallel approaches from the south onto the North-South and Parallel Runways. The unavailability of the PARM would adversely affect the rate of arrivals on both runways 	<ul style="list-style-type: none"> the existing PARM is scheduled for major maintenance in 2004/05 and replacement by 2009. By 2010 there would have been significant development in PARM technology to eliminate the anticipated impacts. SPC would coordinate and work with CASA, Airservices Australia and SACL during the design, development and implementation stage to ensure that any impacts are satisfactorily addressed.

Navigation System

Navigation systems provide for the safe and efficient operation of aircraft including approach and landing. The international standard system for approach and landing guidance is called the Instrument Landing System (ILS) which is comprised of:

-
- a 'Localiser' which aligns with the runway centreline and provides direction guidance;
 - a 'Glide Path' for elevation and descent angle guidance; and
 - either 'Marker Beacons' or distance measuring equipment (DME)

At Sydney Airport the ILS likely to be affected are the 16L Localizer, 34R Localizer and Runway 34R Glide Path. Interference would most likely be caused by container ships while they are transmitting to and docked at the new terminal. Ships of 3000, 4500 and 6000-8000 TEU classes are likely to create unacceptable level of interference. Mitigation measures suggested by the Applicant include upgrading the current antenna system to a higher category and introducing new technology when the ILS is decommissioned from 2010.

Light Spill

The Applicant proposes several lighting design measures to mitigate the effect of light spill from the proposed development.

- High masts – lighting would be directed down to the intended application area with minimal light spill outside the area boundaries.
- Quay cranes – lighting of shuttle boom quay cranes would be specified as downlight types to meet civil aviation requirements.
- Ships – one option is for lighting on board ships whilst berthed to be provided, primarily by the shuttle boom quay cranes with supplementary lighting on board only being provided where necessary.

Issues Raised in Submissions

The Department did not receive additional submissions from DOTARS, Airservices and the Sydney Airport Corporation Limited during the re-exhibition period. However, the Department has reviewed the DOTARS and Airservices initial submissions to the COI.

DOTARS

The submission made by DOTARS to the COI provides an outline of the approval requirements and processes applying under the *Airports (Protection of Airspace) Regulations 1996*. The submission indicates that DOTARS understands from the Applicant's EIS that the proposal would not infringe Sydney Airports Obstacle Limitations Surface or Procedures for Air Navigation Systems Operations. The submission also notes that if the proposal is likely to infringe on the Sydney Airports Obstacle Limitations Surface or Procedures for Air Navigation Systems Operations, an approval would be required under the *Airports (Protection of Airspace) Regulations 1996*.

Airservices Australia

Australia has indicated that its facilities which provide service in and around Sydney Airport will be impacted by the proposal.

Airservices Australia's initial submission to the COI indicates that the large area of the proposed development will substantially affect the operation of radar systems at Sydney Airport. While Airservices Australia has confidence that technologies can be developed to replace existing technology, it indicates that these technologies cannot be guaranteed to be in place by 2010 and, in some cases, by 2020.

Airservices initial submission to the COI makes reference to future technologies that have been suggested by the Applicant as potential solutions and mitigators to the effects of the proposal.

Airservices has suggested that "to provide appropriate mitigators to the effects of the PBE development, Airservices believes that a combination of technologies would be required". However Airservices also makes the following statements:

- While technology shows considerable promise, it is not yet advanced enough and is not currently accepted by International Civil Aviation Organisation as a suitable surveillance tool to support aircraft separation or Precision Runway Monitor (PRM) operation."

-
- “The adoption of these technologies requires development, international standardisation, commercialisation, aircraft fitment, certification and operating approvals as well as ground system deployment.”
 - “To have any chance of meeting the timeframe of the Port Botany Expansion development, Airservices and the aviation industry operating in Australia, would have to pioneer and develop the operational deployment and use of this technology.”
 - “Airservices Australia is committed to working with Sydney Ports Corporation to develop a shared understanding of each organisation’s future plans and strategies”.

Department’s Position

The Department requires the Applicant conduct further liaising with the Federal Department of Transport and Regional Services, Airservices and the Sydney Airport Corporation Limited (or as appropriate), in order to:

- mitigate the effects of the large reflection area on the Terminal Area Radar’s visibility and the Mt Boyce Route Surveillance Radar;
- establish security and monitoring protocols to prevent recreational vessels straying into the exclusion zone and in the proposed enclosed open area;
- maintain a fuel pipeline reserve along Foreshore Drive;
- conduct a review of the any likely impacts from dredging on the overall stability of the seawall at the southern end of Runway 16L/34R and establish monitoring and mitigation measures (if any) on impacts of future wave height conditions adjacent to the runway and provide data to SACL;
- conduct a traffic analysis on the likely impact of traffic movements around the Airport; and
- consult with SACL in establishing the Bird Hazard Management Plan.

At the time of writing the Department is not aware of such consultation or agreements being reached or if the Applicant has responded to the Airservices, DOTARS and Sydney Airport Corporation submissions.

Due to the uncertainties surrounding the ability to mitigate impacts of the proposal on operation aviation issues and while this fundamental issue seems to remain unresolved, the Department is not in a position to finalise its assessment of the proposal in that regards. The Department expects that as a minimum all relevant issues be clearly exposed and understood; and that all agreed arrangement to be finalised (even in principle) to enable a recommendation to be made.

7.11. Air Quality Impacts

Applicant's Position

Existing Ambient Air Quality

The air quality surrounding Port Botany is influenced by both local and regional pollutant sources, including road traffic, domestic sources, aircraft and a variety of industrial emissions. Sea breezes play a significant role in dispersing pollutants. The applicant conducted air quality monitoring between July 2000 and August 2002 from the Sydney Airport monitoring site at Mascot. The data obtained is represented in table 3.

Table 3

Pollutant	Averaging Period	Monthly Average Background*	Monthly Maximum Background*	Average Background for Impact Assessment**	Current Criterion	
					NSW EPA Criterion (for long term projects)	Project Specific Criterion
PM ₁₀	24-hour	20 µg/m ³	47 µg/m ³	34 µg/m ³	50 µg/m ³	16 µg/m ³
	Annual	-	-	20 µg/m ³	30 µg/m ³	10 µg/m ³
Dust Deposit	-	-	-	15-2g/m ² /month	4g/m ² /month	2g/m ² /month
SO ₂	10-minute	N/A	N/A	N/A	712 µg/m ³	712 µg/m ³
	1-hour	4 µg/m ³ (0.2pphm)	49 µg/m ³ (1.9 pphm)	27 µg/m ³ (1.0 pphm)	570 µg/m ³ (20 pphm)	543 µg/m ³ (19 pphm)
	24-hour	6 µg/m ³ (0.2 pphm)	16 µg/m ³ (0.5 pphm)	11 µg/m ³ (0.4 pphm)	228 µg/m ³ (8 pphm)	217 µg/m ³ (7.6 pphm)
	Annual	-	-	6 µg/m ³ (0.2 pphm)	60 µg/m ³ (2 pphm)	54 µg/m ³ 1.8 pphm)
NO ₂	1-hour	24 µg/m ³ (1.2 pphm)	103 µg/m ³ (5.0 pphm)	64 µg/m ³ (3.1 pphm)	246 µg/m ³ (12 pphm)	182 µg/m ³ (8.9 pphm)
	Annual	-	-	24 µg/m ³ (1.2 pphm)	62 µg/m ³ (3 pphm)	38 µg/m ³ 1.8 pphm)

Construction Impacts

The methodology used for assessing the dust impacts of the construction phase of the proposal was based on the NSW EPA guidelines: *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*. During the period of assessment the background PM₁₀ data revealed 27 exceedences. During the construction period, three years were identified as being the 'worst years' in terms of air impacts.

- Year 1 involves construction of boat ramp and tug berth, dredging and reclamation, rock embankment placement;
- Year 2 involves tug berth construction (truck deliveries, retaining wall), dredging and reclamation, rock armouring (wharf/deck construction), beach enhancement; and
- Year 3 involves boat ramp construction (wheel generated dust by trucks), dredging and reclamation (pre/loading), rock armouring (wharf/deck construction).

Modelling also incorporated mitigation measures, for example, for Year 2 incorporated dust control measures such as watering of roads, application of water sprays and wind breaks.

Air dispersion modelling for the three 'worst years' are provided in the following table:

Key Pollutant and Averaging Period	Scenario	NSW EPA criterion ($\mu\text{g}/\text{m}^3$)	Average background concentration* ($\mu\text{g}/\text{m}^3$)	Site criterion ($\mu\text{g}/\text{m}^3$)	Max Concentration at a residential receiver ($\mu\text{g}/\text{m}^3$)
PM ₁₀ (24-hour)	Y1	50 $\mu\text{g}/\text{m}^3$	34 $\mu\text{g}/\text{m}^3$	16 $\mu\text{g}/\text{m}^3$	~2 $\mu\text{g}/\text{m}^3$
	Y2	50 $\mu\text{g}/\text{m}^3$ -	34 $\mu\text{g}/\text{m}^3$	16 $\mu\text{g}/\text{m}^3$	~16 $\mu\text{g}/\text{m}^3$
	Y3	50 $\mu\text{g}/\text{m}^3$	34 $\mu\text{g}/\text{m}^3$	16 $\mu\text{g}/\text{m}^3$	~16 $\mu\text{g}/\text{m}^3$
Dust Deposition (Annual)	Y1	4g/m ² /month-	2g/m ² /month	2g/m ² /month	~0.3g/m ² /month
	Y2	4g/m ² /month	2g/m ² /month	2g/m ² /month	~2g/m ² /month
	Y3	4g/m ² /month	2g/m ² /month	2g/m ² /month	~2g/m ² /month

- the figures show that the construction activity would not result in additional exceedences of the PM₁₀ (24 hour) criteria or dust deposition when added to the measured background concentrations within the residential areas closest to the site during year 1;
- for year 2 and 3, the construction operations have the potential to result in two additional exceedences the PM₁₀ (24 hour) criteria but this result is not considered significant given the annual average of 27 exceedences of the 50 $\mu\text{g}/\text{m}^3$.

Operation Impacts

The impacts of air emissions containing PM₁₀, SO₂, NO_x, and CO during the operation of the new terminal were modelled using three scenarios

- Scenario 1 – existing case;
- Scenario 2 – the proposed terminal operating by itself at throughput of 1.6 million TEUs; and
- Scenario 3 - all the terminals operating at a collective throughput of about 3.2. million TEUs.

The methodology included emissions from ships (mainly SO₂) trucks, trains and dockside equipment. Operations were modelled 24 hours a day, 7 days a weeks. PM₁₀, SO₂, NO_x were modelled using AUSPLUME. Modelling of CO emissions was not considered necessary since CO emissions represent a lower quantity of emissions compared to NO_x and SO₂ emissions.

Particulate Matter

Table 4 – Predicted PM₁₀ Ground Level Concentrations

Averaging Period	Scenario	Site Criterion ($\mu\text{g}/\text{m}^3$)	Max concentration at residential receiver ($\mu\text{g}/\text{m}^3$)	Max concentration beyond SPC terminal boundary ($\mu\text{g}/\text{m}^3$)
24 hour	1. Existing	16	4	9
	2. New Terminal at 1.6 million TEU throughput	16	4	7
	3. All Terminals at 3.2 million TEU throughput	16	7	13
Annual	1. Existing	10	1	2
	2. New Terminal at 1.6	10	1	2

	million TEU throughput			
	3. All Terminals at 3.2 million TEU throughput	10	2	4

The results obtained indicate that there are no exceedences of the site criterion for 24-hour and annual averaging periods for any of the scenarios, therefore, the proposal would only provide a marginal increase in PM10 concentrations within neighbouring residential areas.

Oxides of Nitrogen

Table 5 – Predicted NO₂ Ground Level Concentrations

Averaging Period	Scenario	EPA Criterion (µg/m ³)	Max concentration at residential receiver (µg/m ³)	Max concentration beyond SPC terminal boundary (µg/m ³)
1 hour	1. Existing	246	200	220
	2. New Terminal at 1.6 million TEU throughput	246	15	175
	3. All Terminals at 3.2 million TEU throughput	246	210	230
Annual	1. Existing	62	35	40
	2. New Terminal at 1.6 million TEU throughput	62	34	39
	3. All Terminals at 3.2 million TEU throughput	62	35	40

Modelling results show that the operational NO₂ impacts do not at present or would not in the future cause any exceedence of EPA criteria when existing background levels are considered on an hourly basis.

Sulphur Dioxide

Table 6 – Predicted SO₂ Ground Level Concentrations

Averaging Period	Scenario	Site Criterion (µg/m ³)	Max concentration at residential receiver (µg/m ³)	Max concentration beyond SPC terminal boundary (µg/m ³)
10 minute	1. Existing	712	155	190
	2. New Terminal at 1.6 million TEU throughput	712	100	115
	3. All Terminals at 3.2 million TEU throughput	712	205	205
1 hour	1. Existing	543	145	245
	2. New Terminal at 1.6 million TEU throughput	543	130	170
	3. All Terminals at 3.2 million TEU throughput	543	210	270

24 hour	1. Existing	217	45	70
	2. New Terminal at 1.6 million TEU throughput	217	45	65
	3. All Terminals at 3.2 million TEU throughput	217	90	100
Annual	1. Existing	54	3	5
	2. New Terminal at 1.6 million TEU throughput	54	3	5
	3. All Terminals at 3.2 million TEU throughput	54	8	14

The results obtained show that no exceedences of the site criterion for 10 minute, 1 hour, 24 hour or annual averaging period for any the scenarios.

Greenhouse Gases

The Applicant concludes that in terms of greenhouse gas emissions there is a distinct advantage to locating the proposal within Sydney. Sinclair Knight and Mertz undertook a study which found that the overall greenhouse gas emissions would be reduced by approximately 505,000 tonnes per annum due to the decrease in the total kilometres travelled by trucks and trains which would otherwise be on the roads if the port facilities were located in other areas of NSW.

Mitigation Measures

During construction the Applicant proposes to implement a Dust Management Plan (DMP) as part of the Construction EMP to minimise the potential for offsite dust emissions from exposed work areas. Some of the mitigation measures to be included in the DMP include:

- apply water to active earthwork areas, stockpiles, gravel roads and loads of soil being transported to minimise wind blown dust emissions;
- site roads to consist of coarse gravel and be kept wet; and
- place a thin bituminous membrane layer to sections of the reclaimed area not being used to stabilise and reduce wind blown dust.

For the operational phase, the assessment shows that impacts on the air quality are acceptable and, as a result, no specific air quality mitigation measures would be required.

Monitoring

The Applicant proposes monitoring in areas considered most likely to receive dust impacts prior to and during construction in accordance with the NSW EPA's *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*. In particular, one high-volume air sampler (HVAS) would be installed with the residential area to the north of Foreshore Road. This is an area which according to the modelling would receive the greatest dust impacts during construction. Three dust deposition gauges would also be installed.

Issues Raised in Submissions

Public Submissions

Of all submissions received by the Department during the exhibition period, 70.9% of submissions specifically referred to air issues. The key issues raised were increasing levels of pollution from trucks and freight trains.

Government Agencies and Council Submissions

Department of Environment and Conservation

In general, DEC considers it likely that assessment work regarding construction phase air quality has been undertaken in an appropriate manner and in accordance with DEC requirements, including *Approved methods and guidance for the modelling and assessment of air pollutants in NSW* (NSW EPA 2001). Should the project proceed, DEC considers that construction phase air

quality impacts could be managed to acceptable levels. This view is subject to confirmation when DEC completes evaluation of data files recently received from the proponent's consultant. Principal issues would be fine particles (as PM₁₀), dust management and possibly odour.

Particles

Further information provided by the proponent has confirmed that some exceedences of relevant PM₁₀ will occur during construction. DEC's experience is that construction-related dust generation, including spoil and waste transport activities, can be a cause of community annoyance and complaint for major civil projects. Effective dust suppression during surface construction and spoil or fill transport activities is essential. For these reasons, DEC considers that the mitigation measures proposed in the EIS should be enhanced by a requirement to temporarily seal source surfaces.

Under the environment protection licence (EPL), DEC would request that all construction activities would be required to be undertaken in a manner that avoids dust emissions. Truck wash facilities would be required to be installed and properly used. Locations, frequency, parameters and performance goals for monitoring dust would be specified. A Soil and Water Management Plan for the reclamation area and other surface work areas would be required to be prepared and implemented.

Odour

DEC's experience from other projects is that dredging operations, and possibly surface stockpiling of organic rich materials, can become sources of fugitive odours. The risk of odours from these construction activities was not assessed in the EIS. Regardless, the requirements of s129 of the *Protection of the Environment Operations Act*, which prohibits licensed activities from causing offensive odours, would apply. Consequently all necessary mitigation measures to meet this statutory requirement would have to be implemented by the proponent.

Should the project proceed, it is evident that ultimate capacity growth in Port use will result in emissions from shipping becoming by far the most significant source of some air pollutants associated with terminal activities, requiring careful consideration of whether there is a possible need for management strategies. Shipping is a source of fine particles (PM₁₀), sulphur dioxide (SO₂), carbon monoxide (CO) and oxides of nitrogen (NO_x). Emissions from main ship engines, which operate only when entering and leaving port, will progressively become particularly significant sources rather than emissions while ships are at berth. Local NO₂ outcomes resulting from the total of emissions from main ship engines, other local sources and background levels are of particular interest to DEC. As any future EPL covering terminal operations would be confined to the terminal premises, DEC would not have jurisdiction over emissions from ships in transit.

DEC is currently assessing further information provided by the proponent. This includes details of particle modelling, oxides of nitrogen (NO_x) modelling, the inventory of pollutant sources, assumptions regarding emissions from main ship engines and data files. DEC's main concern is whether local NO₂ levels could ultimately exceed relevant health-related standards at sensitive locations. Further information provided by the proponent advises this would not be the case. DEC will provide supplementary advice to the Commission should its evaluation suggest results that differ to those currently predicted.

DEC considers that air emissions from plant and equipment on the Terminal site could be managed to acceptable levels, provided all mitigation measures and performance levels described in the EIS are implemented.

Road traffic emissions

As is the case for noise, Port-related landside traffic growth is likely to lead to local air quality impacts beyond the EIS study area. The traffic assessment work undertaken for the EIS confines itself to a relatively narrow area around the proposed development but local air quality

impacts at other locations are likely. Further information provided by the proponent has partially redressed this by assessing air quality issues for some locations, including the M5 East tunnel. DEC considers it would be desirable that emission impact assessment is also carried out at any other traffic hot spots that would be identified by the sub-regional traffic assessment suggested in section 7.1. Those with significant residential populations in their vicinity would be of particular interest.

NSW Health

The Department has reviewed submissions received from the NSW Health during the initial and re-exhibition periods. In regard to air quality, NSW Health considered that the dust controls nominated by the Applicant should be implemented as a minimum. Health also considered dust monitoring should be required at the most affected residents with appropriate response and feedback.

NSW Health has assessed the additional information regarding Assessment of Road Traffic Air Emissions provided by the applicant through the supplement to the EIS. Health considers there is still insufficient information on which to assess population health impacts.

Air Quality

Air quality monitoring data was collected between July 2000 and August 2002 from the Sydney Airport monitoring site in Mascot. This data was compared to the established and set criteria. Specifically, in relation to Suspended Particulate matter (PM₁₀), the NSW EPA 24 hour criterion for PM₁₀ of 50µg/m³ was **exceeded for all of the summer months** where data was available. The NSW EPA has also adopted an annual (all hours) criteria for PM₁₀ of 30µg/m³. From the data obtained at Sydney Airport (2000 – 2002) the PM₁₀ annual average is 20µg/m³ which is below the EPA criteria.

In relation to the assessment of impacts for the construction phase, dust impacts were assessed for PM₁₀ (24hr) concentrations, monthly dust deposition levels and annual total suspended particulates concentrations. The modelling process incorporated certain levels of dust controls including watering of roads, application of water sprays and windbreaks for the scenario involving beach enhancement.

As summarised in the main report, dispersion modelling of dust emissions from construction of the proposed new terminal showed that there are low risks that incremental air borne particulate matter (PM₁₀) (24hr) concentrations and monthly dust depositions would exceed the EPA site criteria of 16µg/m³ and 2g/m²/month respectively at residences closest to the work site (to the north of Foreshore Road). Concentrations of PM₁₀ during construction would result in, at most, two additional exceedences per year of the 50µg/m³ criteria measured in the vicinity of the site in recent years, which is not considered to be significant by the authors of the air quality assessment. Predicted total suspended particulate concentrations are significantly lower than the EPA criteria of 90µg/m³ beyond the site boundary.

The predicted exceedance at two additional times per year is questioned. The implementation and thoroughness of the dust control measures is of paramount importance. It is understood that monitoring will be undertaken during construction. These results need to be reviewed and communicated accordingly to ensure adequate measures are being undertaken to minimise dust nuisances being created.

In relation to the assessment of impacts from the operation of the proposed terminal, it is summarised in the main report as “air quality impacts from Port Botany’s current and estimated future operations (i.e. including the existing container terminal and the new terminal) were assessed by dispersion modelling of both “peak” and “normal” operation. The potential for adverse air quality impacts from the operation of the proposed new terminal, combined with existing container terminals in the future, would be minimal. There would only be marginal increases in Nitrogen Dioxide (NO₂), Carbon Monoxide (CO), PM₁₀ and Sulphur Dioxide (SO₂)

concentrations in the areas surrounding Port Botany, with modelling results showing no exceedences of the NSW EPA criteria within residential areas or at sensitive receivers.” No particular reference or comment is made in relation to neighbouring industrial and port related sites. It was reported that modelling of CO emissions (to predict ground level concentrations) was not considered necessary. This may be theoretically so, however, it is preferred that ongoing monitoring and assessment is undertaken, to ensure complete and accurate assessment and predictions. The marginal increase in PM₁₀ (24hour) concentrations will impact the residential area around Phillip Bay and La Perouse. As such, adequate monitoring and reporting measures are to be put in place and maintained.

Greenhouse gas emissions

The EIS does not include an assessment of the increase numbers of trucks within the Sydney metropolitan area and specifically the local area. The EIS states that the Sydney market accounts for more than 80% of the sources and destinations of existing NSW container trade. The finding of a reduction in greenhouse gas emissions is therefore questioned. Only 20% of the trade is occurring beyond the metropolitan area, much of which is forecast to be via rail.

The state reduction in greenhouse gasses refers to a state wide benefit. However, there is no assessment of the change in greenhouse gasses due to increased traffic on the local and Sydney area. The EIS therefore may have underestimated the impacts on local air quality and greenhouse gases, the area exposed to the majority of the increased truck usage.

Botany Council

Council’s Consultant - Parsons Brinckerhoff has concluded:

- The pollutant of most concern during the construction is particulate emissions. The currently high particulates in the area result in further exceedences of the NEPM air quality goal of 50 µg/m³. The modelling assumed that the mitigation measures had been applied to the activities that generate particulate emissions. If these measures were not fully implemented, the number of additional exceedences is likely to increase.
- Three additional particulate sources have been omitted from the modelling. Dredged material is unlikely to cause a problem as it will be saturated when removed from the Bay. However, the two other sources have the potential to contribute to the particulate emissions and although may be short term and on a smaller scale, could occur during periods of dry, windy weather.
- The source document for the air quality study does not contain thorough details of the inputs to the air modelling. Detail surrounding the emission rates and the assumptions is limited (this is a requirement of Section 10 of the *Approved Methods and Guidance for Modelling and the Assessment of Air Pollutants in NSW*).
- The air quality monitoring section Chapter 23 of the main EIS states that if during construction the levels of PM₁₀ (24-hour) exceed 50 µg/m³ and these episodes are attributed to the earthworks at the site, additional dust management measures would be implemented. The modelling for the construction has assumed that these measures would be implemented (with the level of abatement consistent with National Pollutant Inventory (NPI) Emission Estimation Technique Manual for Mining). Should the levels be exceeded with the mitigation in place, the additional measures should be detailed.
- The potential for odour emission has not been assessed as requested by Randwick City Council.

At the time of writing, the Department had not received a revised submission from Botany Council and DEC.

Department’s Position

Construction

The Department considers that the Applicant would need to submit a Construction Dust Management Plan (DMP) to the Director-General for approval prior to any construction

commencing. The DMP would include the mitigation measures proposed in the EIS, including DEC's recommendation to temporarily seal source surfaces and truck washing provisions. The Department of Health also recommends the drafting of a DMP (refer to Human Health Impacts section (7.7)).

The Department also supports DEC's recommendation requesting the Applicant to prepare a Soil and Water Management Plan (SWMP) for the reclamation area and other surface work areas. The SWMP would need to be submitted for the Director-General's approval prior to the construction stage starting.

The Department is concerned that the Applicant did not address odour impacts in the EIS and concurs with the DEC and Randwick Council recommendation that odour issues be addressed and mitigated.

Operation

The Department concurs with DEC and Councils' assessment that the most significant source of air pollutants would be associated with shipping and from plant and equipment. In its assessment the Department of Health is concerned with the likely health impacts from nitrogen dioxide emissions.

The Applicant has provided further information to DEC which is currently being assessed. The further information includes details of particle modelling, pollutant sources, oxides of nitrogen modelling and assumptions. The Department of Health has already reviewed the additional information and requests that the Applicant provides further studies on the impacts of nitrogen dioxide – refer to Human Health Impact section (7.7). The Applicant provided additional information in the form of an *Assessment of Road Traffic Air Emissions* as part of the *Supplementary Submission Environmental Impacts Statement* (August 2004). NSW Health considers there is still insufficient information on which to assess population health impacts, outlining where information gaps exist. The Department requires an additional response from the Applicant addressing the information gaps outlined by NSW Health.

The Department concurs with DEC's view that air emissions from plant and equipment on the terminal site could be managed to acceptable levels, provided all mitigation measures and performance levels described in the EIS are implemented. The Department recommends that these mitigation measures are formalised by incorporating in the Construction Environmental Management Plan.

7.12. Impacts on Heritage

Applicants Position

The Applicant has investigated Aboriginal, European and Maritime heritage values in the EIS. This took place as a land based and maritime assessment.

Land Based Heritage

The methodology adopted by the applicant to investigate land based heritage included a literature and document review, consultation and land-based field surveys.

Aboriginal Heritage

The applicant suggests that no archaeological remains were recorded or would be expected to remain in the primary study area due to the long history of the area from a climatic point of view pre European contact to post European activities including: likely exploitation of former midden sites for lime; and reclamation and dredging works associated with past developments. However, the Applicant does acknowledge that pre European contact Aboriginal sites would have almost certainly existed.

Consultation with the NPWS Aboriginal sites register and National Native Title Tribunal also confirmed no identified sites within the primary study area. The Applicant also held discussions with the La Perouse Local Aboriginal Land Council. The Land Council did not indicate concerns regarding impact on site within the primary study area but did indicate concern of indirect impact on Aboriginal sites in mobile areas such as Towra Point.

The Applicant concludes that the development would have no identifiable impact on Aboriginal heritage values as no Aboriginal sites have been identified within the primary study area and due to low level hydrological changes anticipated the potential to impact any submerged cultural heritage resource is anticipated to be negligible. As a result the Applicant suggests a permit under section 90 of the National Parks and Wildlife Act is not required.

Non-Indigenous Heritage

The Applicant has indicated that due to major reclamation for the existing port and airport that a new shoreline has been created in the northern part of the Bay. As a result the only potential archaeological deposits in relation to the historic period are items that would have extended into the Bay or that occurred in the Bay such as shipwrecks.

The Applicant indicates that the only item that would have been long enough to extend beyond the current shoreline is the Government Pier built around 1880. The Pier was partially dismantled in 1960. Items that would be buried from past major reclamation include the Sir Joseph Banks Hotel and associated jetty and bathing houses (1844 several kilometres north west of the primary study area); and Dent's Boatyard, jetty and slipway (1840-1890 west of the Government pier).

The Applicant suggests that the likelihood of cultural material or shipwrecks existing in the areas to be reclaimed is considered extremely low due to: the findings of a remote sensing survey; and past dredging in the area.

The Applicant has indicated that the remains of the Government Pier, any evidence of Sir Joseph Banks Hotel and Dent's Boatyard would be considered "relics" under the NSW Heritage Act.

The applicant is committed to the following mitigation and management measures:

- Archaeological monitoring and excavation permit sought under section 140 of the NSW Heritage Act, 1977 if dredging or subsurface excavations are planned in the channel between the proposed terminal and Foreshore Beach in proximity to Sir Joseph Banks Hotel Jetty and Baths and Dent's Boatyard Jetty.

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- Remains of the Government Pier will be conserved, including future onsite interpretation.

Marine Heritage

The methodology adopted by the applicant included identification of the potential for the presence of cultural deposits and structures within the primary study area; visual inspection of the study area (above water only); assessment of the condition of cultural remains not visible – buried or underwater; preliminary significance assessment of the identified cultural remains; determination of the impact of the proposed development on the identified cultural remains within the primary study area; determination of the impact of the proposed development on the potential cultural remains within the secondary study area; and recommendation of mitigation measures.

The Applicant has indicated that the types of cultural formations or deposits that could exist in the study area include: shipwrecks; maritime related structures; cultural deposits formed from littoral sites; cultural deposits formed offshore; and submerged terrestrial sites.

Indigenous Heritage

Potential maritime indigenous impacts are incorporated into the landbased heritage discussed above.

Non-indigenous

Potential fixed maritime structures are discussed above on the non-indigenous landbased section. This section concentrates specifically on shipwrecks.

The Applicant has referred to the NSW Heritage office database of all known shipwrecks in NSW. It is noted from the database that 14 vessels are known to have been lost predominantly at the entrance of the Bay. It is also noted that no known remains of wrecks are recorded within the primary study area. However, the schooner Prompt was the only vessel reported to be wrecked in the primary study area (1881). No wreckage has been found and it is assumed to be removed as it would have been an obstruction to the Government Pier. Two other wrecks are reported to have occurred that could conceivably be within the study area or the vicinity of the study area.

The Applicant indicates that dredging would destroy any cultural remains or shipwrecks on the sea bed and reclamation would bury any remains. However, the applicant claims that the likelihood of cultural material or shipwrecks existing in these areas is considered extremely low due to: the findings of a remote sensing survey; and past dredging in the area.

Issues Raised in Submissions

Public Submissions

Of all submissions received by the Department during the exhibition period 1% specifically referred to heritage related issues. The key issue raised is the impact of the proposal on the Historical nature of the Bay as Captain Cooks landing site.

The Department also received a submission from the National Trust of Australia. The Trust objects to the proposal. The Trust supports a continued working harbour in Sydney and supports a plan for the coordinated use of the State's major ports including the consideration of the Newcastle/Port Kembla alternative.

Government Agencies and Council Submissions

The Department received a submission from the NSW Heritage Office. Although the submission did not raise concern, the Heritage Office has provided recommended conditions if consent is granted.

In summary the recommended conditions of consent include:

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- Detail of the circumstances under which an application for an excavation permit is required to be lodged under section 140 of the Heritage Act;
 - Circumstances that would require construction works to cease and the Heritage Office contacted; and
 - Requirements for the recording, protection and conservation of the remains of the Government Pier in-situ and that its heritage significance is interpreted on site. Details of the proposed methods to achieve this are to be approved by the Director-General prior to the commencement of construction.

Botany City Council

Council has raised a number of issues regarding cultural heritage including:

- The secondary study area should be used rather than the primary study area to assess cultural heritage impacts.
- Potential cultural heritage impacts should be assessed using a three tier basis including: immediate vicinity; local area; and regional area.
- Due to the outstanding historical significance of Botany Bay, tourism, heritage awareness and culture should be promoted within the area and this cannot be achieved with the proposal.
- Any future development that conflicts with the social, cultural and heritage elements associated with Bare island should not proceed.
- Development that conflicts with the ethos of Botany Bay's native owners should not be supported.
- Potential impacts on aboriginal sites in Kurnell are not addressed in the EIS and therefore not properly understood.
- Potential impacts of the proposal on cultural tourism.
- Suggestion that the Government Pier is heritage protected. Suggestion that the proposal will have a negative impact on the potential significance of the pier.
- Supports conserve and retaining the Government pier.
- Suggest rehabilitation of the pier and/or recognition of the structure through plaques or similar.
- Recognition of Sir Joseph Banks Hotel Jetty and Baths, and Dents Boatyard Jetty as relics is required. It is necessary that these features be recorded for future prosperity.
- Recommend archaeological monitoring should occur on the site of Dents Boatyard jetty if further subsurface work is planned for the site.
- Suggest proper mitigation measures are needed in the event that the shipwreck the *Prompt* is located within the study area.

Council suggests that the above-mentioned issues should be addressed prior to a determination of the proposal.

DEC

DEC has raised a number of issues and have provided a number of recommendations regarding Aboriginal cultural heritage, including:

- DEC has a statutory responsibility for the conservation and protection of Aboriginal heritage under the *National Parks and Wildlife Act (NPW Act) 1974*.
- *In relation to the Port Botany Expansion no known or potential Aboriginal objects or Aboriginal Places are to be directly impacted by the proposal.*

DEC recommendations include:

- *Additional information should be provided on the potential for altered hydrodynamics to impact on Aboriginal cultural heritage sites around the Bay, including transport routes and areas associated with spiritual values.*
- Consent conditions should require a contingency plan to be prepared in consultation with DEC within the environmental management and monitoring plan discussed in Chapter 38 of the EIS to adequately address any erosion or damage to Aboriginal heritage caused by changes to wave refraction in the Bay and funds allocated for its implementation.
- Consent conditions should include:

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- 'If any objects or archaeological remains are uncovered or discovered during the activity, work should cease immediately and notification given to the Manager, Central Aboriginal Heritage Unit, Cultural Heritage Division, DEC (Tel: 9585 6990).'
 - *The Commission should note that the EIS social impact assessment has not adequately addressed aboriginal cultural heritage issues and that an expanded definition of cultural heritage issues is required.*
 - *Consultation should be undertaken more widely with the Aboriginal community with a view to addressing cultural heritage considerations and enhancing the social impact assessment for the proposal. Key aspects should include:*
 - *covering all relevant groups including the Metropolitan Local Aboriginal Land Council;*
 - *providing documented proof of consultation to DIPNR and DEC; and*
 - *providing written advice as to the outcome of the consultation.*

Department's Position

The Department concurs with the Applicant's position that the proposal site presents minimal potential for the presence of indigenous heritage items of significance. In relation to non-indigenous heritage, the Department notes that the Government Pier is an existing heritage structure on the site. However, the Department considers the Applicant's proposed conservation and interpretation of the Pier is sufficient to ensure the heritage value is maintained. Heritage recording, protection and conservation methods would need to be developed to meet the requirements of the NSW Heritage Office as indicated in the Heritage Office submission.

The Department also supports the Applicants commitment to undertake archaeological monitoring and excavation permit sought under section 140 of the *NSW Heritage Act 1977* if dredging or subsurface excavations are planned in the channel between the proposed terminal and Foreshore Beach in proximity to Sir Joseph Banks Hotel Jetty and Baths and Dent's Boatyard Jetty.

There is minimal potential for indigenous heritage items to be uncovered during activities in the area. The Department suggests that the Applicant should develop a protocol to identify any heritage items that might be uncovered during construction works, and to assess the heritage significance of these items in the context of the difficulties and costs of recovery.

The Department also considers that the Applicant would be required to ensure that if any archaeological material is uncovered during the proposed works, work would cease and the DEC would be contacted so that an assessment of the item's significance could be undertaken before work continued.

7.13. Surface Water Quality Impacts

Applicant's Position

Hydrology and Water Quality

The EIS states that Hydrologic modelling (to determine surface water flow rates under design rainfall conditions) and hydraulic modelling (to determine the flood water levels) before and after the proposed development showed that the proposed Port Botany Expansion would not have an adverse impact on local flood behaviour in the catchments surrounding Port Botany or cause an increase in flood levels within Penrhyn Estuary. It is acknowledged by the Applicant that a minor impact of 0.02 m would occur in the Floodvale Drain catchment during extremely rare events (i.e. the Probable Maximum Flood (PMF)). However, this change is at the limit of the model's predictive capability. There would also be a minor increase in water level near the outlets of the two eastern most beach drains during the PMF, of the order of 0.06 - 0.12 m.

The EIS also states that the proposed Port Botany Expansion would not affect the quality of water draining from the catchments surrounding Port Botany. Current catchment runoff has high levels of nutrients and low dissolved oxygen.

The EIS does highlight that the partial enclosure of Penrhyn Estuary resulting from the reclamation for the new terminal would affect the transport and dispersion of water contaminants and suspended solids in Penrhyn Estuary and would likely result in increased siltation rates and nutrient and faecal coliform concentrations as well as slight changes in temperatures and dissolved oxygen concentrations.

Modelling for the EIS, undertaken under ambient conditions (i.e. typical dry weather conditions), showed that the increased concentrations of nutrients and faecal coliforms in the Estuary would not exceed the Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) water quality guideline values. Under transient conditions (i.e. short duration wet weather events), increases in peak nutrient and faecal coliform concentrations would occur but these exceedences would be of short duration. However, the EIS states that, if the project proceeds, faecal coliform concentrations at the location of the proposed boat ramp and enhanced beach at the northwest end of Foreshore Beach would be reduced under transient and ambient conditions.

The Applicant proposes that the sediment and suspended solid load (and hence nutrient load) of the stormwater entering Penrhyn Estuary from the catchments could be minimised through the installation of stormwater quality improvement devices (SQIDS) at the outlets of Springvale and Floodvale Drains. However, the installation of these devices would be subject to detailed studies of their impact on upstream flooding.

The EIS suggests that the proposed Port Botany Expansion would not incorporate any elements that would impede the natural flow regimes of existing stormwater channels which discharge to Botany Bay. It is claimed that the proposed terminal's stormwater management system would minimise contaminated runoff discharging into Botany Bay through a first flush capture and treatment system and would provide for reuse of treated stormwater runoff from the terminal for washdown and irrigation purposes.

Water and Waste Water

The EIS outlines that during construction of the proposed Port Botany Expansion, water would be initially supplied by water trucks prior to extension of the existing Sydney Water Corporation water mains, which will provide a permanent connection to the site.

The Applicant informs that Sydney Water Corporation advises that sufficient capacity exists in the water mains to provide the required volume of water during the operation and construction of the new terminal and recreation area.

Potable water consumption would be minimised by storing up to 20,000 L of treated stormwater for use in maintenance and washdown activities and irrigation.

Wastewater from construction activities would be collected in onsite proprietary disposal systems and removed from the site by licensed waste disposal contractors prior to connection to the Sydney Water Corporation sewerage system. During the operational phase, domestic wastewater would be discharged directly to the Sydney Water Corporation sewerage system. The wastewater generated at the recreation area including the new boat ramp would also be discharged to the sewerage system. Trade waste would discharge to the Sydney Water Corporation sewerage system in accordance with a Trade Waste Agreement. The Trade Waste Agreement would determine the level of treatment required prior to discharge.

Sydney Water Corporation advises that sufficient capacity exists in the sewerage system to accept the volume of wastewater expected to be generated during the operation of the proposed new terminal and from the recreation area.

Water usage and wastewater discharge at the site would be subject to a Water Resources Management Plan, which would form part of the site construction and operational Environmental Management Plans and would cover both the construction and operational phases.

Issues Raised in Submissions

Public Submissions

Hydrology and surface water quality impacts have been raised in **69.9%** of all issues raised in public submissions. Particular issues raised are:

- Increased risk of creating stagnant trapped water in Penrhyn Estuary.
- Impacts in change of water levels.
- Limited assessment of impacts on the hydrology of the wider bay.

Government agency and Council submissions

Sydney Water

Sydney Water has indicated that

- information in the EIS is not sufficient for Sydney Water to make a detailed assessment of the impact on Sydney Water's existing water and wastewater system and to make a proper assessment of potential off-site impacts on Sydney Water's stormwater infrastructure located on the foreshore beach; and
- Sydney Water will require the proponent to apply for a section 73 Compliance Certificate should the proposal be approved. Once the application is made, Sydney Water will undertake a review of the impact of the development on its systems and infrastructure.

NSW Fisheries

- Recommends for rehabilitation of seagrass use of hand transplanting to ensure highest success rate
- Recommends the development and implementation of water quality, sediment and erosion controls on drains entering estuary seagrass rehabilitation area, and investigation of methods such as channel extensions to increase flushing;
- Recommends stormwater discharge occur into the bay rather than the estuary
- Requirement under *Fisheries Management Act 1994* for proponent to seek permit for removal of marine vegetation (seagrass), including with application detailed management plan; and
- Need to monitor levels of heavy metals in fish.

DEC

DEC has raised a number of issues regarding surface water quality, including:

- Specific issues relating to the construction phase.
- Water and sediment quality of Penrhyn Estuary.

Specific recommendations provided by DEC include:

- The Commission should note that, if requested, DEC would be able to provide relevant terms of the construction phase environment protection licence (EPL) to assist formulation of appropriate consent conditions.
- The project soil and water management plan should include implementation of all necessary measures to avoid pollution of waters from the reclamation and stockpile areas.
- The Commission should note that the likely reduction in water quality of Penhryn Estuary with the preferred proposal is inconsistent with the requirements and endorsed water quality objectives of section 5 of the NSW Government's *Georges River - Botany Bay Statement of Intent*.
- Water quality risks to seagrass, aquatic and terrestrial fauna in the reconstructed Penhryn Estuary should be better characterised.
- The integrated risk assessment framework currently being developed by the proponent should allow risks to be ranked and evaluated. Acceptable levels of risk should be clearly and transparently defined in quantitative terms wherever possible.
- Any determination should include cost effective measures to protect the identified environmental values of the Estuary (ie seagrass beds and wading bird habitat), such as reducing nutrient loads and improving flushing.
- As a minimum, the above measures should consist of installing best practice stormwater quality improvement devices on Floodvale and Springvale drains, and the Commission should consider the benefits and costs of alternative terminal configurations that would improve flushing.
- Consent conditions regarding the terminal stormwater system should:
 - require enhancements of stormwater system design to be investigated to ensure all potential incident contingencies can be dealt with without impacting on the sensitive habitats in the Estuary;
 - discharges to be directed toward the Bay rather than the Estuary; and
 - an operation and maintenance plan should be developed for the first flush system to ensure performance of the system will be maintained over the long term.
- Consent conditions should require the use of recovered stormwater as a substitute for potable supplies to be expanded, consistent with Sydney Water targets for water supply conservation.
- Consent conditions should require that docked ships can only discharge bilge wastes and sewage to shore based systems.
- Consent conditions should require ballast water to be sampled and submitted for testing prior to being discharged to verify that pollution of waters has not occurred.
- Consent conditions should require further information on details of the freshwater/saltwater interface be obtained before commencing dredging operations.

Botany Council

- There is a requirement to determine the need to lengthen the beach drains for Springvale, Floodvale and Mill Stream may be required but has not been assessed in the EIS.
- The hydrocarbon contaminants (from the Orica Site) have not been assessed in relation to the estuary or bay water quality. There is also no outline of proposed monitoring.
- A comprehensive water quality management and monitoring plan should be required to address the risks to the estuary and bay water quality from all the sources identified.

Randwick Council

- Suggests that the EIS relies on dated water quality data.

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- More detail regarding proposed major earthworks is required to determine impacts on flow patterns, quality, concentration of contaminants and existing sediment dispersal.
 - More detail regarding the impact of surface water quality changes on swimmers needs to be provided and restrictions on swimmers needs to be clear.
 - More detailed assessment of contaminant concentrations in Penrhyn Estuary and resultant biological effects is required prior to the proposal proceeding.
 - There is a need for the Applicant to detail preventative and management measures to mitigate against the TBT based antifouling paint compound contaminants.

Department's Position

Water Quality

It should be noted that the consultants' predictions of water quality are used as the basis for many other sections of the EIS. Therefore it is important that predictions of changes to water quality are accurate and reflect changes that are relevant to ecological processes. Ecological processes are discussed in detail in section 7.3 of the Department's submission to the COI.

As discussed in section 1.6 of the Department's submission, the Department undertook a preliminary assessment of the EIS and subsequently coordinated a series of specialist meetings with the Applicant and various government agencies to raise additional information requirements with the Applicant. Specifically, meetings held on the 16 and 18 March discussed water quality issues in Penrhyn Estuary and the relationship to ecology issues. As a result of these meetings the Applicant undertook to provide additional information, including

- Investigation into dissolved oxygen variation in Penrhyn Estuary (Supplementary Submission to EIS)
- a Review of Nutrient Load and Concentration and Implications for Potential Eutrophication for Proposed Penrhyn Estuary (Supplementary Submission to EIS)
- Effect of Alternative Measures to Improve Water Quality
- Outline of Environmental Management Plan (Supplementary Submission to EIS)
- Penrhyn Estuary Risk Assessment.

The Applicant also provided information relating to:

- Justification of the basis for the use of ANZECC trigger value for assessing water quality impacts rather than a local trigger value
- Predicted changes in salinity as a result of proposed development

The Department has considered the additional information provided by the Applicant and has identified a number of issues still requiring resolution to enable finalisation of the Department's assessment. These include:

Dissolved oxygen modelling

The Department raised initial concerns that the assessment of most water quality variables did not take into account the biological and biogeochemical processes that are very important in determining final concentrations of nutrients, DO, pH and algae in the water column. Simple dispersion models are not likely to be adequate to assess changes to DO as a result of works in Penrhyn Estuary. It is important that details on the diurnal, seasonal and event-based variation of DO are provided, taking into account the planned increase in plant biomass. Average values of DO in an enclosed estuary are not biologically relevant, as extreme ranges will affect biota.

The Applicant provided additional analysis of potential changes in the diurnal DO range. The conclusions of this analysis included a recommendation that, in response to concern over periodical occurrence of supersaturated conditions, a reduced area of seagrass bed be considered as part of the proposed habitat enhancement works.

The Department still has concerns regarding the methods and literature values underpinning this analysis, the model outputs and its conclusions. Model outputs of diurnal DO variation do not reflect diurnal patterns or ranges typical of similar NSW estuaries. Importantly, the EIS is

based on rehabilitation of up to eight hectares of seagrass within Penrhyn Estuary. The Department does not support a substantial reduction of this area and requests new DO modelling that addresses the Department's concerns regarding methods, input values, and model outputs. If the proposal is approved, the Department may consider including use of other options to improve water quality such as increased flushing and reduction in nutrient loads.

- *Suspended sediment*

The Department raised initial concerns that the loads and fate of fine sediment to the bay from the catchment is unclear and questioned the capacity of SQIDS to remove fine sediment and nutrients, their impact on fish passage and the requirement for regular cleaning in order to maintain their effectiveness. The contribution of tonnes of fine sediment to the bay to construct the habitat has not been taken into account when examining sediment re-suspension.

In response, the Applicant advised that the average annual sediment load to Penrhyn Estuary is about 130 tonnes. The effectiveness of SQIDS in removing nutrients and suspended solids ranges from 20-60%. A 20% removal would still have a beneficial effect on resulting water quality in Penrhyn Estuary.

The Applicant advised that, in determining a suitable sediment composition for the proposed intertidal flats, consideration will be given to the potential for resuspension and erosion of the sediments. The existing intertidal flats appear to be stable and are closer to the outlets of Floodvale and Springvale Drains than the proposed intertidal flats. Resuspension and erosion are therefore not considered to be significant issues for the future estuary. The Applicant noted that ongoing sediment movement is a function of most coastal estuaries after rainfall events, particularly large rainfall events, and would be expected to occur at Penrhyn Estuary under these circumstances at present.

The Department will require that SQIDS have the capacity to remove fine sediment, and that the body responsible for their cleaning and maintenance will need to be determined.

- *Nutrient Load and Concentration and Implications for Potential Eutrophication / ANZECC trigger levels*

The Department requires further information from the Applicant on this issue, in particular in relation to apparent contradictions between conclusions regarding the flushing times and outcomes of investigations into the diurnal oxygen variation in Penrhyn Estuary. If flushing time is sufficient to ensure the risk of phytoplankton blooms is in fact minimal, then it seems contradictory that DO values would become supersaturated.

In relation to the use of SQIDS to reduce nutrient load, the Department considers their capacity to do so will be dependent on their ability to remove fine sediments that carry the majority of sediment-borne nutrients. The Department seeks estimates of the likely reduction in nutrient load of the SQIDS or case studies where they have been successfully used in similar circumstances.

The Department accepts that it may be reasonable to assess the potential nutrient status of Penrhyn Estuary as mesotrophic given the short flushing times. However, the Department does not accept that in the event that Penrhyn Estuary became eutrophic, the consequences would not be serious, as argued by the Applicant, or that the proposed measures to reduce the area of seagrass are appropriate.

Protection will be necessary from the impact of changes to the flushing of the estuary, resultant changes in water quality and consequences for the ecology of the estuary particularly in relation to turbidity, nutrients and algal growth. The methods of protection may be further addressed and resolved in discussions between agencies and the Applicant.

The Department still questions the validity of applying ANZECC standards to Penrhyn Estuary, noting that the automatic applicability of ANZECC standards to non-coastal lake coastal waterways is not substantiated using the sources cited. Further investigation of the application of ANZECC standards to the proposed development area may be required.

- *Effect of Alternative Measures to Improve Water Quality.* The Department requested the Applicant consider alternative measures to mitigate the impacts on water quality of contaminants as a result of the proposed development. Lawson and Treloar undertook sensitivity testing on water quality using alternative measures including widening the channel parallel to Foreshore Beach, incorporating culverts or channels into the terminal development, and including sediment and nutrient removal devices on Springvale and Floodvale Drains. The testing found that the option of the stormwater quality control devices was most feasible from a cost-benefit perspective.

The Department accepts that stormwater treatment may be improved by the SQIDS, noting that it is important to determine the type of SQIDS that are planned and ensure they have the capacity to remove fine sediments. The body responsible for their cleaning and maintenance will need to be determined.

The placement of sediment and litter traps within the proposed seagrass rehabilitation area (Appendix A – Supplementary Submission 2A) covers a significant area previously allocated to seagrass rehabilitation. The status of this proposed layout needs to be clarified.

Hydrology and Flooding

The Department generally concurs with the EIS in regard to hydrology and flooding issues. However, the Department required the Applicant to provide additional information and response to the following:

- The sensitivity of results should be tested to a reduced loss model for previous areas (say 25mm initial loss with 2.5mm/hr continuing loss). This will give increasing flows for both pre and post development cases and would show if this causes any additional changes.
- The Applicant has subsequently responded to the Department's initial comments (see letter from Lawson and Treloar dated 16 April 2004 in Appendix A of this submission) and the Department is satisfied that the losses used in the Lawson and Treloar model appear to be appropriate.
- The Department has considered this response and concludes that sensitivity testing is required to be carried out prior to construction. The sensitivity testing would be carried out using different Manning 'n' values to explore limits of the difference in flood level between the existing and post proposal situation. Two scenarios are required to be explored:
 - Manning 'n' = 0.02 for the channel section and 0.07 for the floodplain section,
 - Manning 'n' = 0.05 for both the channel section and the floodplain.

The test is required to be carried out for all discharges up to the Probable Maximum Flood.

- In addition the management and monitoring program proposed by the applicant will be required to include an adequate maintenance program to ensure the waterway capacity referred to in the EIS and Habitat Enhancement Plan is maintained. This will ensure shoaling and higher flood levels are avoided in Floodvale and Springvale drain.

Environmental Management and Monitoring Plan

In relation to water quality, the Department requires the inclusion of greater detail, including clearer links between objectives and performance indicators, more details about times, frequency and sites for sampling. Monitoring of the extent, expansion and condition of seagrass in the estuary will be required. Data gathering, and specific management actions to be taken in response to findings is also required. The Department considers that this additional information would need to be provided.

Conclusion

The Department requires the Applicant to address the outstanding issues raised in this section, including identification of appropriate mitigation, monitoring and management that would need to be adopted to ensure the impacts on water quality are minimised. It is recommended that these measures are developed by the Applicant to the satisfaction of the Department, NSW Fisheries and DEC. These measures are required to be developed to enable the Department to finalise its assessment.

7.14. Waste Management Impacts

Applicant's Position

The Environmental Impact Statement indicates that the principles of waste reduction, waste reuse and waste recycling would be adopted during the construction and operation of the new terminal.

Construction Waste

The Applicant has listed the main construction waste materials and corresponding management measures as follows:

Table 1 – Construction Waste Generation and Management

Waste Stream	Estimated quantity for disposal per annum	Management Measures
Construction materials (rock, concrete, timber, masonry, bricks, plasterboards, metal and packaging materials)	3,000 tonnes	A construction Waste Management Plan would be developed. which would require that all contractors record the types, quantities and destinations of all waste material taken off-site.
Road and rail waste (road stone/railway ballast/concrete and metal railway lines)	200 tonnes	
Dredged material	None	Contained on site – some would be used in the creation of the ecological habitat in Penrhyn Estuary.
Green Waste	None	Reused on site – to be used in the rehabilitation of areas disturbed during construction and for landscaping.
Excavated soil	None	Contained on site – most would be used in landscaping.
Domestic waste (glass, aluminium cans, paper and cardboard, milk bottles, soft drink bottles and food waste)	720 m ³	Recycling facilities would be provided – some domestic waste would be collected and transported off-site on a regular basis.
Human waste	14,000 kL	Portable toilet facilities would be used and emptied on a regular basis in accordance with Council and EPA requirements.

Operational Waste

The operational waste generated by the proposed new terminal would be similar to the waste generated by the existing operations at Port Botany. The main types of waste and proposed management are listed in Table 8.

Table 2 – Operational Waste Generation and Management

Waste Stream	Estimated quantity for disposal per annum	Management Measures
Domestic waste (glass, aluminium cans, paper and cardboard, milk bottles, soft drink bottles and food waste)	4,500 m ³	Recycling facilities would be provided at the new terminal and in public recreation areas. Separate bins would be provided for food waste and fish remains. All domestic waste would be collected and transported off-site on a regular basis.

Maintenance material - disused parts and components, machinery and scrap metal - hazardous/dangerous goods (including oils and solvents)	2,500 m ³ 100 kL	Management of these substances would be regulated by an EPA licence which would be obtained by terminal operators. Scrap metal and used parts would be recycled where practicable
Wastewater (Trade waste)	7,500 kL	All wastewater would be discharged to the Sydney water sewerage system.
First Flush Stormwater	54,000 kL	Water from the stormwater flush system would be directed to the onsite stormwater treatment system. Clean stormwater would be discharged into Botany Bay. Potentially contaminated stormwater would be discharged into the sewage system in accordance with a Trade Waste Agreement.
Quarantine and Ship Waste	Negligible	Only small quantities of quarantine waste would be generated and would be disposed in accordance with the requirements of SPC, EPA and AQIS. Slops from ships (oily water/sludges) would be disposed of by an EPA licensed contractor and then recycled.

Issues Raised in Submissions

Public Submissions

Of all submissions received by the Department during the exhibition period, only one submission specifically referred to waste issues. The key issue raised is that excessive consumption is against waste reduction policies.

Government Agencies and Council Submissions

Sydney Water has made two submissions to the Department, one during the exhibition period of the EIS and another during the exhibition of the supplementary reports from Sydney Ports. Both submissions note that the information in the EIS is not sufficient to make a detailed assessment of the impact of the proposed development on Sydney Water's existing wastewater systems and the stormwater infrastructure. Sydney Water has advised that, should the proposal be approved, it will require the Applicant to apply for a Section 73 Compliance Certificate under the *Sydney Water Act 1994*. Once the application is made, Sydney Water would undertake a detailed review of the impact of the development on its systems and infrastructures. The assessment would include Sydney Water requirements which the Applicant would be required to meet. Sydney Water advises the Applicant consult with Sydney Water to obtain the likely requirements for a trade waste licence, for example, the EIS proposes that the concentrated sludge would be disposed via the sewer but this practice is not acceptable unless the sludge is pre-treated.

Botany Council is concerned that the assessment of waste is very general in nature and that further detail is required on the Waste Management Plans mentioned. The submission also mentions that the level of waste minimisation measures are not detailed, for example, the report does not detail the possible reuse or recycling of construction waste. Council also recommended that a monitoring regime be established for wastewater discharges during the construction operational phase

Department's Position

The Department is generally satisfied with the Applicant's study on the likely waste streams, quantities and waste management measures but the further details are required regarding

minimisation of waste and recycling/reusing practices. The Department considers that a Waste Management Plan would be required as a part of any construction and operation activities. The Plans should be prepared in consultation with Resource NSW and Botany Council. The Waste Management Plan should cover both the construction and operational phases and include measures to minimise the production and impact of wastes generated at the site. The Waste Management Plan should also include identification of the type and quantities of waste that would be generated, a description of how the waste would be handled, stored, reused, recycled and, if necessary, appropriately treated. A description of how the effectiveness of these measures would be monitored, and if any non-compliance is detected, would be required.

The Department also recommends that the Applicant consult with Sydney Water regarding the likely requirements from Sydney Water to obtain a Section 73 Compliance Certificate. This consultation should take place prior to construction.

7.15. Impacts on Visual Amenity

Applicant's Position

The Applicant included a visual impact assessment as part of the EIS for the proposed Port Expansion. The visual impact assessment selected representative view locations at the immediate, local and regional level to determine the likely visual impact of the Port Botany Expansion on surrounding areas. The visual impact on views from the air and from the waters of Botany Bay were also assessed to account for the views from recreational boating craft and air passengers.

Assessment Criteria

Visibility of components of the project and the visual absorption capacity of the landscape were the criteria used by the Applicant to assess visual impacts.

Visibility is simply the extent to which the proposal is visible or can be seen. The Applicant used a high, moderate and low criteria as an indicator of visibility. Visual absorption is the capacity of the existing landscape to absorb development without creating significant visual change resulting in reduction in scenic quality. Combining the two criteria the Applicant developed a visual impact rating. An example of the visual impact rating matrix used by the Applicant is provided in the table below.

	VISIBILITY		
	LOW	MODERATE	HIGH
VISUAL ABSORPTION RATING	VISUAL IMPACT RATING		
High	Low	Low	Moderate
Moderate	Low	Moderate	High
Low	Low	Moderate	High

The visual impact assessment includes consideration of impacts during the construction and operational stages of the proposed development. It was concluded in the EIS that visual impacts of the proposal would be similar during both stages of the proposal.

In particular viewing situations assessed included:

- Immediate Vicinity:
 - Foreshore Road, Banksmeadow;
 - Sir Joseph Banks Park lookout, Banksmeadow;
 - Foreshore Beach;
 - Molineux Point; and
 - Penrhyn Estuary.
- Local views:
 - Koorngai Ave, Yarra Bay Bicentennial Park;
 - Elaroo Ave, Phillip Bay;
 - Beauchamp Road, Hillsdale; and
 - Beauchamp Road, Matraville.
- Regional views:
 - Lady Robinsons Beach, Brighton-le-Sands;
 - Silver Beach, Kurnell;
 - Botany Bay National Park, La Perouse; and
 - Sydney Park, St Peters.

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- Views from the air:
 - view of proposed Port Botany Expansion looking south; and
 - view of proposed Port Botany Expansion looking west.
 - Views from the water:
 - view from the immediate vicinity looking northeast (< 1.5km);
 - view from the immediate vicinity looking southeast (<1.5km);
 - view from Botany Bay (1.5 km-3 km); and
 - view from Botany Bay (>3 km).

The assessment of the visual impacts from the above viewing locations concludes:

- When viewed from the adjacent foreshore corridor or approaches to Sydney Airport, the proposed development would have a moderate or high visual impact and would partially impede views of Botany Bay.
- The local area views of the Port Botany Expansion would be low or moderate due to existing vegetation and structures which would impede views of the new terminal.
- At the regional scale, the Port Botany Expansion would generally have at most a low visual impact due to the long viewing distances.
- Views from the waters of Botany Bay would vary with distance. All views of the new terminal would be seen within the context of the existing port and other industrial uses which are located immediately adjacent to the site of the proposed expansion.

The Applicant has proposed a number of mitigation measures in the EIS to minimise the visual impact of the proposed development, including:

- planting native vegetation screening along the foreshore corridor between the Mill Stream and Penrhyn Road;
- partial screening of terminal operations by the proposed noise wall and a terminal landscaping buffer strip;
- lighting control measures;
- use of low profile quay cranes; and
- careful selection of materials and colours to minimise the contrast and reflectivity of buildings and equipment at the new terminal.

The Applicant also emphasises that viewers would have an opportunity to see an increase in visually interesting port-related activities including the movement of container ships, cranes and containers.

Issues Raised in Submissions

Public Submissions

Of all the submissions received by the Department during the exhibition of the EIS and DA 1% made direct reference to the visual impacts of the proposal. Key issues raised include:

- Proposal will result in negative visual impacts.
- Specific negative visual aspects of the proposal include the proposed sound wall, cranes and stacked containers.

Government Agencies and Council Submissions

The Department received a submission from Botany City Council, which raised specific issues regarding potential visual impacts of the proposal. No other Government agency submissions raised specific visual impact issues. Key issues raised by Council in regard to visual impacts included:

- Concerns regarding the impacts on the view of Port available from the viewing platform at Sir Joseph Banks Park.
- Visual impacts on both Foreshore Beach and Penrhyn Estuary environs.
- Proposed access road to the expanded Port and Boat Ramp facility would cut the beach visually.

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- Visual intrusion will cut the tranquillity of the beach.
 - Proposed extension of the Botany Freight Rail Line is a visual intrusion to the beach.
 - Suggest visual impacts need to be addressed prior to determination of the DA/EIS.

Department's Position

The Department considers that it has been established that the proposed Port Expansion is likely to have potentially high to moderate visual impacts particularly when viewed from the adjacent foreshore corridor, approaches to Sydney Airport or certain close proximity views from the water.

Although the Department acknowledges that the proposal would be seen within the context of the existing port and other industrial uses it is considered that as a minimum the mitigation measures proposed by the Applicant would be required. These include: planting native vegetation screening along the foreshore corridor between the Mill Stream and Penrhyn Road; partial screening of terminal operations by the proposed noise wall and a terminal landscaping buffer strip; lighting control measures; use of low profile quay cranes; and careful selection of materials and colours to minimise the contrast and reflectivity of buildings and equipment at the new terminal.

The Department also considers that in addition to the mitigation measures proposed by the applicant, that the proposed design materials of buildings, equipment and the proposed sound wall need to be determined in consultation with Botany City Council and the local community. This would ensure that the visual impacts of the proposal would be reduced. In addition the Department also recommends that the following general principles for planning and management works would need to be accepted:

- Foreshore building setbacks, controls on building form and height, and retention and enhancement of foreshore vegetation should be used to maintain or enhance the general landscape character of the area.
- Protection and enhancement of estuarine and terrestrial vegetation maintains distinctive landscape elements and provide visual screening of views from the water to buildings.
- Planning and design of Port Botany Expansion works should take account of views from recreational craft using current/future public boat ramps and from Foreshore Beach.
- Planning and design of Port Botany Expansion works should take account of the contribution of vegetation to enhancing views both across the bay and along the shores of the bay adjacent to the Port.

7.16. Cumulative Impacts

Applicant's Position

The Applicant considers that the proposed Port Botany Expansion would not present any additional cumulative impacts other than those already identified in the EIS. However, the Applicant does acknowledge that the proposed Port Botany Expansion and the future predicted growth of Sydney Airport would result in a competing demand for available industrial, commercial and residential land uses in the Botany Bay region. Similarly, the Green Square redevelopment would also place pressure on residential land use in the region.

The EIS indicates that cumulative benefits of the proposed Port Botany Expansion would include employment and economic benefits, a reduction in greenhouse gas emissions and habitat enhancement of aquatic and terrestrial habitats. The EIS suggests that these benefits would be lost if the proposed Port Botany Expansion did not proceed.

Issues Raised in Submissions

Public Submission

The Department received 1.2% of submissions that specifically raised the issue of potential cumulative impacts associated with the proposal. Key issues raised include:

- Cumulative impacts of incremental filling.
- Cumulative impacts considering other major development requires more assessment.
- Cumulative transport, air, noise and visual impacts should be addressed.
- Cumulative and indirect impacts on bird habitat at Shell Point/Taren Point needs to be assessed.
- Cumulative traffic impacts associated with the airport expansion are unacceptable.

Submissions from Government Agencies and Councils

RTA

The RTA has indicated that the EIS does not consider the cumulative impacts of the port expansion in combination with other future developments eg Green Square and the Sydney Airport expansion which would impact on Southern Sydney's road network.

Botany City Council

Botany City Council has raised a number of concerns with the proposal in relation to cumulative impacts. Key areas of concern include:

- General cumulative impacts:
 - range of proposals considered is limited in the EIS;
 - a 'whole of Bay' approach is required;
 - land use changes in the area in terms of urban consolidation have not been considered;
 - the Marrickville Truck Tunnel proposal has not been included in the EIS; and
 - the description of the ecological works in Penrhyn Estuary as a cumulative benefit is exaggerated.
- Airport Masterplan (a plan for Sydney Airport's future for the next 20 years) is not adequately addressed in the EIS;
- Cumulative economic impacts: questions whether the proposal need to take place in Botany Bay to provide a significant economic cumulative impact to the State?.
- Cumulative transport impacts:
 - have not been examined adequately;
 - traffic impacts around intermodal terminals will be much larger than predicted in the EIS;
 - the figure of 2% contribution to total peak hourly traffic volumes by the proposal is not supported by Council.
- Cumulative environmental impacts:
 - Enormous cumulative environmental pressures on Botany Bay and surrounding areas, in particular traffic congestion, contaminated soils, air and water pollution.

Council suggests that the above cumulative impact assessments should be satisfactorily completed prior to the Department's and COI determination of the proposal.

Randwick City Council

Key issues raised by Randwick Council regarding Cumulative impacts include:

- Need for the expansion to consider in detail cumulative impacts and benefits.
- Cumulative Traffic/Transport impacts.
- Cumulative impacts of the Bay environment/contamination (particularly Penrhyn Estuary).
- Relationship to the Airport/Risk and related cumulative impacts.

DEC

DEC has raised various issues regarding cumulative impacts. Key issues raised include:

- While Chapter 36 of the EIS contains a discussion of cumulative impacts on the Bay in terms of future projects, it does not consider past projects and their impacts on wader bird habitat. Such cumulative impacts have been addressed in research articles⁶ and other environmental assessments for projects within the Bay including the Environmental Impact Statement on the Creation of Little Tern and Wading Bird Habitat, Towra Spit Island, Botany Bay for the Sydney Ports Corporation, prepared by Dames and Moore in June 1996. The data contained within this EIS in relation to the loss of bird habitat should have been considered in detail within the EIS for the Port Botany Expansion.
- Section 3.5 of the *Statement of Intent for the Botany Bay –Georges River System*, which requires project approval to be conditional on adequate consideration of whole-of-bay effects and cumulative impacts, is of specific relevance to this project and strongly endorsed by DEC.
- Any determination would need to address the scale and location of the incremental impacts from this development from overall human-made changes to Bay hydrodynamics. DEC notes that while each reclamation in the Bay has a small effect, the cumulative impacts can be large, as attested by the retrospective review provided by the proponent. If all the port reclamation and runway reclamation was considered together then the change to tidal prism would be much larger. Cumulative impacts are of critical interest where there may be potential to approach or pass a detrimental threshold on tidal prisms which could lead to significant environmental impacts. The large developments on the northern side of the Bay are at least partially responsible for the need for coastal protection works on the south and west coast beaches, by changing local wave fetches and wave alignments. The reclamation adds a small cumulative effect to this already altered environment.
- Any determination needs to address the scale and location of the incremental impacts from this development from overall human-made changes to Bay hydrodynamics.
- Regular monitoring to determine the impact over time should be required to be conducted by the proponent as a condition of consent. This should be included as part of the Monitoring and Management Plan.
- Conditions of consent should ensure that the proponent takes a proportionate responsibility for any cumulative impacts caused by the proposal around the Bay and allocates adequate resources to mitigate and manage those negative impacts.

Department's Position

As discussed in section 4 of this report, the Department is actively involved in a number of initiatives to address the cumulative impacts of all major development activity on the existing road and rail networks. In particular the Department is involved in the preparation of a Metropolitan Strategy and a Metropolitan Intermodal Facility Strategy. The Department considers that these initiatives will ensure that appropriate integrated infrastructure, particularly with regard to transport and inter-modal facilities, is in place to facilitate the forecast container throughput at Port Botany up to 2025. It must be appreciated that such actions stand outside the

⁶ A relevant research article includes: Joy M Pegler, "Intertidal Waders at Botany Bay – A Fifty Year Retrospective" in *Wetlands (Australia)* 16(1), 1997.

core functions of the Port Authorities but are being undertaken as a whole-of-government exercise.

However, the Department's is concerned that any strategic/economic benefits of the proposed Port expansion are not out-weighted by any significant residual environmental impacts that cannot be fully addressed or mitigated or which are in the long-term detriment to Botany Bay. Therefore the Department requested additional information from the applicant regarding whole of Bay cumulative impacts of the proposal considering past, present and proposed development. In particular the applicant is required to consider the cumulative impacts of the proposed on Wader birds and hydrodynamics of the Bay.

The Department has subsequently reviewed additional information provided by the Applicant and considers that the Applicant is still required to provide additional information regarding the impacts of the proposal on Wader birds (detailed requirements are discussed in section 7.3 of this report).

Conclusion

The Department has considered additional information provided by the Applicant regarding the impact of the proposal on hydrodynamics of the Bay and considers and considers additional information is still required (refer to section 7.6 for the Department's detailed considerations). The Department will finalise the cumulative impact assessment once this additional information is received.

7.17. Socio-Economic Impacts (including Recreational Opportunities)

Applicant's Position

Social Impacts

The Applicant notes in the EIS that the proposed Port Botany expansion would have a wide range of social impacts. The EIS identifies Foreshore Beach users and the Botany Bay fishing and boating communities as the main users likely to be impacted by the proposal. Foreshore Beach users include individuals, families, dog walkers, runners, swimmers, windsurfers, paddle and surf skiers from various council areas surrounding Botany Bay. The fishing and boating community are active users of the boat ramp in Penrhyn Estuary. The fishing and boating community includes formally organised groups as well as lone fishermen.

A social profile study was conducted which concluded that the nature of impacts on the community would be determined by residents' proximity to the new terminal and/or their preferred recreation activity. The study also concluded that the proposed expansion would not have a significant impact on people from the Randwick and Botany local government areas.

There has been some community opposition to Port Botany since it was established in the 1970s which continues to the present. The community concerns are mainly due to the cumulative impact of industrial development in the Botany Bay region on both the natural and social environment.

During the community consultation process, community members emphasised the importance of Foreshore Beach, Penrhyn Estuary, Penrhyn Road boat ramp and waters of Botany Bay for recreational activities and as regional open space sites. Particular concerns included continuation of dog walking opportunities along Foreshore Beach, access restriction to areas on the beach and Penrhyn Estuary; the impact of the proposal on the ambience of Foreshore Beach; the proposed location of the boat ramp; and the impact of the reclamation work and development of road and rail bridges on the ecology of Penrhyn Estuary. The fishing and boating community considered the Port's expansion as an opportunity to improve the existing boat ramp facilities.

The Applicant has advised of the following impacts during the construction and operation of the Port Botany expansion:

- the impact on the public open space and recreational amenity would be most significant during the construction phase of the project. The dredging and construction work would likely affect the short term accessibility to parts of Foreshore Beach, Penrhyn Estuary and areas in the northern part of the Bay. Some part of the beach would always be available for public use;
- construction activities would impact on windsurfers and swimmers who use the area in front of Foreshore Beach but access to the greater part of the Bay would be maintained;
- a public boat ramp would be available for access to the wider Bay at all times during construction;
- operation of the new terminal would impact upon access to parts of Foreshore Beach, Penrhyn Estuary and areas in the northern part of Botany Bay;
- the majority of Foreshore Beach would be retained with enhanced landscaping. Recreational activities which currently take place would continue with enhanced facilities for walkers and cyclists;
- recreational water activities which currently occur in the area of the Bay in front of the beach would be excluded. Windsurfing and swimming would still be possible at Foreshore Beach from the area between the new boat ramp and Mill Stream;
- the ecological habitat at Penrhyn Estuary would be enhanced. Public access would be restricted to a boardwalk and viewing platform; and

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- the boat ramp would be relocated to the middle region of Foreshore Beach. The new ramp would have enhanced facilities. Recreational crafts would be directed to the wider Bay via a marked navigation channel between the Parallel Runway and the new terminal.

Economic Impacts

Sydney's Ports handle approximately \$42 billion worth of trade each year. The total impact on NSW's economy was \$2,509 million in output in 2001-02. Household income generated by the operation of the ports totalled over \$738 million and employment estimated at around 6,945 direct jobs and 10,075 indirect jobs (2001-02).

The Applicant employed EconSearch Pty Ltd to undertake an assessment of the economic impacts of the construction and operation of the proposed expansion on the NSW economy.

Construction Impacts

The construction of the Port Botany expansion would require substantial infrastructure requirements. Sydney Ports and other private operators are likely to incur a cost of \$576 million for the proposed development. This figure includes construction and fit-out costs scheduled over a 24 year period 2001-02 to 2024-25. Should the proposal be approved, construction is likely to commence in 2005. Therefore, the economic impacts are most likely to be felt over the years 2004-05 to 2006-07.

Over the construction period, the proposed expansion would generate \$810 million in output for the NSW economy. Value-added attributable would be \$220 million and household income generated would be \$86 million through the construction phase. During the peak impact year of 2006-07, the direct household impact would be \$6.5 million with 155 jobs. Indirect household impacts would be \$9.6 million with an associated 258 jobs.

Operational Impacts

Over the life of the project to 2024-25, the operation of the proposed terminal would generate a total impact on the NSW economy of over \$16 billion in output. Value added attributable to the operation of new terminal would be \$8.9 billion and household income generated would be around \$4.8 billion.

Once the new terminal is fully operational (2024-25), total employment would be approximately 3,737 direct jobs and 5,369 indirect jobs.

Issues Raised in Submissions

Public Submissions

Of all submissions received by the Department during the exhibition period, 79.5% of submissions specifically referred to recreation and social issues and 2.7% to economic and employment issues. The key issues raised were loss of recreation areas and opportunities; concerns with the design and location of boat ramp and its proximity to the tugs; social decline and disenfranchised youth; concerns that the proposed boardwalk would disturb the birds. In terms of the economic impacts, the main concerns were that the proposal was not economically viable because the jobs would only be relocated from closure of other port activities, and that locating the port in Newcastle or Port Kembla would encourage a shift towards these regional areas.

Council Submissions

Social Impacts

Botany Council

In its submission, the City of Botany Bay Council expressed its concern with the statement in the EIS that the proposal would not significantly impact on the people in the Botany local government area due to their socio-demographic status. Council would like this statement explained due to the increase in land prices and rise in new residences in the last five years.

Council recommends that conclusions in the EIS would come from a wider analysis of the community and not just the ABS census data.

Council's submission highlights a number of deficiencies in the social impact assessment, including:

- concentration on predominately local communities instead of assessing the impacts at a wider sub regional scale;
- lack of a historical analysis on the demographic changes since the Port and the Airport were established;
- lack of consideration for the large business and worker community; and
- difficulty in understanding the magnitude and duration of impacts on the community during construction and operation.

Council recommends the use of Research and Recommendations of Council Social Plans to understand the communities' needs and aspirations together with the social values framework in DIPNR's Towards a strategy for Botany Bay. An assessment of current social impacts should have been undertaken to better understand the current situation and the effectiveness of current mitigation measures together with an attempt to prioritise impacts and undertake a trade-off analysis to determine the key issues in the community.

Council's submission also refers to the impact of increase truck movements on the community – this issue is explored in section 7.1 of this report.

In terms of recreational issues, Council had several concerns regarding the location of the boat ramp and car park. The proposal would cut the Foreshore Beach into two, impeding the progress of walkers, the current uninterrupted vista would change, reduction in landscape areas, the four-lane boat ramp and tug berth would affect the quality and amenity of the foreshore environment; the shape of the boat ramp and car park is incongruous and not in keeping with the linear nature of the foreshore.

The Council is also concerned that recreational boats would have to navigate relatively narrow waters utilised by container ships and that tug boats would be an additional conflict or hazard to recreational boaters. The Council also objects that boating opportunities would be reduced during the construction stage.

Randwick Council

Council does not agree with the EIS's conclusion that: 'the proposed (port) expansion would not impact significantly on the people in the Randwick and Botany LGAs due to their socio-demographic status' and that the 'only area of social infrastructure affected by the proposal is recreational facilities.' Council argues that income levels are not the basis on which to assess the social impacts and that:

- The methodology (that is, social profiling and social infrastructure analysis) is superfluous and simplistic in that the adopted methods merely denote the social-economic and social infrastructure levels of the LGAs but do not address any meaningful socio-economic linkages and conditions affecting residents in the subject local Government areas.
- The methodology is predicated on the assumption that the cumulative impacts on the existing residential area are acceptable as the area is already subject to, and the residents already tolerate, a substantial amount of industrial land use. This assessment is unsatisfactory.
- The EIS reduces the determinants of social impact to "residents' proximity to the port and/or their preferred recreational activity" but does not examine in depth community values linked to quality of life objectives, such as increased road safety issues for parents, and the overall amenity of the local neighbourhood. Questions, whether local residents notion of environmental amenity has been fully considered. Additionally, the ease of "using" services in the surrounding area such as access to public areas, schools and shops may be hindered

by increased truck presence on the roads, the potential for trucks to use inappropriate roads, or the extended 24 hour operation.

- The statement that all recreational activities will be able to continue is erroneous. The proposal will effectively reduce the accessible area of Foreshore Beach by approximately half and that, subject to monitoring, other areas may need to be restricted. It is uncertain if the remaining beach will be suitable for swimming, windsurfing etc.

Recreational Boating / Jetty

Randwick Council is concerned that the combined restricted access and the potential contamination to the Foreshore Beach area will impact on its recreational use, especially for local residents, many of whom comprise young families with lower income levels who thus may tend to utilise the public open space and foreshore areas.

The proposal is also likely to affect sailboat users due to the narrow channel created between the parallel runway and the new terminal. Concern is raised that this channel will not be able to be navigated via “tacking” for sail boats under certain weather conditions. As the recreational jetty will be the only trailer slip area in the Bay region this could effectively prohibit sail boat usage.

Additionally, the impact for all small boat craft in manoeuvring in such close proximity to the draft created by up to 8,000 TEU container ships raises concern for amenity and safety, which is not addressed in the EIS impacts.

Foreshore and open space

Randwick Council is concerned that large container ships have the potential to be moored within 400m of the public beach area and tugs even closer and that this has the potential to be quite intimidating for beach users, an impact which has not been assessed in the EIS.

Also, the proposed restriction of public access to the Penrhyn Estuary in addition to the 57ha of reclaimed land for the proposed development appears excessive. The extent of restriction of the area proposed cannot be fully determined until a comprehensive post-construction contaminant monitoring program establishes the extent of elevated contamination levels in the Estuary and beyond.

Economic Impacts

Botany Council states that the economic analysis undertaken does not adequately provide an overall understanding of the proposal's net economic effect on the community and that a cost benefit analysis should have been undertaken capturing the full scope of costs and benefits including environmental, social and economic impacts. Council further argues that a cost benefit analysis would provide additional justification for choosing the Port Botany expansion.

The EIS also lacks an economic impact assessment of the area on the northern part of Botany Bay as requested in the Director-General's requirement. The economic impact focused at a state-wide level.

Randwick Council is concerned that no assessment of the economic impacts on the surrounding area has been undertaken. In particular, the EIS makes no assessment of the impact of the intensification of land uses and any direct benefit to the local area and the local economy. The real impact on the local community and surrounding neighbourhoods is not adequately assessed when the impact of the proposal on social and environmental issues is considered against increased economic benefit. The Council also requested a cost-benefit analysis be undertaken.

Additionally, the proposal and the EIS do not provide any evidence of researching current best practice and container capacity management from large and busy overseas port examples. The EIS should provide discussion on the efficiency of the port operations and what measures may be undertaken to improve this aspect without creating more space and proceeding with the port expansion. This issue is further discussed in section 6A.

DEC

DEC has raised a number of issues regarding the potential economic impacts of the proposal. In particular, DEC has made the following recommendations:

- The limitations of input-output analysis compared to full benefit-cost analysis should be noted.
- The environmental costs and benefits of the Port expansion proposal should be defined to assist evaluation of the costs of mitigation and offset measures.
- Overall employment benefits of the project should be ascertained to assist broader consideration of benefits and costs.
- The merits of applying choice modelling or other survey techniques of potential economic value of environmental services to the Port Botany expansion proposal should be considered.

Department's Position

Social Impacts

The Department is satisfied that the Applicant has undertaken an appropriate broad community consultation program. The Department is also satisfied with the provisions for the new boat ramp but some compensation is required for the loss of access to Foreshore Beach by the other users. The Department considers that the Applicant should meet with both Botany and Randwick Councils to establish some sort of compensatory measures which would benefit the community.

The Social Impact Assessment concludes that the proposed expansion would 'not have a discernable impact on the social profiles of the two local government areas' even though it is a 'large infrastructure project, with large employment effects'. This statement is not supported by a Social Impact Assessment. The Applicant notes in the EIS that 1,100 people would be directly employed by 2010 and 3,700 people by 2025. The Department requests that the Applicant conduct a Social Impact Assessment (SIA) on the likely impacts of the extra workforce on the area. The study should consider impacts on accommodation and housing demands, transport requirement and any other community infrastructure and services which may be required. The Department considers that the SIA would need to be considered by the Director-General prior to construction.

Economic Impacts

The Department recognises that the proposal would contribute considerably to the NSW economy in terms of employment, investment and would have a flow-on effect to other port-related activities. The proposal would directly impact the local, regional and state economy.

8. CONCLUSION

At this stage of its assessment, the Department draws the Inquiry's attention to the need to focus on the three areas and associated issues raised in this submission, namely:

- a. The proposal's consistency and integration within *Towards a strategy for Botany Bay*, the investigations into the development of a *Metropolitan Intermodal Freight Strategy* and the wider *Metropolitan Strategy* and the achievement of modal split targets;
- b. Pending information required to address a number of outstanding environmental and amenity issues, particularly aviation and impacts on Penrhyn Estuary; and
- c. Conflicting information on the throughput capacity of the Port both in terms of its current "footprint" and proposed "footprint".

The Department recognises the need to provide for an increase in trade through Port Botany, and to accommodate an increase in annual throughput up to 3.2 million TEUs as provided by the NSW Ports Growth Plan (and in the absence of any alternative). The options of achieving this (including the "do nothing" or alternatives to the proposed option) should be further and carefully considered. Such options will have implications for the environmental, amenity, transport and strategic planning outcomes.

In reporting to the Minister, the Inquiry should ensure proper consideration of these issues.