Environment Effects Act **1978**

VICTORIAN DESALINATION PROJECT ENVIRONMENT EFFECTS STATEMENT

REPORT OF THE INQUIRY

TO:

MINISTER FOR PLANNING

Inquiry:

Kathryn Mitchell – Chair

Nick Wimbush – Deputy Chair

Chris Harty - Member

Garth Lampe - Member

Greg Sharpley - Member

4 December 2008

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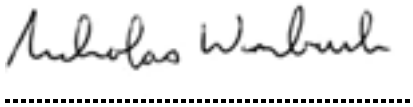
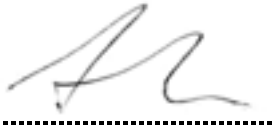
Kathryn Mitchell, Chair



Nick Wimbush, Deputy Chair

Chris Harty, Member



Garth Lampe, Member

Greg Sharpley, Member

4 December 2008

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EXECUTIVE SUMMARY

1. *In response to the continuing drought and the need for water security, the Victorian Government released the next stage of its plan for water in June 2007 - Our Water Our Future: The Next Stage of the Government's Water Plan. This Plan provides long-term solutions to secure Victoria's water supplies by:*

    - *Diversifying and boosting water supplies in Melbourne;*
    - *Networking water resources across the State through the Water Grid; and*
    - *Enabling a rapid and flexible response to changing water needs.*

    As part of this Plan, the Victorian Government announced on 19 June 2007 its intention to develop a Seawater Reverse Osmosis Desalination Plant near Wonthaggi to augment Melbourne's water supply, as well as other regional supply systems. This decision was informed by Melbourne Water's Seawater Desalination Feasibility Study (2007), which investigated the feasibility of desalination as an option to augment Melbourne's water supply.

2. *The Minister for Planning appointed an Inquiry on 3 September 2008 under the provisions of the Environment Effects Act 1978, to consider the Environment Effects Statement (EES) for the Victorian Desalination Project, in accordance with Terms of Reference (dated 19 August 2008). The Inquiry comprised Ms Kathryn Mitchell (Chair), Mr Nick Wimbush (Deputy Chair), Mr Chris Harty, Mr Garth Lampe and Mr Greg Sharpley. The Proponent for this Project is the Secretary, Department of Sustainability and Environment (DSE), on behalf of the Minister for Water.*

3. *The proposed works comprise four main components- these are a Desalination Plant with the capacity to produce 150 to 200 gigalitres (GL) drinking water per annum; Marine Structures for the seawater intake and the saline concentrate outlet associated with the plant; a pipeline to transfer water from the plant to Melbourne's water supply network; and power supply infrastructure to supply electricity for the plant and associated infrastructure. These components have been assessed in accordance with the Inquiry's Terms of Reference and the Project Objectives.*

4. *The Inquiry is considering the EES on the basis of what is referred to as the Reference Project. That is, there is no final project in place, but rather a concept of what the Victorian Desalination Project (VDP) may include. The Project is subject to a tendering process, and at the time of writing, two tenderers have been selected to provide a final bid. The Government has adopted a Public Private Partnership (PPP) as the procurement method for the Project. It is understood that the final designs for*

the project works will not be available until mid 2009 when the successful tenderer is chosen.

5. *The EES was exhibited from 20 August to 30 September 2008, from which 405 written submissions were received. All were referred to the Inquiry, and a hearing was held in relation to the EES over a 15 day period from 14 October to 7 November 2008.*

6. *In respect to the first component - the Desalination Plant - the major issues to be addressed include visual impact of the Plant on the community and wider tourism appeal; noise and dust impacts, and vibration levels during the construction period of two years; impacts on terrestrial flora and fauna; potential flooding of the Plant site, the interaction between the Plant and the Powlett River flood plain, and the presence of potential acid sulfate soils; waste management; greenhouse gas emissions; social and economic impacts on the local Wonthaggi community during the construction period particularly arising from the housing accommodation needs of a large construction workforce; and traffic impacts.*

7. *With respect to the construction and operation of the Desalination Plant, the Inquiry finds that the technology and associated process adopted for the Reference Project concept design are in line with best practice and adopt proven technologies. While there may be post construction impacts on visual amenity, the Inquiry supports the greater attention that is being given as part of the procurement process to additional landscaping requirements. The Inquiry acknowledges that the EES identifies the major potential environmental impacts and sets out a range of mitigation measures and Performance Requirements that provide the basis for satisfactorily addressing these potential environmental impacts.*

8. *There are likely to be a range of social and economic impacts on the local area arising from the construction of the Desalination Plant. The role of the Bass Coast Shire Council in addressing these potential impacts should be given greater prominence. The Inquiry recommends that the Government establish arrangements that will facilitate earlier and speedier consideration of such impacts on the local area during the construction of the plant including the impacts arising from the accommodation requirements of construction workers and potential short and longer-term tourism impacts. These arrangements could include provision of one-off financial assistance to the Bass Coast Shire Council to facilitate the Council's important role in these considerations.*

9. *In respect to the second component - Marine Structures - the major issues to be addressed include: construction impacts – direct and indirect; operation impacts on marine structure location; intake and outlet; and the cumulative effect of marine structures.*

10. *The Inquiry acknowledges the probable local impact on the benthic marine environment at the inlet and outlet. Impacts may arise from the cumulative effect of entrainment of short lived larvae from reef based species, and exposure to elevated levels of salinity from dispersion of the concentrate plume. However, it considers that this will not result in unacceptable environmental effects. Both pre construction survey and post commencement monitoring should be required to confirm biological assemblages in the area of influence.*

11. *The option of disposing pre-treatment waste with the saline concentrate is unlikely to have significant toxicological effects but further testing of the final suite of chemicals should be undertaken. Notwithstanding this, national and international best practice suggests that pre-treatment wastes should not be disposed of to the marine environment and should be removed to landfill.*

12. *Overall, the Inquiry accepts that the site is suitable for the Desalination Plant and marine structures. The seawater is relatively high quality, which in turn provides for an efficient desalination process. The Plant site is large and reasonably remote from Marine National Park areas. The site is largely cleared site of vegetation, and provides sufficient area for substantial buffers within site boundaries. The site sits behind a substantial and stable dune system providing total screening of the Plant from Williamsons Beach. Because of the geology underlying the dunes, the site should be well protected from any storm surges and sea level increases associated with climate change.*

13. *In respect to the third component - Transfer Pipeline - the major issues identified include: geology and geomorphology; impacts from the pipeline on surface water and groundwater; flora and fauna impacts; traffic, noise and vibration resulting from construction of the pipeline ; socio-economic impacts; and the pipeline alignment.*

14. *The Inquiry notes that careful management of soils, in particular Potential Acid Sulfate Soils at the Powlett River crossing is required to avoid environmental impacts on the Powlett River. The Inquiry supports the Proponent's identification of the requirement to undertake investigations into the environmental impacts of dewatering during construction in the northern sector and the potential for saline intrusion in the coastal section during dewatering. The Inquiry supports the*

Proponent's efforts to minimise the areas of habitat that are to be removed but notes that the offsets may be created away from the region.

15. *In respect to the fourth component – Power Supply - the Reference Project proposes an underground power line from the Plant site to Woolamai, and then an overhead powerline connection in the form of lattice towers from Woolamai to Tynong North. The major issues identified include: agricultural use impacts; economic value of agricultural production; land value impacts; landscape impacts; social impacts; and electro-magnetic fields. The Inquiry acknowledges the extent of concern raised by submittors in relation to visual, agricultural, land value and social impacts.*

16. *Having regard to the Proponent's stated position that the Power Supply approach is still to be resolved as part of the procurement process, the Inquiry considers the Power Supply approach can be enhanced by avoiding where possible, the areas subject to the Significant Landscape Overlay, the Special Use Zone 1 and the Potato Cyst Nematode areas. Additionally, the Power Supply lines should follow road or property boundaries wherever possible, and consider use of poles in appropriate locations.*

17. *The Inquiry finds that surface and ground water impacts from the Reference Project can be adequately mitigated by the proposed Performance Requirements and approvals processes required by various authorities. The Inquiry notes that additional geotechnical/ground water investigations are currently being undertaken to provide further guidance for the detailed design phase. The Plant site should not result in significant environmental impacts on water quality in the Powlett River, subject to detailed design and effective environmental management measures.*

18. *The Inquiry finds that there will be significant traffic impacts both at the Plant site and along the Transfer Pipeline and Northern Grid Connection corridors during the construction phase of the VDP, and some traffic impacts in the immediate vicinity of the Plant during operation. The Performance Requirements for traffic should minimise potential impacts, however the Project Company will need to work closely with the various Councils and authorities during the preparation and implementation of the Traffic Management Strategy and Plans to ensure their effectiveness.*

19. *The Inquiry has made a number of recommendations that reflect its key findings, most of which propose changes to the Performance Requirements. Additional recommendations include providing assistance to Bass Coast Shire Council to facilitate managing a range of impacts associated with development of the Plant, and enhancing the Environmental Management Framework to include the provision of regular public information.*

20. *The Inquiry is confident that the VDP will result in significant benefits to the State of Victoria, subject to implementation of the Environment Management Framework and Performance Requirements, which should ensure effective management of the environmental effects of the Project.*

PART 1: BACKGROUND

1. INTRODUCTION

Victoria is facing a critical water crisis. It has experienced higher temperatures and record low rainfall for the past ten years. It has been in drought for many years and there is no sign that drought conditions are abating. Less rainfall means less run-off and results in a significant reduction in the amount of water available to Victorians. At the same time, Victoria is grappling with climate change. The Government has proposed a number of projects to enhance Victoria's water supply, one of which is to build a Seawater Reverse Osmosis Desalination Plant near Wonthaggi.

This project, known as the Victorian Desalination Project (VDP), is the subject of an Environmental Effects Statement and is under review by this Inquiry.

1.1 The Inquiry

The Minister for Planning appointed the Inquiry on 3 September 2008 under the provisions of the *Environment Effects Act* 1978, to consider the Environment Effects Statement (EES) for the Victorian Desalination Project. The Inquiry comprised:

- Kathryn Mitchell: Chair
- Nick Wimbush: Deputy Chair
- Chris Harty: Member
- Garth Lampe: Member
- Greg Sharpley: Member

The Inquiry has been greatly assisted in its work by the Office of Planning Panels Victoria, but specifically Michael Crossman (Panel Associate), Laura Agius (Administration Assistant), Adrian Williams (Panel's Business Manager) and Rebecca Price (Senior Project Officer). Additionally, it retained the services of Chris Wren SC to provide legal advice.

The Proponent for this project is the Secretary, Department of Sustainability and Environment (DSE), on behalf of the Minister for Water. The proposed works comprise a Desalination Plant with the capacity to produce 150 to 200 gigalitres (GL) of potable water per annum, marine structures for the seawater intake and the saline concentrate outlet associated with the plant, a pipeline to transfer water from the plant to Melbourne's water supply network, and power supply infrastructure for the plant.

The Inquiry is considering the EES on the basis of what is referred to as the

Reference Project. That is, there is no final project in place, but rather a concept of what the VDP may include. The project is subject to a tendering process, and at the time of writing, two tenderers have been selected to provide a final bid. The Government has adopted a Public Private Partnership (PPP) as the procurement method for the project. It is understood that the final designs for the project works will not be available until mid 2009 when the successful bidder is chosen.

1.2 Terms of Reference and Project Objectives

The Minister for Planning issued Terms of Reference for the Inquiry on 19 August 2008 (see Appendix 1). The Terms of Reference provide the Purpose and Background for the project and note that the proposal is part of the *Our Water Our Future: The Next Stage of the Government's Water Plan*. In this regard the Victorian Government announced in June 2007 its intention to develop a Reverse Osmosis plant near Wonthaggi to augment Melbourne's water supply, to be operational by the end of 2011.

The Terms of Reference provided background information on the proposal and then outlined its tasks at Part 2 and notes:

> ***The principal objectives of the Inquiry are to establish a sound understanding of the environmental effects of the project and to advise on the best approach to reduce or otherwise manage these effects.*** (Terms of Reference bolding)
>
> *The Inquiry is to provide a written report to the Minister for Planning setting out information and advice in relation to the following matters only:*
>
> 1. *The likely environmental effects of the construction and operation of the components of the project, including the Desalination Plant at the site west of Wonthaggi, the associated marine structures, the water Transfer Pipeline and the high-voltage powerline, as well as relevant variations identified in the EES. To the extent practicable, the likely environmental effects of project options identified in the EES should also be addressed.*
>
> 2. *Whether the proposed alignments of the water Transfer Pipeline and the high voltage powerline are generally suitable or should be adjusted, in light of their likely environmental effects.*
>
> 3. *Whether the environmental effects of the project are capable of being effectively managed, without significant adverse consequences - particularly in the long-term –*

either on the basis of the proposed Performance Requirements (subject to necessary refinement) or other environmental management measures.

4. *Recommendations regarding the approach of the environmental management framework presented in the EES, including any appropriate strengthening of this framework, to provide a high level of confidence that implementation of the project will achieve acceptable environmental outcomes.*

5. *In light of the preceding matter, any specific recommendations regarding the proposed Performance Requirements, including for aspects relating to siting, design, construction techniques, waste production, energy efficiency and environmental mitigation, that would be appropriate to ensure acceptable environmental outcomes consistent with applicable legislation, policy and industry best practice.*

6. *The considerations relevant to the Assessment that will inform decisions on the project under the Planning and Environment Act 1987, Coastal Management Act 1995 and Environment Protection Act 1970, as well as under the Environment Protection and Biodiversity Conservation Act 1999 (Cth), having regard to relevant regulations and guidelines including the Ministerial Guidelines.*

The Terms of Reference note that the following strategic alternatives are outside the scope of the EES and are matters that the Inquiry is not required to examine:

- *strategic options for augmenting water supplies to Melbourne;*
- *different technologies for the Desalination Plant (ie thermal); and*
- *potential locations for a Desalination Plant outside the Wonthaggi – Kilcunda area.*

The Inquiry is required to provide advice in the form of a written report to the Minister for Planning by 4 December 2008.

Parts 4 (Procedure) and 5 (Conduct of Hearings) provided the basis for the manner in which the hearing process was managed and conducted by the Inquiry. In this regard Part 4 (3) notes the Inquiry "*conduct an early public session, preferably during the exhibition of the EES and WAA, at which the Proponent and its specialists will outline the content of the EES and WAA*". This session was held on 10 September 2008 and advertised via the Department of Planning and Community Development (DPCD) EES Project web site. Invitations were sent to all members of the Technical Reference Group. In attendance were the Inquiry, and representatives from the Proponent and Cardinia Shire Council.

The proposal to build a Desalination Plant at Wonthaggi is Government Policy and

the Inquiry's role is to provide advice to Government on the matters outlined in its Terms of Reference. In undertaking that role, the Inquiry is cognisant of the Project Objectives, as outlined in Table 1 of the Executive Summary, EES Volume 1. The Project Objectives are:

Time Objectives

- *To commence delivery of desalinated water from the Project to Victoria's water supply system by the end of 2011*

Scope objectives

- *To provide Victoria with a rainfall-independent supply of initially up to 150 GL of desalinated water per year*
- *To allow for the efficient future expansion of the Project to supply up to 200 GL of desalinated water per year*
- *To ensure desalinated water delivered meets the State's water quality requirements*
- *To retain the flexibility to vary supplies over time to support optimisation of Victoria's water supply system*
- *To deliver the Project in a manner consistent with the State's policy of retaining ownership and management of water resources in public hands*

Value for money objectives

- *To deliver innovative solutions and overall value for money to the State through a whole of life approach to service delivery, risk management and the design, construction, operation and maintenance of the Project*

Environmental objectives

- *To minimise the environmental impact of the Project through design and appropriate risk management and mitigation measures and in particular, to minimise adverse impacts on the coastal and marine environment from construction activity, visual intrusion, noise and waste discharge and disposal*
- *To protect the beneficial uses of the coastal and marine environment, including the landscape and recreational values of the adjacent coastal reserve*
- *To optimise energy efficiency and ensure that 100% of the electricity used in operating both the Plant and the Transfer Pipeline would be offset by the purchase of renewable energy credits. This would be in addition to the State's current renewable energy targets*

Social objectives

- *To maximise benefits to the local community and wider economy within relevant Victorian Government policy frameworks*
- *To establish and maintain the highest levels of health and safety throughout the*

delivery and operation of the Project
- *To minimise disruption to the surrounding area during construction*

These Objectives, in conjunction with the Terms of Reference, provide the framework for the Inquiry's consideration of issues relating to the EES for the Victorian Desalination Project.

1.3 Submissions and Hearings

The EES was exhibited from 20 August to 30 September 2008, and 405 written submissions were received. Part 4 – procedure of the Terms of Reference notes that "*Written submissions that specifically respond to the Task of the Terms of Reference will be the principal means of providing input into the Inquiry process*". Further, "*At its discretion the Inquiry shall invite those submittors who raise substantive issues to present at the Public Hearing, but shall, as necessary, place time limits on the length of all presentations*".

Part 4 (6) of the Terms of Reference allowed the Inquiry to conduct a public hearing, commencing the week of 13 October, to obtain information from submittors and relevant agencies, including expert witnesses, regarding matters relevant to the Terms of Reference. The Terms of Reference note that the combined duration of any discussion sessions preceding the hearing was to be up to 18 sitting days or otherwise conclude by 7 November 2008.

In this regard, the Inquiry held a public hearing in relation to the proposal over 15 days (14, 15, 16, 21, 22, 23, 24, 27, 28, 29, 30, 31 October and 5, 6, and 7 November 2008) in rooms at Cardinia Cultural Centre at Pakenham and the Silverwater Resort at San Remo, during which time the following parties were invited to be represented and/or heard:

Table 1: Appearances at Hearing

Submittor	Represented By
Department of Sustainability and Environment (Proponent)	• Stuart Morris QC, with Chris Townshend instructed by Corrs Chambers Westgarth, who called supporting information/evidence from: - Greg Finlayson, Manager Water Treatment, GHD - Kerry Black, Managing Director, ASR Ltd - Scott Chidgey, Marine Biologist, CEE Consultants - Ian Smales, Zoologist, Biosis Research - Michael Warne, Principal Research Scientist,

Submittor	Represented By
	CSIRO - Allan Wyatt, Director, ERM - Stephen Boyle, Maunsell Australia - Ray Phillips, Phillips Agribusiness - John Noronha, Senior Economist, Essential Economics - Ruth Davies, Principal Social Planner, Maunsell - Mark Koller, Environmental Engineer, GHD - Neville Henderson, PricewaterhouseCoopers
Environment Protection Authority (EPA)	• Stuart McConnell, Director, Science and Technology • Brett Light
DSE - Biodiversity and Ecosystem Services	• Kimberley Dripps, Executive Director
Bass Coast Shire Council	• Alan Bawden, Chief Executive Officer, who called evidence from: - Rob Milner, Coomes Consulting - David Dreadon, Coomes Consulting • Paul Smith, Environment Manager • Patti Wenn, Community and Economic Director • Stephen Piasente, Infrastructure Director • Hannah Duncan Jones, Director Planning and Environment • Jeanette Draper, Social Planner • Stephanie Symes, Economic Planner
Cardinia Shire Council	• Maria Marshall, Barnaby McIlrath, and Barnaby Chessell, Maddocks, who called evidence from: - John Gallienne, Onfarm Consulting Pty Ltd - Andrew Biacsi, Contour Consultants - Ric Simes, Director, Access Economics - Steve Schutt, Hansen Partnership
City of Casey	• Sonia Rappell, Senior Strategic Planner • Warren Smith, ESD Officer
Baw Baw Shire Council	• Phil Stone, Director Planning and Information • Thea Jordan, Manager Planning and Development
South Gippsland Shire Council	• Peter Sharpe, Manager Social and Economic Development • Jenny Dean, Councillor
Watershed Victoria Inc	• Jason Kane of Counsel, and Elizabeth McKinnon, Environment Defenders Office, with Andrea Bolch, who called evidence from:

Submittor	Represented By
	- Jochen Kaempf, Oceanographer • Additionally, the following assisted in the submissions: - Nola Maxfield, Medical Practitioner - Chris Heislers, Veterinary Surgeon - David Wingfield, Science teacher
Power Grid Option Group	• Alan Fraser, Chairman • Pete Smith • Mick Maguire
Longwarry and District Progress Association	• Shirley Higman, President • Iris Andrews, Secretary
Bass Coast Landcare Network	• John Hauser, President • Peter Huitpweit, Vice President
Australian Conservation Foundation (and VNPA)	• Chris Smyth, Marine Campaign Coordinator
Environment Victoria	• Mark Wakeham, Campaigns Director
Victorian Farmers Federation	• Ian Anderson
Cardinia Ratepayers and Residents Association	• Gloria O'Connor • Catherine Manning
National Trust	• Helen Bull
Friends of the Earth Australia	• Cam Walker, Campaign Coordinator
Westernport Swamp Landcare	• Susan Davies
Surfing Victoria	• Max Wells, CEO
Friends of the Koalas	• Patricia Hunt
Bird Observation and Conservation Foundation	• Richard Hunter, CEO
Pakenham Racing Club	• George Dawe, Committee Member
Astronomical Society of Victoria	• Barry Clarke
Phillip Island Conservation Society	• Margaret Hancock, President
Friends of Wonthaggi Heathlands and Coastal Reserve	• Geoff Glare and Beth Banks
Horticultural Peat Farmers Group	• Frank Grovers • Wayne Tymensen • George Lineham
Western Port Bird Observation and Conservation	• Helen Dennis, Secretary
Bass Coast Regional Health	• Jeff Bennett, Chair

Submittor	Represented By
	• Lea Pope, CEO
SandCrash	• Peter Skinner • Simon Taylor • Simon O'Brien
Bonlac Supply Company	• Noel Campbell
Longview Horticulture	• Joseph Murray
Bass Coast Coastal Board Riders	• John Gemmill, (with Ruby and Elijah Gemmill)
Community Submittors	• Jeff Reilly
	• Jan Fleming
	• Beverley Walker
	• Carolyn Charles
	• Neil Duncan
	• Jane Jobe
	• Malcolm Wildes
	• Jessica Harrison
	• Suzanne Heislers
	• Pat Gordon
	• David Wingfield
	• John Wright
	• Maria Riedl
	• Viki Hain
	• Jodie, Tim and Wilhelm Layton
	• Noel Campbell
	• Yvonne, Sam, Cassandra, Nicholas and Andrea Tamburo
	• Sean Morgan
	• Taz Kozaris
	• Geoff and Pam Ferrier
	• Angie Priestley
	• Alys Carson, with assistance from David Blum
	• David and Dorene Blum
	• Jan Morphett
	• Ailsa Drent
	• Max and Bev Hall

Submittor	Represented By
	• Gary Knox
	• Robin McCauley
	• Arnis Heislers
	• Jim and Heather Garnham
	• Patricia Hunt
	• Colin and Beverley Hobson
	• Gideon Cox
	• Dawn Juddery
	• George and Olivia Lineham
	• Nigel and Jennifer Atkins
	• Andrew Pollitt
	• Georgina and Stephen Fairchild
	• Andrew Nicholls
	• Wayne and Joan Weller
	• Walter Grahame
	• Michael and Susanne Kendall
	• Lisa Huitson, Bruce and Sheila Campbell, Sally Blackney
	• Catherine Manning
	• Michael Beasley
	• Louise Brooks
	• Mark Hayes
	• PM Chapman
	• Lyn Whitlam
	• Neil Rankine
	• David Trigg
	• Joanne Karamesinis
	• John and Wilma Coleman
	• Robert and Robyn Peacock
	• Jeff and Ann Brown
	• Denise Davidson, Norm, Wayne and Beverley Henwood
	• Mark Robertson
	• Michael Marson

Submittor	Represented By
	• Russell and Alison Jones
	• Darren and Sinead Hickmont
	• Will and Nancy Paterson
	• Bruce Dunn
	• Robin Middleton
	• Barbara Stewart
	• Charlotte Laemmle
	• Peter Brown
	• Warren Raabe
	• Maurice Schinkel
	• Greg Scullin
	• Anwyn Martin
	• Joseph Murray
	• Graham and Faye Wood
	• Bill Pearson

In accordance with the above and its Terms of Reference, the Inquiry structured the timetable to provide for opening presentations on Day 1 from the Proponent, the EPA, the five Councils (Bass Coast, Cardinia, Casey, Baw Baw and South Gippsland), and the two key interest groups (Watershed and Power Grid Option Group). The next four days allowed the Proponent to present its case, followed by the EPA and the five Councils, who generally were allocated the time they requested. Due to time constraints, time limits were imposed on all submittors, with 20 minutes for each community group and 10 minutes for individual submittors. Watershed was invited to present over a full day, and the Power Grid Option Group requested two hours.

Some submittors were critical of the assignment of their submissions under the issue classification developed and adopted, and then responded to, by the Proponent. However, the Inquiry found it extremely useful as it enabled the Inquiry to review the submissions and the manner in which many of the issues had been addressed through the EES and/or the Performance Requirements.

At the outset of the hearings the Inquiry made it clear that all submissions (and evidence) should focus on the Tasks set out in Part 3 of the Terms of Reference. In particular, the Inquiry noted that it could not make comment or findings in relation

to the policy decisions underlying the Victorian Desalination Project. The Inquiry requested that submittors be cognisant of the Terms of Reference and its role in this process, and asked that submittors ensure their verbal presentations focus on the tasks as set out in Part 4 of the Terms of Reference.

The Proponent prepared a detailed response to issues raised in submission by submittors and tabled this as Document No 44. The response focussed on a range of discrete issues, rather than on the components of the Project. It identified the issue (and sub-issue), the submissions that raised it and then provided a response. The key issues (totalling 45) as identified by this document included:

- Agricultural/horticultural;
- Air quality;
- Commercial;
- Construction;
- Cultural Heritage;
- Decommissioning;
- Economic;
- EES;
- Emergency Services Management;
- EMF;
- Energy consumption/efficiency;
- Evaluation criteria;
- Flora and fauna;
- Geology;
- Greenhouse;
- Groundwater;
- Land acquisition/compensation;
- Landscape and visual amenity;
- Lightspill;
- Location/siting of the Plant;
- Marine biology;
- Marine discharge;
- Marine entrainment;
- Marine pests;
- Marine water quality;
- Modelling;
- Noise;
- Odour (excluding waste);
- Outside scope;
- Performance Requirements generally;

- Power;
- Recreation;
- Road infrastructure/safety and access;
- Security;
- Social;
- Soils;
- Surface waters;
- Traffic;
- Transfer pipeline alignment;
- Vegetation removal;
- Planning and coastal strategy; and
- Waste.

Some submittors were critical of this document as they considered it did not fairly respond to the issues raised, however, the Inquiry found it extremely useful as it enabled the Inquiry to review the submissions and the manner in which many of the issues had been addressed through the EES and/or the Performance Requirements.

Overall, the Inquiry considers that the information brought to it through the written submissions, and then followed up by evidence and further submissions has been extremely useful. The Inquiry thanks all submittors for their contribution to the Inquiry process.

1.4 Site Inspections

On 25 September, members of the Inquiry (and their support staff) made an unaccompanied visit of the subject site, the Transfer Pipeline and power line easements and the surrounding areas. DSE provided an itinerary of sites to visit along the easement corridors and at the subject site, as well as a map showing specifications of the site. These documents were tabled at the commencement of the hearing.

To further their understanding of the desalination process and with the plant cited as a reference source throughout the EES, members of the Inquiry visited the Perth Seawater Desalination Plant located at Kwinana in Western Australia on 3 October. Staff of the Western Australian Water Corporation conducted a tour of the plant and its surrounds, and briefed the Inquiry on various aspects of the plant and the desalination process.

On 29 October, members of the Inquiry visited the proposed site of the Pakenham Racing Club near Longwarry and a number of sites suggested by the Power Grid

Option Group in Longwarry, Loch and surrounds. On 30 October members visited sites in and around Kilcunda, Anderson, Williamsons Beach and Wonthaggi. On Wednesday 5 November, members visited the mouth of the Powlett River area and the surrounding sand dunes, and on Thursday 6 November members visited the general site of the Longwarry power option area, as well as the Koo Wee Rup area.

1.5 Independent Expert Group

As part of the EES process for the Desalination Project, the Minister for Planning asked the Department of Planning and Community Development (DPCD) to:

> *Convene a group of independents experts with expertise of high standing in the fields of hydrodynamics, marine ecology, eco-toxicology and water treatment, to provide advice with respect to the scoping and implementation of technical studies with respect to the Desalination Plant, and potentially also the works approval application under the Environment Protection Act 1970, as well as the preparation and implementation of an environmental management plan for the construction and operation of the plant.*

The Independent Expert Group (IEG) was established in April 2008 to provide advice to the Secretary, DPCD and it comprises:

- Professor Mick Keough (University of Melbourne);
- Adjunct Professor Des Lord (University of Western Australia);
- Mr Tom Pankratz (Water Consultants International); and
- Dr Jenny Stauber (CSIRO Land and Water, Centre for Environmental Contaminants).

The Tasks of the IEG, as noted in their Terms of Reference include:

> *To advise the Secretary, with respect to the IEG members' individual expertise, on relevant aspects of:*
>
> *(i) Draft Scoping Requirements for the EES, to inform their finalisation;*
> *(ii) Design of studies for the EES to address relevant aspects of the Scoping Requirements;*
> *(iii) Adequacy of pertinent EES studies, including components of the exhibited EES, to inform the assessment of environmental effects and environmental management responses;*
> *(iv) Adequacy of proposed environmental monitoring to inform design and operation of the Desalination Plant, in particular for the seawater intake and marine discharge;*

(v) Any specific matters directed to the IEG by the Secretary DPCD or his delegate.

Part 4 (8) allowed for the Inquiry to "*Seek written or verbal information or advice, as required, from the Independent Expert Group or its individual members or from such other experts or specialists as the Inquiry may consider would be of assistance. Any such information or advice must be publicly disclosed (unless it is of a confidential nature)".*

In this regard, the Inquiry held two meetings with members of the IEG, these occurred on 11 October (with members Des Lord and Tom Pankratz) and on 11 November (with members Mick Keough, Des Lord and Tom Pankratz).

The IEG prepared a written report on essentially the marine issues associated with the VDP, which was made publicly available on 16 October as Document 17. The report responded to:

- Consistency of the Reference Project with industry best practice;
- Adequacy of hydrodynamic investigations;
- Assessment of marine ecological impacts;
- Further information for project design and monitoring; and
- Suitability of key Performance Requirements.

Following its initial meeting with the IEG, the Inquiry asked the members of the IEG to provide a written response to some 25 questions, mainly concerned with the marine structures and related issues. A letter to this effect was sent to the IEG via the Secretary of DPCD. The response from the IEG was received by the Inquiry on 7 November and it was tabled as Document 182 (All but three questions were responded to).

The second meeting held with the Inquiry on 11 November resulted in exploration and clarification of the matters addressed in response to the questions of the Inquiry.

The Inquiry has found the work of the IEG to be particularly instructive and helpful in its deliberations.

1.6 Approach to Report

To meet its obligations in respect to the Terms of Reference and in providing its response to the Minister for Planning, the Inquiry has approached consideration of the VDP by focussing on key issues relating to the development of the Desalination Plant and its associated infrastructure, in accordance with its Terms of Reference and the Project Objectives. It has not been possible to address every issue raised by

every submission. The Inquiry has adopted the Reference Project as its base project for consideration. In doing so, it has focussed on the Performance Requirements as the key means of providing recommendations to enable delivery of the Project.

The structure of the Inquiry's report is outlined as follows:

- **Part 1: Background** – These chapters provide information about the Inquiry and its processes, a description of the proposal, the relevant State and Commonwealth legislation and planning controls (*Chapters 1 to 3).*

- **Part 2: Analysis of Project** - Chapters 4 to 7 provide a detailed discussion on each of the four main components of the project. This includes the Desalination Plant, marine structures, the Transfer Pipeline and the power supply. Chapter 8 discusses other issues, including the EPA Works approval, greenhouse gases, waste, surface water and groundwater and traffic and access issues *(Chapters 4 to 8).*

- **Part 3: Response to Terms of Reference and Recommendations** - These chapters "*de-construct*" the Terms of Reference, and provide the findings of the Inquiry as they relate to the six tasks, namely the environmental effects, proposed alignments, management of effects, environmental management framework, Performance Requirements and legislative considerations. It then summarises the response to matters of Commonwealth interest. The Inquiry provides all of its recommendations in the concluding chapter *(Chapters 9 to 13).*

At the Directions Hearing, the Inquiry advised that it had a number of key issues which it considered the Proponent should address during the course of the proceedings. These included:

(i) Information on the issue of flotation of the Transfer Pipeline following the decommissioning of local dewatering during construction in high water table areas;
(ii) Potential for waste materials to be classified by the EPA as prescribed wastes, and the identification for sites with adequate life to take the waste;
(iii) The nature of the ocean currents from a seasonal perspective;
(iv) The final preferred options for the powerline and the pipeline, taking into account the issues raised in submissions and any further investigations;
(v) Justification of the identified pipeline construction at the various sensitive locations;

(vi) A clear and concise response to the Tasks of the Terms of Reference as set out in Section 2;

(vii) Information on the northern power connection – as opposed to an on site gas fired power station option;

(viii) Comment on any structural issue associated with the construction of the pumping station pits and proximity to the disused coal workings;

(ix) A tabular listing of each of the specialist consultants recommendations and associated draft Performance Requirements proposed;

(x) An assessment of the merits of the project components against the relevant provisions and policies contained in the respective Planning Schemes.

Responses to these issues were provided to the Inquiry at various stages of the hearing process. Additionally, the Inquiry requested further responses from the Proponent on specific issues during the course of the hearing and these were all provided. The Inquiry was conscious it sought much information from the Proponent and it observes this was provided in a very short period of time and in good faith.

2. THE PROPOSAL

This chapter provides the strategic context for the Project, an overall summary of the four key components of the proposal and outlines implications of the procurement approach for the EES and the Inquiry.

2.1 Background

In response to the continuing drought and the need for water security, the Victorian Government released the next stage of its plan for water in June 2007 - *Our Water Our Future: The Next Stage of the Government's Water Plan*. This Plan provides long-term solutions to secure Victoria's water supplies by:

- *Diversifying and boosting water supplies in Melbourne;*
- *Networking water resources across the State through the Water Grid; and*
- *Enabling a rapid and flexible response to changing water needs.*

As part of this Plan, the Victorian Government announced on 19 June 2007 its intention to develop a Reverse Osmosis Desalination Plant near Wonthaggi to augment Melbourne's water supply as well as other regional supply systems. This decision was informed by Melbourne Water's *Seawater Desalination Feasibility Study* (2007), which investigated the feasibility of desalination as an option to augment Melbourne's water supply.

In September 2007, the Victorian Premier and Minister for Water announced that the Project would be delivered as a Private Public Partnership (PPP) in accordance with the Government's *Partnership Victoria* policy framework.

By Order in Council dated 18 December 2007 under the *Project Development and Construction Act* 1994 (Vic), the Secretary, Department of Sustainability and Environment (DSE) was nominated as the "*facilitating agency*" and the project's proponent. Under this Act, the responsible Minister (the Minister for Water) and the Secretary have powers to "*govern, co-ordinate and implement the Project*".

The Secretary DSE submitted a referral to the Minister for Planning to determine whether the Project required assessment under the *Environment Effects Act* 1978. The Minister for Planning decided on 28 December 2007 that an EES was required to document the environmental effects of the Project.

The Project was also referred to the Commonwealth Minister for the Environment, Heritage and the Arts to determine whether it is a controlled action requiring approval under the *Environment Protection and Biodiversity Conservation Act* 1999 (Cth). On February 4 2008, the Project was determined to be a controlled action and on the same date it was determined to accredit the Victorian EES process as the assessment approach.

The EES was prepared by DSE in response to Scoping Requirements issued by the Minister for Planning on 4 May 2008. It was exhibited for 30 working days between 20 August and 30 September 2008.

2.2 What is Proposed?

The proposed works comprise four components:

(i) **Desalination Plant** with the capacity to produce 150 gigalitres per annum and the potential to increase to 200 gigalitres of potable water in the future;
(ii) **Marine Structures** for seawater intake and the saline concentrate outlet;
(iii) **Transfer Pipeline** (approximately 85 kilometres in length) connecting the Desalination Plant to the Melbourne water supply network; and
(iv) **Power Supply** to the Desalination Plant and associated infrastructure.

Work undertaken for Melbourne Water's *Seawater Desalination Feasibility Study* (2007) suggested the indicative capital cost for the Project is $3.1 billion. At the Hearings, the Inquiry was advised the cost proportions for the four components were in the order of Desalination Plant – 47 per cent; Marine Structures – 18 per cent; Transfer Pipeline – 28 per cent; and Power Supply – 7 per cent, after estimating the cost of the Power Supply component in capital cost terms.

The EES is a complex set of documents. It comprises five Volumes, which include Synthesis of Environmental Effects (Volume 1), and then Volumes 2 to 5 which relate to the environmental effects of marine structures, Desalination Plant, Transfer Pipeline and power supply respectively. These volumes are supported by 84 Technical Appendices in 11 additional volumes.

(i) Desalination Plant

The proposed site for the Desalination Plant is located between the townships of Wonthaggi and Kilcunda in South Gippsland, approximately 90 kilometres south-

east of Melbourne. The EES sets out that key factors considered in selecting the site for the Desalination Plant between Wonthaggi and Kilcunda included the following:

- Accessibility to a deep ocean environment, providing a clean water source and enabling effective dispersal of the saline concentrate;
- A site terrain suitable to enable construction of the required infrastructure for the Plant and the Transfer Pipeline;
- Relatively flat site reducing the need for earthworks;
- An ability to access existing infrastructure for the construction of the Plant;
- Compatible with existing water supply network;
- Reasonably distant from both Western Port Bay and Bunurong Marine National Park; and
- Minimal disruption to coastal and recreational activities.

The EES states that land is in the process of being acquired for the Project by the State Government. The 264 hectare site is located near the mouth of the Powlett River and largely consists of cleared farmland. There is a coastal reserve with vegetated high dunes between the site and Williamsons Beach. Access to the site is primarily via Lower Powlett Road, with secondary access available from Mouth of Powlett River Road.

The Desalination Plant is to be a Seawater Reverse Osmosis plant with an initial 150 GL/year capacity. The EES lists the infrastructure components of the Desalination Plant as including the following:

- Tunnel shafts that connect the tunnels to the seawater pump station;
- Below ground seawater pump stations containing pumps and intake screens;
- Pre-treatment plant and associated buildings;
- Pre-treatment waste treatment;
- Desalination Plant and associated buildings;
- Clear water storage for desalinated water;
- Storage and use of chemicals for pre-treatment, desalination and post treatment (potabilisation);
- Electrical sub-station to distribute power around the site; and
- Offices, storage sheds, roads and stormwater management measures.

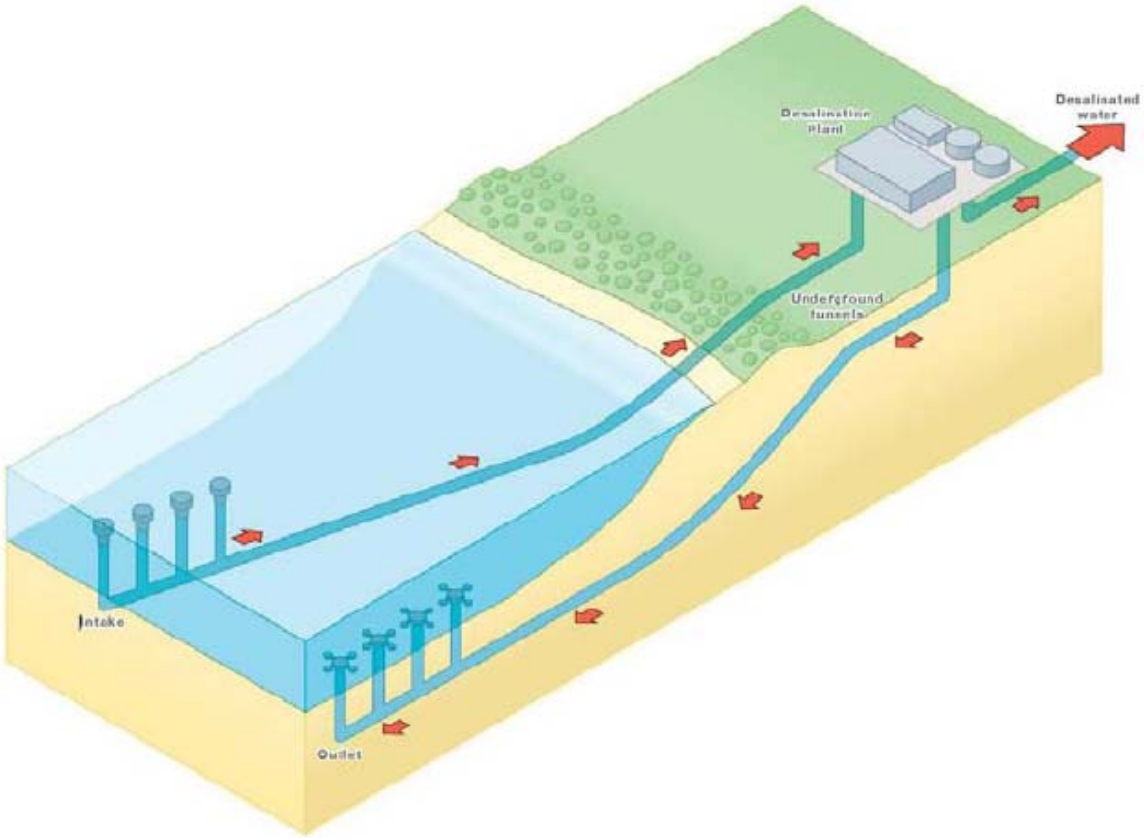
The Desalination Plant and its potential effects are discussed in further detail in Chapter 4.

(ii) Marine Structures

The Marine Structures would deliver seawater to the Desalination Plant and provide for removal of the saline concentrate from the desalination process. These structures would be located approximately one to two kilometres offshore from the Desalination Plant, in an open coastal environment.

The Marine Structures comprise the seawater intake and saline concentrate outlet conduits together with solutions for reducing the intake of marine organisms and diffusing the saline concentrate discharged back to the ocean.

Figure 1: Marine Structures



The Marine Structures and their potential effects are discussed in further detail in Chapter 5.

(iii) Transfer Pipeline

The Transfer Pipeline would be a dedicated pipeline with the capacity to supply up to 200GL per year of potable water. The potable water would be pumped north approximately 85 kilometres to Berwick, where it would connect into Melbourne

Water infrastructure to allow wide distribution through the Melbourne Water supply network and potentially connect to regional water authorities.

To "*provide flexibility for the detailed design of the Transfer Pipeline*", the EES states that a 400-metre wide corridor was selected for investigation with a nominal alignment. The Transfer Pipeline alignment final easement will be approximately 15 to 20 metres wide, and will be located within the investigation corridor (subject to minor adjustments).

The Transfer Pipeline and its potential effects are discussed in further detail in Chapter 6.

Figure 2: Transfer Pipeline and Power Supply Corridors

(iv) Power Supply

The project requires electrical energy for operation of the Desalination Plant and Transfer Pipeline, with the "*average annual power demand for a 150GL per year plant capacity is estimated to be 92 MW and for a 200 GL per year plant power, demand is estimated to be 133 MW*." The proposal for the Power Supply is a connection to the existing power supply network near Tynong via a 220kV overhead northerly grid connection.

The EES states that existing electricity supply to the Bass Coast area is limited and cannot support the additional power demand arising from the Desalination Plant and Transfer Pipeline. It also makes the comment that future electricity supply planning for the area suggests a need for upgraded power supply to the region regardless of the addition of the project's power demand.

A number of potential power supply sources were considered, including renewable energy, a stand alone gas-fired power station and a grid-based power supply source. The EES describes the reasoning behind why a grid-based power supply source was deemed the best option.

The Power Supply and its potential effects are discussed in detail in Chapter 7.

2.3 Reference Project, Variations and Options

As briefly outlined earlier, a Reference Project has been developed as the basis for environment impact and risk assessment in the EES. The EES states that the Reference Project "*demonstrates a feasible way that the Project could achieve the State's objectives and the environmental Performance Requirements*". That is, it provides an appropriate basis for assessing the expected range of environmental impacts, while recognising that altered or additional impacts may result from configuring the Project differently. The EES studies have focused substantially on the Reference Project.

As well as the Reference Project, "*Variations*" have been put forward in the EES. These contemplate other design and management solutions which meet the Project Objectives and Performance Requirements and are within the scope of this EES assessment.

In addition, the EES also identifies "*Options*" that may potentially be of interest to the Project but which have not been considered further for technical or commercial reasons, or because they did not appear to offer significant advantage over the Reference Project. The EES and the Terms of Reference state that while Options have

not been fully assessed, "*they are matters upon which comment is invited*". Any further process for the Options will be determined by the Minister for Planning prior to any endorsement by the State for utilisation in the Project.

A summary of the key elements of the Reference Project, Variations and Options is presented in the table below reproduced from EES Volume 1:

Table 2: Key Elements of Reference Project, Variations and Options

Key elements	Reference Project	Variation	Option
Marine Structures			
Intake concept	Direct intake in deep water		Seabed filtration
Marine conduits	Large tunnels and shafts	Multiple conduits/pipes on the seabed	Tunnel and then pipes trenched into seabed
Intake head	Mushroom structure		
Intake screening	Grill on intake head Active screen onshore	Passive fine screen at intake head	
Concentrate outlets	Rosette diffuser	Pipeline diffuser	
Marine Structure locations	Offshore on low profile reef	Alternative locations	
Desalination Plant			
Pre-treatment concept	Media filtration	Additional clarification processing such as Dissolved Air Flotation (DAF) Membrane Filtration (MF/UF)	
Pre-treatment waste Management	Landfill Disposal		Ocean Disposal
Brine disposal	Ocean Disposal		
Transfer Pipeline			
Corridor/alignment	Corridor with nominal alignment	Alignment deviations within corridor	Alternative corridor/alignment
Booster Pump Station	Nominated location on alignment		Elsewhere on alignment
Dosing Facility	Dosing Facility at Plant		Dosing Facility at Booster Pump Station
Power Supply			
Grid connection corridor/alignment	Grid connection - northerly	Alternative alignment within corridor	Alternative corridor/alignment
			Grid connection underground – Tynong North to Woolamai
			Gas-fired power station on plant site and gas supply lines
			Hybrid – gas-fired power station and wind farm

2.4 PPPs, Project Timelines and Performance Requirements

The Project will be delivered as a Public Private Partnership (PPP), which involves the private sector financing, designing, constructing, commissioning, operating, repairing, maintaining and handing over the Project and associated infrastructure. The State is seeking to contract with a single purpose privately owned vehicle (the Project Company) to deliver the Project.

The procurement process is being conducted in two phases. The Expression of Interest phase conducted in mid - 2008 led to the short-listing of two consortia. The second phase, which is the Request for Proposal phase, is currently underway with submissions from the short-listed bidders due in March 2009. The Project contract is expected to be awarded by mid - 2009 and the Project to be operational by end - 2011. Significant activity in relation to the construction of the Plant itself is predicted to occur between September 2010 and June 2011 with the expected peak workforce on-site at the Plant expected to be 900 workers.

The adoption of the PPP process, and the concurrent timetable for the procurement and this EES processes, is reflected in the concept and development of the Reference Project used in the EES and the focus on Performance Requirements. The Reference Project represents a hypothetical project design with varying levels of specificity which was developed to demonstrate the Project's feasibility and ability to achieve acceptable environmental outcomes. As acknowledged in the EES, the Project as bid and built by the successful bidder will almost certainly differ from the Reference Project. The procurement process has also meant the proposed environmental Performance Requirements set out in the EES for the Project, largely aim to describe the performance outcomes that the Project must achieve rather than the detailed design or processes used to achieve this. This approach is designed to provide the capacity for innovation in design, technology and operations, as well as financial structuring, by the interested parties.

From the perspective of the Inquiry, this has meant the focus has largely been on an assessment, at a general level, of the environmental impacts and risks of the Project concept, and the robustness of the Performance Requirements to achieve the appropriate environmental outcomes. These Performance Requirements, along with other requirements, will form part of the Project Agreement with the successful Project Company. In addition, and associated with a number of these Performance Requirements, the Project will be subject to the conditions of relevant statutory approvals, including those of the EPA.

3. LEGISLATIVE AND POLICY FRAMEWORK

The Terms of Reference note that under Victorian law, the Project requires the following approvals:

- *Authorisations under the Planning and Environment Act 1987 to provide for the use and development of the Desalination Plant, water pipeline and power supply infrastructure, ie under the Bass Coast, Casey, Cardinia and South Gippsland Planning Schemes;*
- *Works Approval under the Environment Protection Act 1970 from the Environment Protection Authority to construct the Desalination Plant;*
- *Consent for use and development of coastal Crown land under the Coastal Management Act 1995 for the marine structures;*
- *Approval of cultural heritage management plan under the Aboriginal Heritage Act 2006; and*
- *Consent for waterways crossings under the Water Act 1989 for the water pipeline.*

While other approvals may also be required, the decisions necessary for the above approvals will be substantially informed by the outcomes of this EES process. Approval of a Cultural Heritage Management Plan will be assessed as part of a separate process to the EES Inquiry.

The EES states that other Victorian approvals may include:

- Permits for taking flora and fauna under the *Flora and Fauna Guarantee Act* 1988; and
- Consents under a range of Acts to enable access to and use of public land.

The project needs approval under the Commonwealth's *Environment Protection and Biodiversity Conservation Act* 1999, for which the controlling provisions for this project are:

- Sections 16 and 17B (wetlands of international importance); and
- Sections 18 and 18A (Listed threatened species and communities).

This chapter provides an overview of the various State and Commonwealth legislation and policy affecting the project.

3.1 State Legislation

Key approvals required are set out in Chapter 4.1.2, EES Volume 1. This Inquiry hearing process will inform decisions under the following legislation:

(i) *Planning and Environment Act* 1987

The *Planning and Environment Act* 1987 provides a system of control for the use and development of land in Victoria. The Act is administered across Victoria via planning schemes created under this Act, and which set out specific detail on the types of uses and development that are permitted within each municipal area.

(ii) *Environment Effects Act* 1978

The *Environment Effects Act* 1978 establishes the legislative framework for obtaining information and advice on the likely environmental effects of projects by decision makers and those responsible for undertaking works, in the form of an EES. The Act requires a body which is carrying out or proposing to carry out declared works to prepare an EES which must be submitted to the Minister administering the Act, to assist the Minister's assessment of the environmental effects of the works.

(iii) *Flora and Fauna Guarantee Act* 1988

The main objectives of this Act are to conserve Victoria's flora and fauna, to manage potential threats, to ensure that any human use of flora and fauna is sustainable and to make certain that the diversity of Victoria's flora and fauna is maintained at its present level. The Act highlights its key role as the main piece of Victorian legislation that deals with the conservation of threatened species.

(iv) *Environment Protection Act* 1970

The *Environment Protection Act* 1970 establishes the Environment Protection Authority (EPA), outlines its powers, duties and responsibilities and makes provision for the prevention of pollution and the protection of the environment.

(v) *Coastal Management Act* 1995

The *Coastal Management Act* 1995 provides a coordinated approach to approvals for the use and development of coastal Crown land in Victoria. Section 3(1) of the Act defines coastal Crown land as:

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

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

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

(vi) *Heritage Act* 1995

This Act establishes a framework for heritage protection in Victoria. It provides protection for a wide range of cultural heritage places and objects.

(vii) *Aboriginal Heritage Act* 2006

The *Aboriginal Heritage Act* 2006 (Vic) replaced the *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984 (Comm) and the *Archaeological and Aboriginal Relics Preservation Act* 1972 (Vic). Key features of the Act include:

- the creation of the Aboriginal Heritage Council, with membership of traditional owners who will advise on the protection of Aboriginal heritage;
- the use of cultural heritage management plans for certain development plans or activities;
- the ability for registered Aboriginal parties to evaluate management plans, advise on permit applications, enter into cultural heritage agreements and negotiate the repatriation of Aboriginal human remains; and
- alternative dispute resolution procedures.

The Plant site, Transfer Pipeline corridor and Power Supply corridor cover areas of

cultural heritage, both Aboriginal and European. Construction of all these elements of the Project is likely to impact on cultural heritage through the removal, damage or destruction of artefacts.

The proposed alignments of the Transfer Pipeline and Northerly Grid Connection have had regard to avoiding impacts on registered aboriginal heritage sites and sites identified as sensitive in terms of their potential to contain aboriginal relics.

The scoping document for the EES required that draft Cultural Heritage Management Plans, under the *Aboriginal Heritage Act 2006*, be prepared for exhibition with the EES. These are found in Technical Appendices 82, 83 and 84. Once the designs for infrastructure are fully developed detailed cultural heritage field investigations can be undertaken to complete the draft Plans. It is proposed that the Performance Requirements and the Cultural Heritage Management Plans will be implemented to manage any potential impacts.

The Terms of Reference note that while Aboriginal cultural heritage is a relevant matter for the Inquiry, it should not consider in any detail the draft Cultural Heritage Management Plans that have been prepared in conjunction with the EES. Any decision on these plans will follow the Minister for Planning's assessment.

In its conclusions, the Proponent advised that the sites of Aboriginal cultural heritage significance that have been identified at the site during investigations have been, or are in the process of being registered on the Victorian Aboriginal Heritage Register. Further, Mr Morris advised that:

> *These sites will be subject to the management procedures set out in a Cultural Heritage Management Plan to be approved for the site by Aboriginal Affairs Victoria following completion of the EES process. In addition to being a Performance Requirement, the Project Company will have a statutory obligation to comply with the Cultural Heritage Management Plan. In addition, the Performance Requirements require the Project Company to design extent of the Works and Temporary Works to avoid known sites if practicable.*

The Inquiry is satisfied that cultural heritage issues can be addressed satisfactorily through the appropriate processes during the course of the Project. ***However, it makes two recommendations in relation to the Performance Requirements relating to Aboriginal Heritage, these are clarification issues only as follows:***

(i) Amend the Performance Requirements as follows:

- Amend the first Objective in 8 (Aboriginal Heritage) to delete the word: *…"known"…*

- Delete the first four Performance Criteria in 8 (Aboriginal Heritage) and replace with: *"No Works to be undertaken prior to the approval of project Cultural Heritage Management Plan(s) in accordance with the Aboriginal Heritage Act 2006"* and *"Comply with the approved Cultural Heritage Management Plan(s)".*

(viii) *Road Management Act* 2004

The *Road Management Act* 2004 establishes a coordinated management system for public roads that will promote safe and efficient State and local public road networks and the responsible use of road reserves for other legitimate purposes, such as the provision of utility services.

(ix) *Crown Land (Reserves) Act* 1978

The *Crown Land (Reserves) Act* 1978 is the principal legislation dealing with the reservation and management of Crown lands in Victoria.

(x) *Land Act* 1958

The *Land Act* 1958 governs the management and disposition of unreserved Crown land, including the granting of leases and licences over unreserved Crown land for commercial, industrial, agricultural and other purposes.

(xi) *Electricity Safety Act* 1998

This Act prohibits any person from making an opening in the ground above or below an electric line, unless they have the authorisation of the person who oversees that particular line.

(xii) *Wildlife Act* 1975

The purposes of the *Wildlife Act* are in summary, to protect and conserve native wildlife and to regulate the conduct of persons engaged in activities relevant to wildlife. All native wildlife is protected under the Act unless otherwise exempted.

(xiii) *Fisheries Act* 1995

This Act provides for the regulation, management and conservation of Victorian fisheries including aquatic habitats.

(xiv) *Water Act* 1989

Under Section 1, the stated purposes of the Act are to provide for the integrated management of the terrestrial phase of the water cycle, its conservation and management for sustainable use, community involvement in the pursuit of those objectives, the elimination of inconsistencies in the treatment of surface and groundwater resources and waterways, definition of water entitlements and the responsible and efficient allocation to various needs and consumers.

(xv) *Catchment and Land Protection Act* 1994

The *Catchment and Land Protection Act* 1994 focuses on the management and protection of State water catchments. Its primary concerns are the maintenance of State land and water resources and the enhancement of long-term productivity. The Act promotes and supports the operation of the Victorian Catchment Management Council and the Catchment Management Authorities. It also provides a system of controls on weeds and pests.

(xvi) *Renewable Energy Act* 2006

The main purpose of Victoria's *Renewable Energy Act* 2006 is to promote the development of renewable energy generation through the establishment of a scheme that:

- provides for the creation and acquisition of renewable energy certificates; and
- requires the surrender of renewable energy certificates.

(xvii) *Safe Drinking Water Act* 2003

The *Safe Drinking Water Act* 2003 is concerned principally with the regulation of the quality of drinking water supplies. It provides a regulatory framework for drinking water quality that includes:

- a risk management framework from "catchment to tap";
- a set of standards for key water quality criteria;
- information disclosure requirements for water businesses; and

- systemic community consultation processes.

3.2 State Government Policy

(i) Victorian Coastal Strategy, 2002 and Draft Victorian Coastal Strategy, 2007

The Victorian Coastal Strategy (VCS) is the Government's overarching policy for use and development of the Victorian coastline. It establishes a framework for the long term ecologically sustainable management of the Victorian coast and provides guidelines for decision making processes that impact on the coast. The VCS places importance on the environmental, social and economic significance of the coast and creates a hierarchy of principles for coastal planning and management that "*provide a pathway for decision making that leads to triple bottom line outcomes*". The hierarchy of principles is:

(a) provide for the protection of significant environmental features;
(b) ensure the sustainable use of natural coastal resources;
(c) undertake integrated planning and provide direction for the future; and
(d) when the above principles have been met, facilitate suitable development on the coast within existing modified and resilient environments where the demand for services is evident and requires management.

The draft Victorian Coastal Strategy 2007 has been released for public comment, but at the time of writing this report, the Draft Strategy had not been finalised. As outlined later, the Draft Strategy specifically contemplates the establishment of a coastal Desalination Plant to supplement Melbourne's water supply.

(ii) Victorian River Health Strategy, 2002

The Victorian *River Health Strategy* was released in August 2002 and outlines the Government's long-term direction for the management of Victoria's rivers. It aims to provide a clear vision for the management of rivers in Victoria and a comprehensive policy direction on issues affecting river health. It provides a blueprint for integrating "*all Victorians' efforts on rivers and for ensuring that the state gets the most effective river health benefits for the effort and resources invested*."

(iii) Native Vegetation Management Framework, 2002

The *Native Vegetation Management: A Framework for Action* was released in 2002, and is the State Government's strategy to protect, enhance and revegetate Victoria's native vegetation. It was developed to implement the objectives of Victoria's

Biodiversity Strategy and the National Strategy for the Conservation of Australia's Biological Diversity. The Framework's main goal is "*to achieve a reversal, across the entire landscape of the long-term decline in the extent and quality of native vegetation, leading to a net gain*."

(iv) Victorian Greenhouse Strategy, 2002

The *Victorian Greenhouse Strategy* was released in 2002 and details the actions the Government is taking in response to climate change on three fronts:

- The reduction of greenhouse gas emissions;
- The sequestering of carbon through enhancement of greenhouse sinks; and
- The development and implementation of strategies to adapt to climate change.

The Strategy outlines the action Government Departments must take to reduce greenhouse gas emissions from their own operations, including: reducing building energy consumption; increasing the use of electricity from renewable sources; reducing vehicle fleet related greenhouse gas emissions; offsetting vehicle fuel emissions through tree plantings; and incorporation of high levels of energy efficiency in all major project developments.

(v) Our Water Our Future: The White Paper, 2004

In 2004 the Victorian Government launched *Our Water, Our Future: The White Paper* action plan to secure water for homes, farms, businesses and the environment. *Our Water Our Future* sets out 110 new initiatives for water conservation and is aimed at every sector of the community. It examines household use, industrial and agricultural use, recreation and tourism, environmental impacts, pricing, population increases and climate change to ensure there is adequate water to sustain growth over the next 50 years.

(vi) Victoria's Environmental Sustainability Framework, 2005

Victoria's *Environmental Sustainability Framework* was released in April 2005 and aims to make environmental sustainability a consideration in everything Victorians do by taking "*a long term perspective and holistic approach to improving the environment*." It sets out a vision for Victoria to become a sustainable state within one generation by setting three strategic directions, including:

- Maintaining and restoring our natural assets;

- Using our resources more efficiently; and
- Reducing our everyday environmental impacts.

(vii) Our Environment Our Future – Sustainability Action Statement, 2006

Our Environment Our Future is a $200 million package of 150 "*priority sustainability initiatives to secure a sustainable state for future generations of Victorians*." It identifies five areas for immediate action:

- Responding to the challenge of climate change;
- Maintaining and restoring our natural assets;
- Using our resources more efficiently;
- Reducing our everyday environmental impacts; and
- Government leadership

(viii) Melbourne Water: Sustainable Water – A Strategic Framework, 2007

Sustainable Water – A Strategic Framework formalises Melbourne Water's commitment to sustainability. It links the organisation's programs to a range of government policy platforms including *Our Water Our Future*, *Central Region Sustainable Water Strategy*, *Our Environment Our Future* and *Melbourne 2030*. It provides the context for Melbourne Water's planning processes to ensure that social, economic and environmental impacts are all considered.

(ix) Our Water, Our Future: the Next Stage of the Government's Water Plan, 2007

In response to predicted future pressures on water resources relating to drought, climate change and increased population, the Victorian Government released "*Our Water, Our Future: the Next Stage of the Government's Water Plan*" in June 2007. The overarching objectives of this plan is to "*provide water security for Victoria's growing population and economy in the face of drought and the challenge of climate change*". It outlines the major infrastructure projects to increase the supply for Melbourne and regional centres, and identifies the following components:

- A Desalination Plant;
- Modernising Victoria's Food Bowl irrigation system to capture lost water for farms, the environment and Melbourne;
- Expansion of Victoria's water grid;
- Upgrading Melbourne's Eastern Treatment Plant to provide recycled water;

- Supporting new and existing water conservation programs for homes and industry; and
- New Victorian water grid projects, including the Sugarloaf Interconnector Pipeline.

The State's objectives under the Plan are listed in Table 1-1 of the EES.

3.3 Commonwealth Legislation

The *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) is administered by the Commonwealth Department of the Environment, Heritage, Water and the Arts. The EPBC Act requires that an environmental approval be obtained from the Minister administering the Act before taking any action that has/will have/is likely to have a significant impact on matters of national environmental significance relevant to various sections of this Act. Approval is required for actions involving the Commonwealth, including activities concerning Commonwealth land and activities of Commonwealth agencies that may have a significant effect on the environment.

In respect of proposals involving the Commonwealth, the Act prohibits a person taking action on Commonwealth land that *"has/will have/is likely to have a significant impact on the environment and outside Commonwealth land that has/will have/is likely to have a significant impact on the environment on Commonwealth land".*

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

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

As outlined earlier, on 4 February 2008 the Minister's delegate determined that this project is a *controlled action,* and therefore requires approval by the Commonwealth Government Minister for the Environment, Heritage and the Arts before it can proceed. The Victorian EES process for the Project has been accredited by the Commonwealth for its assessment needs.

Additionally, the *Native Title Act* 1993 provides native title claimants and appropriate Aboriginal groups with the opportunity to be involved and make comments on proposals that may affect native title.

3.4 Planning Considerations for Land within the Project Area

The Inquiry's Directions asked the Proponent to provide "*An assessment of the merits of the project components against the relevant provisions and policies contained in the respective Planning Schemes*" (question 10). This information was provided to the Inquiry on 30 October as Document 105, and it provided an overview of the planning framework. In response, the Proponent noted that if the Minister's assessment of the Project following the EES process is favourable, facilitative measures to support its implementation will need to occur. Mr Morris suggested that some form of Planning Scheme amendment or exemption can be expected. (This is already foreshadowed by the existence of a Public Acquisition Overlay over the site of the Plant which recognises the future use of the land). While the Proponent did not provide a detailed analysis of the planning scheme provisions, it acknowledged the relevance of the Planning Scheme provisions through the objectives which the Project should, if possible, meet. It noted that: "*Among these are the need to respond to the sensitivities of coastal location, the objectives of Significant Landscape Overlays and the value of high productivity agricultural land recognized by the Special Use Zone – Horticultural Preservation in Cardinia".*

The following narrative provides a brief overview of the planning framework for land within the Project area (which is largely taken from Document 105).

State Planning Policy Framework (SPPF)

Clause 18 of the SPPF relates to Infrastructure, and one of the key components of infrastructure is water supply, sewerage and drainage (Clause 18.09). The objective is to plan for the provision of water supply, sewerage and drainage services that efficiently and effectively meet State and community needs and protect the environment. It is Government policy that the Desalination Project is crucial infrastructure to secure Melbourne's water supply against the effects of rainfall dependency in a situation of drought, population growth and the potential effects of climate change.

Clause 15.08 (Environment) aims to protect and enhance the natural ecosystems and landscapes of the coastal and marine environment and requires decision making by planning and responsible authorities to be consistent with the hierarchy of principles of coastal planning and management as set out in the *Victorian Coastal Strategy 2002*

and have regard to (where relevant):

- *Coastal Spaces Landscape Assessment Study* (DSE, 2006); and
- *Siting and Design Guidelines for Structures on the Victorian Coast* (Victorian Coastal Council, 1998).

The Proponent advocated that the Project provides for the protection of the beach and coastal dune system by locating infrastructure in the sub-strata. The Plant makes sustainable use of seawater and is subject to Performance Requirements to protect the sustainable use of coastal resources (e.g. commercial and recreational fishing). While the Project is a one-off development of critical water infrastructure, it facilitates integration of water resource planning across the State and provides direction for its water future. The *Victorian Coastal Strategy* states that suitable development will generally be coastal dependent or relate to coastal dependent uses, which is clearly the case.

A review has recently been carried out of the *Victorian Coastal Strategy 2002,* and the draft *Victorian Coastal Strategy 2007* (Draft Strategy) has been released for public comment but has not yet been adopted. This Draft Strategy utilises the same principles for coastal planning and management as the 2002 strategy but provides updated policies and actions relating to future challenges including climate change and population growth. In this regard, the Draft Strategy notes (section 4.5) that water availability is an increasing concern for growing coastal settlements and that seawater desalination and recycling wastewater could provide new supplies of water. It specifically states that: "*A Desalination Plant will be built on the coast by the end of 2011 to supplement Melbourne's water supply*". A new action (4.5.1) of State/regional importance is for the Department of Sustainability and Environment, Environment Protection Authority and Victorian Coastal Council to: *"Give expert advice during the assessment of environmental impacts, and siting and design of a Desalination Plant".*

With respect to sea level rise from climate change, the Draft Strategy requires new development to take account of predicted sea level rise of between 0.4m and 0.8m by 2100 for planning and risk management purposes. The Performance Requirements for Flooding Control require the Project Company to design and construct the Desalination Plant to be sufficiently above the 1 in 100 Annual Exceedance Probability Flood Level under expected climate change conditions, with a reasonable allowance for the uncertainty of the estimates (Performance Requirement 12.3).

The Desalination Plant site is partly within an area listed in the *Victorian Coastal Strategy 2002* as being within the Coastal Protection Zone which applies to "*areas in*

relatively natural condition or which are significant for botanical, zoological geological or geomorphological, archaeological or historical reasons". Areas located within the Coastal Protection Zone should be managed to protect natural values of the zone.

Minimisation of the disturbance to this zone has been achieved by establishing the Desalination Plant site behind the coastal dune system on flat, cleared agricultural land. Drilling under the dunes and beach area will allow these systems to remain untouched with minimal disturbance to the sea bed through the location of the inlet and outlet structures beyond the high relief reef area of marine sensitivity. In addition, the Performance Requirements contain a wide range of conditions and processes to respond to, integrate with and minimize impacts on, the coastal landscape.

Zones, Overlays and Local Policies

The Local Planning Policy Frameworks of the affected municipalities do not specifically contemplate the Desalination Project, however, the key zones, overlays and policies that generally apply to land affected by the Project are outlined as follows:

- **Desalination Plant**

The Desalination Plant is located in a Farming Zone and is currently affected by a Public Acquisition Overlay under the Bass Coast Planning Scheme. The purpose of the Farming Zone is "*to ensure that non-agricultural uses, particularly dwellings, do not adversely affect the use of land for agriculture*". A Utility Installation is permissible within the zone. Schedule 4 to the Public Acquisition Overlay identifies the site as land "*which is proposed to be acquired by a public authority*" for the purpose of the Desalination Project. Mr Morris submitted that "*by expressly dedicating the site for future use for a Desalination Plant, the Public Acquisition Overlay dispenses with any other discretion under the Bass Coast Planning Scheme concerning the use of the land for this purpose*". In relation to the design and siting considerations in clause 35.07-6 of the Farming Zone, which require consideration of the effect on the environment of the siting, design, height, bulk, colours and materials of new development, the Proponent noted these sensitivities are addressed by Performance Requirements specifying the building envelope and setback, and a comprehensive range of architectural and landscaping requirements to ensure that the facility is integrated well into the landscape.

The north-western corner of the site is covered by a Land Subject to Inundation Overlay where development must take account of 1:100 year flood levels and ensure

the free passage of floodwaters and drainage so that existing flood levels do not rise as a result of the development. These outcomes are mandated by the Flooding Control Performance Requirement (12.3) which requires the Desalination Plant to be designed to be sufficiently above the 1 in 100 Annual Exceedance Probability flood level under expected climate change conditions to allow for the natural closing of the mouth of the Powlett River and coincident levels in Bass Strait. The Visual Amenity Performance Requirement 1.13(d) requires re-establishment of a wetland (the unnamed tributary of the Powlett River) in this area of the plant site.

Schedule 1 (Coastal Wetland Areas) and Schedule 4 (Land Subsidence) to the Environmental Significance Overlay (ESO) apply to the site. The purpose of ESOs is to identify areas where development of land may be affected by environmental constraints, and to ensure that development is compatible with identified environmental values. ESO1 applies to the land along the foreshore south of Mouth of Powlett River and seeks to ensure that land use and development does not adversely affect the water quality and habitat values of the Bass coastline – particularly its wetlands and rugged coastal cliffs. Development of this land must (among other things):

- *Maintain and improve the stability of coastal wetlands, dunes and coastline;*
- *Conserve areas of environmental importance or significance; and*
- *Avoid potential threats to the quality, life cycle processes or functioning of aquatic and terrestrial ecosystems or native plants and animal species.*

The Proponent noted that given the Planning Scheme extends only to the low water mark, construction in the area subject to this control is limited to sub-strata in order to preserve the integrity of the dunes and that the Plant site largely comprises cleared farmland without significant terrestrial or aquatic ecosystems.

ESO4 applies to a portion of the site extending north west of Lower Powlett Road and refers to the risk of land subsidence resulting from past coal mining activity. The decision criteria in ESO4 require a geotechnical report from a qualified geologist and consideration of the extent and location of development in relation to the undermined areas. The geotechnical investigations undertaken at the site and the Geology and Geomorphology Performance Requirements requiring any Project works to be able to tolerate any differential settlement resulting from potential subsidence, including from the old mining works (Performance Requirement 10.3), serve this objective.

- **Transfer Pipeline and Powerline to Woolamai**

The land along the co-located underground powerline and Transfer Pipeline fall largely within the Farming Zone, with some land contained within the Public Conservation and Resource Zone (e.g. along the Powlett River) and Road Zone 1 (e.g. along Bass Highway). Within these zones, use of the land for these purposes is either permissible or as of right. In this regard, the Proponent said:

> *Although the effect of development on agricultural land uses is a key decision criterion within the Farming Zone, and flora and fauna values must be protected within the PCRZ, the public benefits of utility infrastructure counterbalance the policy discouragement flowing from these criteria. The fact that the infrastructure is to be located underground and will impose only minor on-going constraints on agricultural activity is also relevant in achieving this policy balance. The underground location of the infrastructure also fully satisfies the design and siting requirements of clause 35.06-7.*

This section is affected by a Significant Landscape Overlay (SLO1 – Strzelecki Foothills and Bass Valley). As the pipeline and powerline are underground and will not be visible, the landscape objective of this overlay is generally satisfied. ESO4 – Land Subsidence applies to this section.

- **Transfer Pipeline from Woolamai to Soldiers Road**

For land in Bass Coast Shire, this includes land subject to ESO2 – Sites of Geological and Geomorphological Significance and ESO3 – Significant Flora and Fauna Habitat. ESO2 seeks to protect and conserve sites of geological and geomorphological significance from development that may threaten the environmental quality and characteristics of a particular site.

ESO3 seeks to protect sites are of zoological or botanical significance and includes sites containing broad types of vegetation classified as depleted, rare or threatened at a Statewide level.

While the pipeline traverses these areas, the relevant Performance Requirements require the Transfer Pipeline to be designed and constructed so as to avoid and minimize impacts to sites of geoscience significance (Performance Requirement 10.2), and limit impacts on terrestrial flora and fauna (Performance Requirement 6.3).

ESO4 – Land Subsidence and SLO1 – Strzelecki Foothills and Bass Valley, applies to part of the land. The objectives of these overlays are met in the context of the transfer pipe being laid underground with negligible residual effect on the environment and

the location of the pipe in areas which avoid places of special scientific or flora and fauna sensitivity.

The key zones for the pipeline route are the Green Wedge Zone (GWZ1) and Special Use Zone (SUZ1) under the Cardinia Planning Scheme. The purposes of the Green Wedge Zone (GWZ1) are:

- *To recognise, protect and conserve green wedge land for its agricultural, environmental, historic, landscape, recreational and tourism opportunities, and mineral and stone resources;*
- *To encourage use and development that is consistent with sustainable land management practices;*
- *To encourage sustainable farming activities and provide opportunity for a variety of productive agricultural uses;*
- *To protect, conserve and enhance the cultural heritage significance and the character of open rural and scenic non-urban landscapes; and*
- *To protect and enhance the biodiversity of the area.*

While the objectives of the zone do not align with the provision of Utility Infrastructure, neither do they prohibit it. The use of land for utility purposes is either permissible or as of right. In this regard, the Proponent argued that "*So far as land use compatibility is concerned, decision-making in relation to utility infrastructure – particularly linear infrastructure such as pipelines and powerlines which traverse many zones – is in a different category from decision-making on ordinary development. An appropriate policy balance can be reached by locating utility infrastructure in a least damaging location in terms of the values of the zone (having due regard to the nature and technical requirements of that infrastructure)".* Once constructed, the pipeline should not be visible in the landscape.

The Special Use Zone 1 – Horticultural Preservation Zone is designed to:

- *Preserve land of high agricultural quality for horticulture and other farming activities;*
- *Discourage non-agricultural and non-soil based uses establishing on soil of high agricultural value;*
- *Protect the area from the encroachment of urban and rural residential type development;*
- *Minimise the potential for conflict between residents and normal farming practices that are related to the conduct of agricultural activities; and*
- *Encourage sustainable farming activities based on whole farm and catchment planning principles on an individual and community basis.*

It is clear that the planning scheme intends that high quality agricultural soils in the zone should be used for agricultural or horticultural purposes and that development should not unduly constrain the use of other land for those purposes. In this regard, the use of land in the zone for pipeline infrastructure is not the optimal land use sought by the zone, although once completed, it is unlikely to be "*detrimental to the horticultural significance of the area*". Cropping can continue to occur within the easement, provided rehabilitation retains the soil profile (as required by Performance Requirements 5.5). It is noted that Performance Requirement 20.1 and Performance Criteria 5 address the issue of rehabilitation plans.

In the City of Casey, the pipeline traverses a further area zoned Green Wedge – GWZ6, and the same controls generally apply as in GWZ1 in Cardinia.

- **Powerline from Woolamai to Tynong**

Part of the land within Bass Coast Shire traversed by the Powerline is subject to a Significant Landscape Overlay (SLO1 - Strzelecki Foothills and Bass Valley), which includes landscapes recognised as significant by the National Trust within a wider area where "*development has to be sensitively designed and sited to avoid detrimental impacts*" on agricultural areas as a backdrop to the coastal environment. The landscape character objectives include:

- *To protect and enhance the landscape quality of the area.*
- *To protect and enhance vegetation within the landscape.*
- *To ensure that buildings are sited and designed to minimise detrimental impact on the landscape.*
- *To encourage development which is of a size and scale sympathetic and responsive to the surrounding high quality rural and coastal landscapes.*
- *To retain the dominance of the undulating and uncluttered landscape throughout the hinterland by ensuring that buildings and structures outside settlements sit within, rather than dominate the landscape.*
- *To maintain locations of highly scenic and natural vistas along roads and at formal lookout points.*
- *To minimise detrimental impact of built form along the coastline, on hill slopes visible from main roads and settlements and prominent slopes.*
- *To minimise the visual impact of signage and other infrastructure, particularly on hill faces, in coastal areas and in other areas of high landscape values or visibility.*

Taking the above into account, the Inquiry does not agree with the opinion of the Proponent that:

> *Whilst an overhead powerline cannot be recessive in size or scale from a near perspective, and must inevitably detract from the amenity of the landscape, it is submitted that it will not alter the landscape significance of the area and that its impacts will be localized and will impinge marginally and recessively on long distance views.*

The Proponent argued the objectives of minimising detrimental impacts on the landscape through siting and design (including landscape design) has been taken into account in formulating the Powerline alignment. It said the alignment avoids hill faces and slopes, minimizes impacts on vegetation and avoids impacts on the coastline through undergrounding south of the Bass Highway. And further:

> *As recommended in the Landscape and Visual Assessment and demonstrated in evidence by Mr Wyatt, locations of highly scenic and natural vistas along roads and at formal lookout positions are unlikely to be significantly affected and can be enhanced by judicious screen planting within road reservations and other public areas. Finally, all landowners within 0.7km of the powerline will have opportunity to benefit from landscape mitigation measures at the cost of the Project Company to address visual impacts.*

The local policy at Clause 22.08 of the Bass Coast Planning Scheme - Hilltop, Ridgeline and Prominent Coastal Landform Protection Policy applies to all land located on and adjacent to significant hilltops, ridgelines and prominent coastal landforms in Farming, Rural Activity and Rural Conservation Zones. The policy seeks to protect the visual qualities of prominent landforms and ridges and promote development that is sympathetic to environmentally sensitive and significant landscape areas and provides that hilltops and ridgelines along coastal hilltops along the Gurdies and inland landscapes such as the Bass Valley and the Strzelecki Ranges as areas that should not be undermined by development. It is policy that development on ridgelines, prominent hill faces or distinctive coastal landforms should be avoided wherever possible. Where development cannot be avoided, the policy lists a number of considerations which should be taken into account, including siting, design and landscaping and materials. These include locating structures away from ridgelines, preventing prominent silhouetting against the skyline, substantial planting to avoid structures intruding on viewsheds and other measures which have been adopted as Project mitigation strategies. The policy discourages large scale earthworks to avoid significant disturbance to the landscape.

Within Cardinia Shire, the powerline traverses land subject to a Significant Landscape Overlay – SLO3 Lang Lang/Heath Hill. This overlay extends over a wide area recognized by the National Trust and contains indigenous stands of heath

amidst cleared farmland. The landscape character objectives include:

- *To protect and enhance the environmental, scenic and visual values of the Lang Lang/Heath Hill landscape;*
- *To protect and conserve habitat for flora and fauna which contributes to the significance of the landscape;*
- *To ensure that any new development is located and designed to avoid detrimental effects on the key characteristics of the landscape; and*
- *To maintain vegetation as an important element within the landscape.*

The schedule to the overlay does not include any additional or specific decision criteria and, apart from the first element of the landscape objective, the overlay functions effectively as flora and fauna control. The powerline alignment complies with these objectives in that it avoids flora and fauna hotspots and does not damage any stand of indigenous heath. It was argued that it may be less invasive, in terms of flora and fauna impacts, than any underground alternative.

As the Proponent said: *"Where the Powerline traverses land within SUZ1 (Horticultural Preservation) in Cardinia, there is some direct longer-term incompatibility with farming activity in that the overhead powerlines may permanently constrain the way farming activity is conducted on some properties and may cause the conversion of some portions of land from horticultural to agricultural use. This impact must be balanced against the public benefit of the infrastructure and ability of landowners and the Project Company, in consultation, to mitigate these impacts".* With regard to the impact of the infrastructure on the character and appearance of the area, the Proponent submitted that this is not of major concern within the broad, flat vistas of this zone, where there is existing precedent for the presence of overhead powerlines. The Inquiry agrees that purposes of the SUZ are not concerned with landscape character, however they are concerned with protection of viable agricultural land.

Further north, the powerline alignment within Cardinia is affected by an Environmental Significance Overlay (ESO1 – Northern Hills) which protects the environmental values of the hills north of the Princes Highway. The environmental objective to be achieved is:

- *To protect the significant environmental and landscape values in the northern hills area;*
- *To ensure that the siting and design of buildings and works does not adversely impact on environmental values including the diverse and interesting landscape, areas of remnant vegetation, habitat of botanical and zoological significance and water quality; and*

- *To ensure that the siting and design of buildings and works addresses environmental hazards including slope, erosion and fire risk.*

The powerline to the north of the Princes Highway is in an area already marked by power transmission lines and is topographically generally flat.

Within Cardinia, the powerline alignment is affected by Environmental Significance Overlay 3 (ESO3) - Other Significant Sites which protects sites containing rare, endangered or uncommon species of plants and animals that are critical for the protection of habitat for native plants and animals. The powerline in these locations will not impact on areas of significant vegetation or habitat.

PART 2: ANALYSIS OF PROJECT

4. DESALINATION PLANT

The proposed Desalination Plant to be located approximately 90 kilometres south-east of Melbourne in the South Gippsland region is the central element of the VDP. The Plant, which is estimated to account for around 45 per cent of the capital cost of the Project, will draw saline water from Bass Strait and produce fresh drinking water by separating salts and other impurities from the seawater. The Plant will use the Reverse Osmosis (RO) technology which involves pumping water through a membrane under high pressure to produce desalinated water and a saline concentrate.

The acquired Plant site covers 264 hectares and is approximately 5 kilometres from the township of Wonthaggi, 3 to 4 kilometres from Kilcunda and adjacent to the Powlett River. The River opens to Bass Strait one kilometre to the north-west of the site. There are a number of different environments within or adjacent to the plant site including agricultural land, the Powlett River and tributary, coastal dunes and Williamsons Beach. Figure 2-1 from EES (Volume 3, Chapter 2), reproduced below, provides an indication of the location of the site and its proximity to the coastline, Powlett River, Kilcunda, Wonthaggi and Bass Highway.

Figure 3: Desalination Plant Site Location

4.1 Description and Key Issues

Issues relating to the Desalination Plant were addressed in EES Volume 1 – *Summary of Environmental Effects,* Volume 3 – *Environmental Effects of Desalination Plant* and in the EPA Works Approval Application. More detailed information and assessment of the Desalination Plant and its environmental effects were outlined in a range of Technical Appendix reports as summarised below:

- Landscape character and visual amenity (Technical Appendix 34);
- Geology, geomorphology and soils (Technical Appendices 36 and 37);
- Surface water and groundwater (Technical Appendices 40 and 43);
- Flora and fauna (Technical Appendices 13 and 14);
- Cultural Heritage (Technical Appendix 45);
- Air Quality (Technical Appendices 47 and 48);
- Noise and Vibration (Technical Appendix 50);
- Transport Infrastructure (Technical Appendices 51, 53 and 83); and

- Socio-economic (Technical Appendices 10, 11, 17, 54, 55 and 56).

The Proponent tabled an Addendum Report to the Flora and Fauna Technical Appendices at the hearing on the results of the Spring 2008 flora and fauna survey (Document No. 6). The Report of the Independent Expert Group was tabled as Document 17, which included advice on the consistency of the Reference Project for the Desalination Plant and associated marine structures with relevant industry best practice. Additionally, there were a number of submissions about specific matters relating to the Desalination Plant.

(i) The Reference Project

The VDP outlines a Reference Project design identified in the EES as satisfying the project and environmental objectives and capable of meeting the Performance Requirements. The Desalination Plant and associated facilities are major water infrastructure. The infrastructure components outlined for the Reference Project comprise:

- Tunnel shafts that connect the intake and outlet tunnels to the seawater pump station;
- Below ground seawater pump stations and intake screens;
- Pre-treatment plant and associated buildings;
- Pre-treatment waste treatment;
- Reverse Osmosis plant and associated buildings;
- Clear water storage for desalinated water;
- Transfer pump station for pumping desalinated water to Cardinia Reservoir;
- Storage and use of chemicals for pre-treatment, desalination and post treatment (potabilisation);
- Electrical sub-station to distribute power around the site; and
- Offices, storage sheds, roads and stormwater management measures.

The Reference Project is three parallel modules with each module comprising a seawater pump station, pre-treatment plant, Reverse Osmosis (RO) plant and clear water storage producing a third of the proposed Plant capacity (50 GL per year). Allowance has been made for a fourth module of 50 GL at a later stage.

The key elements in the desalination process for the Reference Project outlined in EES Volume 3 are:

- On shore intake screening of sediment, debris and entrained marine biota prior to pre-treatment (screening at the intake head is discussed at Chapter

5). These intake screening washings will be stored in skips with airtight covers until land disposal and will amount to several tonnes per day.

- Pre-treatment filtration prior to the RO process to remove the finer particles, dissolved organics and other substances that could foul the RO membranes. The Reference Project is based on dual media filtration which involves anthracite above sand. The process involves the seawater being chemically conditioned to coagulate and flocculate the suspended matter for removal in the pre-treatment filters. Then removal of coagulated and flocculated material by the water passing through the media filtration. The Reference Project involves periodic cleaning of the pre-treatment filters by backwashing, then separating out the solids in the backwater by thickening and dewatering. The clarified water from dewatering (supernatant) would be recycled back to the head of the plant. The solid sludge waste will be salty and contain iron from the ferric coagulant. It is estimated that 20 to 30 m^3 per day of wet sludge will be generated. It is destined for landfill disposal.
- The pressure driven RO process involves a two pass process through spiral-wound RO membranes. This will remove the dissolved minerals (i.e. salts) from the filtered seawater to achieve the required final treated water quality. To protect and maintain membrane performance, antiscalants will typically be added to the seawater feed stream before RO processing to protect and maintain membrane performance. The waste concentrate stream from the first pass RO, which has total dissolved solids salinity twice that of seawater, will be discharged into the ocean including residual contaminant traces from the chemical dosing. The seawater concentrate is estimated to be 600 to 700 ML/d depending on plant recovery. To reduce fouling and scaling of the RO membranes which impair performance, regular cleaning of the RO membranes (from four times per year to every two years) will be required. This cleaning will involve cleaning and preservation chemicals including possibly caustic soda, sodium bisulphate, hydrochloric acid, detergents, biocides, citric acid and ammonia. This wastewater is to be neutralised prior to being pumped under controlled conditions for disposal via the saline concentrate outfall.
- The potabilisation process for the water obtained from the RO process which involves the addition of carbon dioxide and lime (calcium) to increase alkalinity and prevent damage to the water distribution system arising from the very low levels of dissolved ions in desalinated water. The water will then be chlorinated for disinfection and fluoride added if required.

Supporting and complementing these processes in the Reference Project are:

- the seawater pump stations to lift the screened intake water from below sea

level to above sea level for pre-treatment;
- the use of energy recovery devices to recover some of the energy required for the RO process;
- a transfer pump station for pumping water from the Plant to Cardinia Reservoir; and
- a power terminal station to step-down the transmission voltage from the incoming high voltage supply so power is suitable for distribution around the plant.

(ii) Project Variations and Options

The EES identifies two Variations to the Reference Project, these are:

- In the pre-treatment process, additional stages of clarification upstream of the filtration process. This clarification could involve the use of a Dissolved Air Flotation unit which removes the bulk of the suspended solids by using air to float them from the surface of the backwash water.
- The use of membrane filtration in place of conventional media filtration to remove solid particles prior to the RO process. This involves forcing seawater through a membrane with fine pores. Particles that are larger than the pores are then filtered out. Membrane filtration is a recent technology which potentially can reduce or eliminate the need for a primary coagulant, thereby allowing the backwash water to be directly blended with the RO saline concentrate and discharged to the sea with no deleterious effects. However, to date, there has been limited application of this technology.

Further to the listing of membrane filtration as a project Variation, the EES identifies ocean disposal as an Option in relation to pre-treatment waste management, which is discussed in Chapter 5.

The Independent Expert Group (Document 107) assessed that the Reference Project concept design for the Desalination Plant:

- is consistent with best practice;
- no significant or proven technology options overlooked; and
- when properly applied, the proposed variations to the Reference Design are equally acceptable from both a technical feasibility and environmental point of view.

(iii) Potential Environmental Impacts and Risks

The major environmental impacts identified and assessed in EES Volume 3 stem from the size and location of the plant, the operating characteristics and features and the construction activities.

Landscape Character and Visual Amenity

Significant issues of landscape character and visual amenity arise from the physical dimensions and location of the Desalination Plant. As indicated, the Plant will be located on a 264 hectare property and comprises a number of large and elevated buildings. Figure 2-17 from the EES Volume 3 sets out an indicative landscape concept of the Plant (reproduced below). This indicative concept includes provision for the fourth module. The proposed layout is approximately 400m to 500m from the beach and approximately 150 to 300m from the Northern Boundary. As outlined in the EES, the procurement process adopted may result in an alternative location and the building envelope set out in Technical Appendix 5 allows for significant variation.

Figure 4: Indicative Landscape Concept

The major elevated buildings are the:

- pre-treatment buildings that are 70m x 131m x 13m high;
- Buildings that comprise the RO plant, approximately 70m x 180m x 16m high;
- Clear water tanks that are 70m diameter by 19m (at apex);

- Filtered seawater tanks, approximately 40m diameter by 9m (at apex); and
- On-site electrical switchyard, approximately 54m x 19m x 5m high.

The EES indicates the area required for the construction and operation of the site will be between 60 to 100 hectares with construction activities requiring in excess of 40 hectares. The use of soil displaced during construction is to be used to construct an earthen wall along the northern boundary of the plant to act as a visual screen and noise barrier.

Both the construction and operation of the plant are expected to be on a 24 hour, seven days per week basis with safety and task lighting provided. The Reference Project proposes limited external lighting outside the site boundary. Lighting during the construction period of two years is expected to have a greater impact than during operations.

The main visual impacts at publicly assessable viewpoints are assessed to be from nearby locations such as the Mouth of the Powlett River Road, the Lower Powlett Road and the Bass Coast Rail Trail as it crosses the coastal plain near the site. For residential properties, the greatest potential visual impacts are assessed to be on the 14 residential properties located within two kilometres of the Plant. A visual impact assessment undertaken for the EES at nine residential properties accessed suggests low visual impact for the majority of properties.

Geology and Geomorphology

A number of potential environmental issues arise from this location. The coastal plains inland of the coastal dunes and the north-east proportion of the site open onto the Powlett River floodplain where the surface is below two metres in elevation. It is also known that Western Area Mine at Wonthaggi operated by the State Coal Mine extended underneath the site and these mining activities plus the pastoral land and grazing can result in contamination of the soil. The EES acknowledges that potential acid sulfate soils (PASS) are expected in the low-lying area on the north-east corner of the site but as this is away from the Reference Project construction works, the potential for PASS to be encountered is assessed as Low risk. Areas identified as having the potential for a Medium level environmental impact risk are dune vibration and disturbance, damaging Aboriginal heritage items as a result of tunnelling under the dune system; ground movement and compaction as a result of construction activity; and the encountering of contaminated soils that may affect human health.

Surface and Groundwater

The Plant site is located on a 300 hectare sub-catchment of the Powlett River which discharges to Bass Strait one kilometre north-west of the site. This sub catchment drains into an unnamed Powlett River tributary which crosses the north east corner of the site and also functions as the southern Wonthaggi stormwater drain. In relation to ground water sources, two aquifers were identified as relevant to the site. Areas assessed as having the potential for a Medium level impact risk are soil erosion or spoil from earthworks and stockpiling causing sediment discharge to waterways affecting aquatic flora and fauna and, as a result of tunnelling, seawater intrusion into existing groundwater affecting native flora and fauna habitats. Chemical spills and stormwater leakage; increased stormwater runoff; and surface water drainage, flooding and climate change are assessed as Low impact risks.

Flora and Fauna

The majority of the Plant site consists of grazed agricultural paddocks that contain predominately introduced vegetation with occasional scattered indigenous species. The EES identified eleven different Ecological Vegetation Classes (EVC) present as remnant vegetation patches including three endangered EVCs. Most remnant patches are assessed as containing low species diversity and high weed cover, which is likely to be a result of fragmentation and a history of livestock grazing. A large patch of good quality native vegetation exists along the Kilcunda - Hamers Haven Coastal Reserve and Williamsons Beach and relatively good quality patches are present on the property acquired on the north-west boundary of the site.

Two species of national significance were recorded during survey work – the River Swamp Wallaby-grass (listed as vulnerable under the EPBC legislation) and the Bog Gum – and one species of State significance, the Coast Fescue. The preparation of the site for construction is expected to result in the clearing of native vegetation including four individual plants of the River Swamp Wallaby-grass, a number of Bog Gums and a small area of endangered EVC. The EES assesses that the clearing of native vegetation will result in the loss of individual plants but without reductions in the viability of populations in the local area or region.

Three terrestrial nationally significant fauna species – Orange-bellied Parrot, Growling Grass Frog and Dwarf Galaxias – and 17 state significant fauna species are considered to have some potential to inhabit or visit the Desalination Plant area. Of these species, four State significant species – the White-bellied Sea Eagle, Eastern Great Egret, Royal Spoonbill and Swamp Antechinus – were recorded during survey work. The majority of the State significant species are assessed as wide-ranging

birds for which the site offers very limited value.

Overall, the EES assesses a range of the Plant construction and operational activities as having the potential for medium level flora and fauna environmental risk. These include removal of native vegetation patches including threatened Ecological Vegetation Classes; removal of habitat used by native fauna; increased traffic, noise and vibration impacting local and native fauna; and stormwater runoff to surrounding waterways impacting on surface water ecosystems.

Cultural Heritage

There are fifteen known Aboriginal heritage sites within the Plant site boundary with eleven sites assessed as having low significance and four as having moderate significant. Earthworks activity has the potential to affect known or undetected Aboriginal sites or objects. During the design and construction of the Plant, Aboriginal representatives will be consulted to assist in the location, assessment and management of Aboriginal artefacts and sites, and a Cultural Heritage Management Plan will be finalised for approval following the assessment of the EES by the Minister for Planning.

Air Quality

The local air quality at the Plant site is strongly influenced by the air quality over Bass Strait and the general windier conditions that occur in coastal areas are expected to lead to lower levels of ambient dust compared with other similar plant sites. However the scale and number of activities at the Plant site including constructing access roads; removing of topsoil; transferring and stockpiling excavated material from intake and outlet tunnels; constructing boundary earthen walls; levelling the site to benchmarks; and removing solid wastes from the plant site have the capacity to generate significant dust impacting on visual amenity and causing health problems. The EES assesses the potential air quality risks as a Medium impact risk.

Noise

The existing noise environment around the site is characterised by surf, wind, rain and general agricultural noise sources with a low volume of traffic on Lower Powlett Road and the Mouth of the Powlett Road. Construction activity which will occur 24 hours per day, seven days a week over the two year construction period will particularly impact on ambient noise. Modelling conducted for the EES suggests that construction noise goals may be potentially exceeded during construction with

the noise exceedances most likely to occur over the night time and on weekends when construction noise goals are more stringent. The modelling of operational noise indicates the Plant can comply with EPA noise requirements in both the 150 GL and 200 GL configurations.

Traffic

Traffic movements associated with the construction workforce at the Plant (estimated to peak at 910 workers in late 2010) and the movement of up to 150 vehicles per day to deliver and remove materials will impact on the transport infrastructure particularly the Lower Powlett Road. This road will be the primary access road from Bass Highway to the Plant. Modelling conducted for the EES suggests the travelling time and congestion impacts of the increased traffic will be modest with the possible exception of the intersection of Lower Powlett Road and the Bass Highway during construction peak between 3pm to 6pm. The EES proposes the reconstruction of the Bass Highway and Lower Powlett Road intersection and Lower Powlett Road.

Socio-Economic

A range of potentially significant socio-economic impacts are likely to be associated with the Plant particularly during the construction phase of two years. Construction of the Plant will require a large workforce and work undertaken for the EES estimates that during the most intense employment phase from September 2010 to June 2011 approximately 600-900 workers will be required. The nearby town of Wonthaggi has a population of 7,200. Due to the skills required, 70 per cent of the Plant construction workforce is anticipated to be recruited from outside the local (Wonthaggi/Dalyston, Inverloch and Cape Patterson) and regional areas (Bass Coast and South Gippsland) with an estimated 50 per cent of workers (450 at the peak) temporarily relocating to the local regions. Some 10 per cent of these are expected to bring their families with them. This relocated construction workforce will have significant accommodation requirements and impacts which will need to be addressed as a matter of priority, given the regional holiday home market is considered a limited option for Project workers.

The employment benefits for the local area are expected to largely arise from the indirect jobs created in the services and supply sectors. However, these benefits may be offset by the demand for construction workers reducing the skilled labour available to other local industries. The presence of this large workforce is expected to place demands on the local public services and infrastructure in the region, primarily in Wonthaggi and the nearby Bass Coast Shire area. As noted in the EES

Volume 3, the required time frames for the project mean there is limited time to strategically plan and upgrade services and infrastructure to cater for this increased demand.

The EES also identifies a range of other potential short and medium term economic and social impacts that may arise from the construction and operation of the Desalination Plant. These include:

- Adverse tourism impacts during the construction phase of the project and longer-term arising from the visual impact and the perception that the Wonthaggi/Kilcunda coastline is becoming industrialised.
- Reduction in public access to the Williamsons Beach area both during and post construction. The area in the vicinity of Williamsons Beach is used for a number of land and marine based activities.

Greenhouse Gas Emissions

The greenhouse gas emissions associated with the construction of the Plant are estimated to be 1 053 720 t CO_2 –e or around 75 per cent of the total emissions associated with all the Project components. The Reference Project will consume an estimated 82 MW/year of energy and greenhouse gas emissions arising from the operational power supply for the Desalination Plant are estimated to be 933 820 t CO_2 –e per year. The Victorian Government has committed to offsetting 100 per cent of the electricity used in operating both the Desalination Plant and Transfer Pipeline through the purchase of renewable energy certificates. This issue is discussed further in Chapter 8.2.

The EPA's *Environment and Resource Efficiency Plan* regulations and *Protocol for Environmental Management: Greenhouse Gas Emissions and Energy Efficiency in Industry* all require energy efficiency measures to be identified, evaluated and, if appropriate, implemented consistent with best practice. The Reference Project includes a range of energy efficient measures including the energy recovery devices. In line with the EES Scoping Requirements requiring the EES to specify the benchmarks against which energy efficiency will be assessed, EES Volume 1 adopts the 'Specific Energy Consumption' measure as the indicator of overall energy consumption. This measures the total energy required per volume of potable water delivered, generally given as kilowatt hours per kilolitre of water produced. The EES estimates that the average Specific Energy Consumption indicator for the operation of the VDP to be in the order of 4.1 to 4.3 kWh/kL. This range is higher than that for the Perth plant, and for other plants listed in the EES, and is attributed to the lower temperature and associated higher salinity of the feed water for the Plant. Reference is also made to

the impact of the high standards of the Melbourne drinking water supply compared with the standards applying elsewhere.

In their submission, the EPA drew attention to the discrepancy between the Specific Energy Consumption range cited in the EES of 4.1 to 4.3 kWh/kL and the range of 4.0k to 4.6 kWh/kL used in the Works Approval Application. As part of EPA processes further information would be required to establish whether the performance requirement of less than 4.6kWh/kL is consistent with best practice.

Waste

The construction and operation of the Plant will give rise to a range of waste streams as outlined in EES Volume One. Waste streams from the construction of the Plant are identified as construction spoil, acid sulfate soils, waste arising from construction and use of temporary infrastructure, waste from construction and landscaping works and possibly contaminated soils, green waste from vegetation clearance and waste arising from demolition of existing structure. Wastes arising from the operation of the plant are identified as intake screen washings, pre-treatment backwash sludge, RO membrane cleaning wastes, discarded filter media, discarded cartridge filter elements, discarded RO membranes, lime sludge and general operation and maintenance wastes.

The EES provides a general description of the approach towards the management of waste including the requirement to apply the EPA waste hierarchy of waste avoidance, waste recycling, waste treatment and waste disposal. However in the absence of a final project design by the successful Project Company, the classification of waste and the potential disposal sites are not firmly established. The EES acknowledges a long term waste and management plan for the construction and operational phases of the Project covering the Plant will need to be developed.

(iv) Submissions and Inquiry Hearings

The major issues in relation to the Desalination Plant raised in the submissions and in the presentations to the Inquiry include:

- The overall visual effect of the Plant; an underestimate of the visual impact of the Plant from major tourist routes; inadequate assessment of Plant from the east and west; and the difficulty to effectively camouflage/screen the Plant due to its size and the surrounding topography;
- The Project and Plant will adversely affect the local tourism industry;
- Overdevelopment/industrialisation of the coast and loss of pristine qualities;

- The construction and operational impacts on seabirds and native flora and fauna;
- Visual, landscape and fauna impact of Plant light spill;
- Plant site is prone to flooding;
- Concern about adverse fauna impacts if flood prevention measures at the Plant alter the natural flooding cycles of the Powlett River;
- Location of Plant close to rising sea levels;
- Dewatering may cause exposed acid sulfate soils to oxidise leading to acidification of groundwater;
- Energy consumption and greenhouse gas emissions;
- Waste management and disposal to land fill;
- Traffic impact;
- Impact on housing availability (including social housing), house prices, rental prices and affordability; and
- Impact on local health services.

The Bass Coast Shire Council presented comprehensive submissions to the Inquiry on 30 and 31 October on the issues of community consultation, planning and visual impact, traffic impacts, waste management, power supply options, social and economic impact and governance. They also submitted a detailed set of minimum requirements which they subsequently forwarded as additions to the proposed Performance Requirements where appropriate. A particular focus of these requirements was the need for improved information flows, communication with and involvement of the Bass Coast Shire Council.

The following presents a summary of the positions put by a number of individuals and groups to the Inquiry to illustrate the main areas of community and local government concern. It is not intended to be a comprehensive summary of the views presented in submissions and to the Inquiry on these issues.

On visual impact, Mr Morgan presented views from the elevated Kilcunda Ridge and Lookout some 7-8 kilometres from the Plant site and questioned the EES assessment that the views from more than 4 kilometres from the Plant would be visually insignificant. The National Trust submitted that the visual impact of the Plant particularly from the major tourist routes including the Bass Highway (which forms part of the Bunurong Tourist route from Anderson to Inverloch), the Bass Coast Rail Trail (from Anderson to Wonthaggi) and the significant ocean view at Kilcunda may be underestimated. Ms Gordon and Ms Heislers presented photographs and material on the visual impacts from Kilcunda including the night light spill from the current pilot plant activity and from the nearby Bass Highway and South Dalyston respectively. Bass Coast Shire Council presented work

commissioned from Coomes Consulting Group on the EES assessment of visual impact which concluded, that while an appropriate methodology had been employed to undertake these assessments, there were gaps in the landscape and visual assessment, notably in the consideration of recreational values, user perceptions of the landscape character units in the area, the impact of night lighting and planning policies and strategies.

Sandcrash Pty Ltd, a group comprising seven families who own a property directly adjacent to the northern boundary of the site acquired for the Plant, raised a number of concerns including the extent and nature of the northern landscape and buffer and the traffic, noise, dust, odour, chemical waste and security. In particular, they referred to recent information which indicated the northern buffer zone was now 100 metres and questioned whether this zone and the proposed landscape treatment and mounding would adequately address their concerns regarding visual amenity, noise and light spill.

A number of submissions expressed concern about the potential fauna impact of the construction and operation of the Plant particularly on the migratory and resident birds of the Powlett River and offshore. Ms Heislers submitted the Powlett River area is very important for the conservation of key Australian and migratory birds inhabiting wetlands and ocean shores and waters.

On lighting, Dr Clarke, Astronomical Society of Victoria Inc pointed to a range of adverse impacts of night lighting and the need for stringent controls.

A number of submissions referred to the predicted extent of PASS area along the Lower Powlett River and called for further testing of PASS. A number of submissions commented that the Powlett River site is prone to flooding and questioned the EES assessment that there is more than sufficient high ground within the site to enable the Plant infrastructure to remain flood free even under extreme flood events. Both Ms Miles and Mr Myhill drew attention to a 2003 publication by the West Gippsland Catchment Management Authority which indicated the plant site is an area subject to inundation. Mr Myhill also raised the potential repercussions of stormwater run-offs from the Plant given the considerable area of roof space and impervious surfaces. These repercussions include the issue of artificial breaching of the sandbar at the mouth of the Powlett River to mitigate flooding and the ecological implications of altering the natural flooding cycles of the river.

Mr Schinkel referred to a range of matters in relation to the construction of the Plant and perceived inconsistencies in the EES. In particular, Mr Schinkel drew the

Inquiry's attention to the requirement in the Environment Management Plan for the Preliminary Works for proper cleaning and washdown procedures for vehicle, plant, equipment and personnel to prevent the likelihood of the spread of weeds and pathogens.

On traffic impacts, the Bass Coast Shire Council observed that the EES assessment primarily focussed on the capacity of the roads to cater for the anticipated traffic based on simple measures such as the width of existing roads, and did not consider the impact on the road network from a structural capacity or the impact on a number of roads in the immediate area of the Plant and the transfer corridors for the water pipe and power.

The Council put forward a number of specific traffic enhancement and mitigation measures including up-grading other roads and intersections that are in close proximity of the Plant site and provide alternative access, the conduct of road safety audits and structural assessments of roads impacted by the construction of the Plant and the Transfer Pipeline and Power Supply.

On the economic impacts, the Council highlighted the potential impact on tourism of the establishment of the Desalination Plant on a major tourist route, pointing out that 3.4 million people visit the Bass Coast annually, more than half of the Shire's businesses rely on tourism income and over 2,100 jobs are directly attributable to tourism. On the social impacts, the Council pointed to the need for accommodation and other affordable housing options for the workforce which do not cause affordability constraints for the Bass Coast community and are integrated into the community.

The Bass Coast Regional Health Service and Dr Maxfield commented on the potential impact on local health services which are currently faced with high and rising demand.

(v) EES Performance Requirements

Stemming from the assessment of the potential environmental impacts and other legislative and regulatory requirements, the EES sets out the proposed Performance Requirements that will govern the project, and be the basis for the contract with the Project Company.

Significant proportions of these requirements relate to the construction and operation of the Plant, and are included under the following headings:

- Whole of Project - Visual Amenity, Social and Economic, Public Safety, Terrestrial Flora and Fauna, Waterways and Wetlands, Aboriginal Heritage, Heritage, Resource Efficiency, Flooding Control, Groundwater, Surface Water Quality, Erosion and Sediment Control, Acid Sulfate Soils, Contaminated Land, Hazardous Materials and Dangerous Goods, Waste-General, Site Rehabilitation, Air Quality – Dust, Odour and Emissions, Airborne Noise, Vibration, Traffic and Transport and Greenhouse Gas
- Coastal – Coastal Integrity and Coastal Flora and Fauna.

The Performance Requirements of particular relevance to the Plant site, given the issues raised in the submissions and presentations to the Inquiry include:

- Visual Amenity – 1.2, 1,4, 1.7 and 1.10;
- Social and Economic – 3.2, 3.3, 3.5;
- Terrestrial Flora and Fauna – 6.3 and 6.4;
- Waterways and Wetlands – 7.2, 7.4 and 7.5;
- Geology and Geomorphology – 10.3;
- Flooding Control – 12.3;
- Groundwater – 13.2;
- Surface Water Quality – 14.2 and 14.3;
- Acid Sulfate Soils – 16.2 and 16.3;
- Airborne Noise – 22.2, 22.3, 22.4, 22.5 and 22.6; and
- Traffic and Transport – 24.2 and 24.4.

(vi) Summary of Key Issues

The Inquiry has considered the information put to it in relation to the construction and operation of the Desalination Plant and concludes the key issues to be addressed include:

(i) Visual impact of the Desalination Plant on the community and wider tourism appeal;
(ii) Noise and dust impacts and vibration levels during the construction period of two years;
(iii) Impacts on terrestrial flora and fauna;
(iv) Potential flooding of the Plant site, the interaction between the Plant and the Powlett River flood plain, and the presence of potential acid sulfate soils;
(v) Waste management;
(vi) Greenhouse Gas Emissions;
(vii) Social and economic impacts on the local Wonthaggi community during

the construction period particularly arising from the housing accommodation needs of a large construction workforce; and

(viii) Traffic Impacts.

The issues of (v) waste management and (vi) greenhouse gas emissions are considered in Chapter 8, which also considers the traffic impacts and surface water and groundwater issues from a whole of Project perspective.

4.2 Inquiry Response

In considering these key issues, the Inquiry had regard to both whether sufficient details regarding the construction and operation of the Plant had been provided or were available to make an informed judgement, and the nature of the Performance Requirement and associated mitigation measures set out in the EES. In doing so, the Inquiry noted that the key issues outlined above had all been identified and canvassed in the EES. However, given the nature of the procurement process associated with the VDP and the absence of a defined and detailed Desalination Plant design, many of the issues had been canvassed at a general level with a range of further detailed assessments and strategies to be developed once the successful Project Company had been selected. The Inquiry was also aware, as set out in the proposed Performance Requirements, that a number of environmental requirements for the Plant are the formal responsibility of the EPA and other bodies.

(i) Visual Impacts

It is clear that the Desalination Plant will have a significant visual impact from a number of locations in the vicinity notwithstanding the mitigation and screening measures proposed. The Performance Requirements for the visual amenity of the plant site stipulate a range of largely qualitative requirements including the requirement to design and site the Desalination Plant to minimise visual impacts on surrounding landscapes.

During the hearing, the Inquiry sought clarification from the Proponent on the discrepancy between the mounding grade at the Plant site specified in the Performance Requirements 1.9 as less than 1:3 compared to the Proponents' experts representation of 1:5. The Proponent's response (Document No 177) indicated 1:5 was inappropriate given the maintenance cost implications but indicated *"landscaping will be given close attention as part of the bidder's response to the current Request for Proposal, which contains additional landscaping requirements to those outlined in the Performance Requirements*". The Inquiry strongly supports greater attention being given to the visual impact issues and considers, as part of the communications

strategy and community consultation processes proposed under the Environmental Management Framework, the surrounding and wider community should be provided with information on the visual modelling required as part of Performance Requirement 1.4.

Given the issues raised by Sandcrash Pty Ltd, the Inquiry considers further consideration should be given to the location and extent of the perimeter landscaping buffer on the northern boundary.

(ii) Impacts during Construction

The scale and continuous nature of the construction activity for the Plant will inevitably impact on noise, dust and odour and cause vibration. The Inquiry notes that there are a number of significant Performance Requirements in relation to the issue of airborne noise including compliance with EPA regulations and guidelines. In particular, it notes that the requirement to implement a communications strategy with key stakeholders and the community, and in relation to the issue of noise from night-time construction works, strongly supports early consultation with the EPA.

In response to a request from the Inquiry at the final day of the hearings, the EPA provided further advice on the wording of specific Performance Requirements. This advice identified minor amendments to the Performance Requirements for air quality – odour and emissions and airborne noise to reflect the current EPA guidelines and earlier submissions by the EPA.

(iii) Impacts on Terrestrial Flora and Fauna

The issues of coastal flora and fauna identified during the Inquiry are given particular emphasis in the proposed Performance Requirements at 6.3, 6.4 and 13.2. In this regard, the Inquiry considers particular consideration should be given to the approach with the EPBC listed River Swamp Wallaby-grass plants recorded on the plant site either by avoiding or restricting access to the relevant areas or by proposals to salvage and translocate plants or propagate seedlings from the plant material. The Inquiry also notes the proposed monitoring of the possible presence of the EPBC-listed Orange-bellied Parrot (Performance Requirement 28.3).

(iv) Flooding, Flood Plain and Soils

The Inquiry notes the concern that a number of parties raised about the potential flooding of particular areas of the Plant site and the ecologically implications of the Plant site for the Powlett River including the risks posed by the storage and use of

chemicals. These issues are discussed in detail in Section 8.4 of this report.

(vi) Traffic Impacts

The traffic in the vicinity of the Desalination Plant will increase significantly during the construction period from the significant daily movements of up to 900 construction workers and 150 daily truck movements delivering and removing materials from the site. The Inquiry notes the Performance Requirement to up-grade the major access road to the Plant and intersection of this road, the Lower Powlett Road with the Bass Highway (Performance Requirement 22.4) and the development of a traffic management strategy and systems (Performance Requirement 22.2).

The increased traffic will be a key discernible impact on the local community and the Inquiry considers priority should be placed on early implementation of these Performance Requirements with significant involvement of and consultation with the Bass Coast Shire Council.

(vii) Social and Economic Impacts

The issues that were of particular concern to the Inquiry were the potential social and economic impacts arising during the construction phase of two years. The construction workforce at the peak will be more than 10 per cent of the population of nearby Wonthaggi. While the Inquiry accepts economic and employment benefits will flow from the Desalination Project, the scale of the Project is such that there will be a range of social and economic impacts on the local and surrounding community including in areas that cannot always be predicted or accurately estimated in advance.

One area where there will be potentially significant impacts, given the short lead time before the estimated commencement of the Plant construction activities in early 2010, is the area of accommodation. The Inquiry notes that the EES and supporting Technical Appendix refers to the possibility of a construction village located on the site or nearby. However, no firm details are provided on the options. The Bass Coast Shire Council raised a number of concerns regarding the construction of a temporary accommodation village on the plant site, including the isolation from the general community and the potential for increased social conflict when interaction does occur. The Council preference was for the accommodation constructed to be integrated into the community. However, the short lead times will impact on the practicability of this approach. There will also be a range of other impacts on the local community including increased demand on health services and potential disruptions during the peak summer tourist season.

On accommodation, Performance Requirement 3.5 refers to the development and implementation of a construction workforce strategy to minimise impacts on the local accommodation sector. On the other impacts, Performance Requirement 3.3 refers to the establishment, during construction, of a Community Reference Group to provide timely information and minimise any potential impacts on the local community.

Given the Victorian Desalination Project is a vital State project and the short lead times, the Inquiry believes consideration should be given by Government to the establishment of arrangements that will facilitate earlier and speedier consideration of the potential social and economic impacts, including the potential impacts on tourism. These arrangements could be built on the regional cross-Departmental approaches that have increasingly been adopted across the State Government and would need to be linked to the outcomes and timing of the procurement process. As part of these arrangements, the Inquiry recommends that consideration should be given to one-off assistance to Bass Coast Shire Council towards its important role in these arrangements. Further, the Inquiry considers that Performance Requirements in this and other areas could be strengthened by explicit reference to the involvement and role of the Bass Coast Shire Council.

As a final note, the Inquiry has reviewed the Performance Requirements for Public Safety (4) and has recommended an amendment to a specific requirement to explicitly allow for the input of Bass Coast Shire Council.

4.3 Findings and Recommendations

With respect to the construction and operation of the Desalination Plant, the Inquiry makes the following findings.

Based on the advice of the Independent Expert Group, the technology and associated process adopted for Reference Project concept design are in line with best practice and adopt proven technologies.

A range of environmental impacts will arise during the construction phase of the Plant. Post construction, the major impacts will be on visual amenity and potentially the interaction of the Plant site with the Powlett River flood plain.

In relation to visual amenity impacts, the Inquiry strongly supports greater attention being given as part of the procurement process to additional landscaping requirements.

The EES identifies all the major potential environmental impacts that were raised in submissions and presentations to the Inquiry and sets out a range of mitigation measures and Performance Requirements that provide the basis, albeit at a general level, for addressing these potential impacts.

There are likely to be a range of social and economic impacts during construction arising from the accommodation requirements for construction workers and the associated impacts on local services and traffic. The role of the Bass Coast Shire Council in addressing these potential impacts should be given greater prominence.

With respect to the environmental impacts of the construction and operation of the Desalination Plant, the Inquiry makes the following recommendations:

(i) Amend the Performance Requirements as follows:

- Add the following to Performance Requirement 1.4: "*The results of the modelling to be provided to the community and relevant property owners as part of the proposed communications strategy prior to construction*".

- Add the following to Performance Requirement 1.7: "… *having particular regard to the potential visual amenity and noise impacts on the northern and western boundaries*".

- Amend Performance Requirement 4.3 to read: *"Develop a Safety Management System for the facility in conjunction with emergency services and the Bass Coast Shire Council that complies with Major Hazard Facility legislation, if it is determined that the Project Company will be operating a Major Hazard Facility".*

- Add the following to Performance Requirement 6.4 (c): "; *conservation of significant flora species (River Swamp Wallaby-grass, Green Striped Greenhood, Matted Flax Lily, Maroon Leek-orchid)".*

- Include reference to the involvement and consultation with the Bass Coast Shire Council in the following Performance Requirements 3.2, 3.3, 3.4, 3.5, 24.2, 24.5, 24.6 and 24.7.

- Add the following to Performance Criteria 21.4: "… *and ensure no offensive odours beyond the boundary of the premises*".

- Update the Performance Criteria 22 and Performance Requirements for

Airborne Noise to refer to EPA Publication 1254.

(ii) The Government establish arrangements that will facilitate earlier and speedier consideration of a number of the potential economic and social impacts on the local area during the construction of the Plant including the impacts arising from the accommodation requirements of construction workers and potential short and longer-term tourism impacts. These arrangements could include provision of financial assistance to the Bass Coast Shire Council to assist the Council's important role in these considerations. Consideration could be given to financial assistance to be used for employment of a full time Project Liaison Officer for the duration of the Project and for up to six months post commencement of operation, provision to upgrade Lower Powlett Road, and funding for a socio-economic strategy to deal with issues relating to an accommodation strategy and potential impacts on tourism.

5. MARINE STRUCTURES

Marine structures comprising undersea tunnels, risers, intakes and diffusers proposed as part of the VDP are intended to deliver seawater to the Desalination Plant and provide for removal of the saline concentrate arising from the desalination process.

The marine structures are proposed to be located approximately one to two kilometres offshore from the Desalination Plant, in an open marine environment within Bass Strait. Seawater is proposed to be transferred to the Desalination Plant via an intake structure located offshore. The intake structure is designed to control the flow velocity of the water at the intake to reduce impingement and entrainment of fish and other marine biota. The intake heads would be connected to the intake tunnel by a vertical conduit, referred to as a riser. Water would be transferred via an underground tunnel from the seawater intake to a seawater pump station located at the Desalination Plant site from where it would be pumped up into the plant for pre-treatment and desalination.

Saline concentrate produced as a result of the desalination process would contain elevated concentrations of saltwater at around twice the salt content naturally found in seawater and amounts of some chemicals added throughout the desalination process. The saline concentrate would be discharged from the plant into the sea via an underground tunnel and then through diffuser structures to dilute and dissipate the high salt concentrate into the water column.

The marine structures are located in the marine waters of Bass Strait approximately three kilometres from Wonthaggi to the south and one kilometre from the Powlett River to the north. Bass Strait separates central Victoria and Tasmania and is roughly a bowl shaped marine environment with depths at its centre of around 80 - 85 metres below sea level while at its edges to the west and east it reaches depths of around 40 - 50 metres below sea level. Where the marine structures are proposed to be located sea depths are relatively shallow and extend steeply from the beach initially before levelling out to around 40 metres below sea level at 3,000 metres from the shoreline. Water flushing times in this area is estimated at around 120 days. The Powlett River estuary is an intermittently opened and closed barrier estuary with an associated estuarine (saltmarsh) wetland.

Two coastal protected areas and two marine parks, including Bunurong Marine National Park, are located within twenty kilometres of the project area. These areas protect significant marine habitat and species. The Kilcunda-Harmers Haven

Coastal Reserve is directly adjacent to the Desalination Plant site and covers the adjoining Williamsons Beach.

The coastline encompassing Williamsons Beach is oriented north-northwest to south-southeast and directly faces the south westerly waves and oceanic swells with offshore currents running predominantly from west to east along the coast. Wave swell is often large in Bass Strait although variable in the central area. Deep ocean swell can be felt on the seafloor at around 40m depth, although the actual depth depends on the size and wavelength of the swell. Offshore, it is anticipated that bottom sediments would be subjected to wave stirring to at least 40 metres depth in large long period swells.

Ocean currents in the area are primarily controlled by tides and winds. The wind climate is seasonal with current speeds driven by local winds. Winds in the area blow for much of the year with the strongest blowing from the southwest during winter while periods of calm conditions during autumn and lighter winds and easterly winds during summer tend to weaken current strengths and change their direction respectively. Typical wind driven current strengths when averaged through the water column are about 1% of wind speed, while surface currents are closer to 3%. Thus, for strong winds of say 15 ms-1, the vertically averaged deeper and surface currents are anticipated to be about 0.15 and 0.45 ms-1 respectively. Typical wind-driven current strengths are anticipated to be similar to the tidal currents. Tidal currents are diurnal and run predominantly parallel with the shoreline. Typical peak tidal current strengths are slow and range from approximately 0.04 to 0.1 ms-1. Maximum tidal currents rarely exceed 0.2 ms-1.

The intertidal habitat of the area is largely sandy beach inhabited by infaunal species with scattered sandstone and mudstone reef platforms that support a diverse array of flora and fauna species with small seaweeds, snails and limpets dominating this type of habitat. The subtidal environment experiences substantial turbulence from wave activity with most of the subtidal habitat dominated by a mosaic of scattered rocky reefs of varying relief interspersed with small patches of sandy sediments. Reef occupies most of the seabed immediately offshore from the Project site between 300 m and 1,500 m offshore, over an approximate depth range of 8 m to 30 m. The area is habitat for a wide range of seaweeds, invertebrates and fish species.

The pelagic environment comprises the open oceanic waters of the broad shallow basin of Bass Strait. The biological community consists of plankton, fish and larger mammals such as whales and dolphins.

Reef habitat at the offshore area can be categorised based on broad topographic, semi-quantitative characteristics. These categories are High Relief Reef, Moderate Relief Reef and Low Relief Reef. However, the Inquiry understands that the distinction between high, moderate and low relief reef is not definitive and there are not necessarily distinct boundaries.

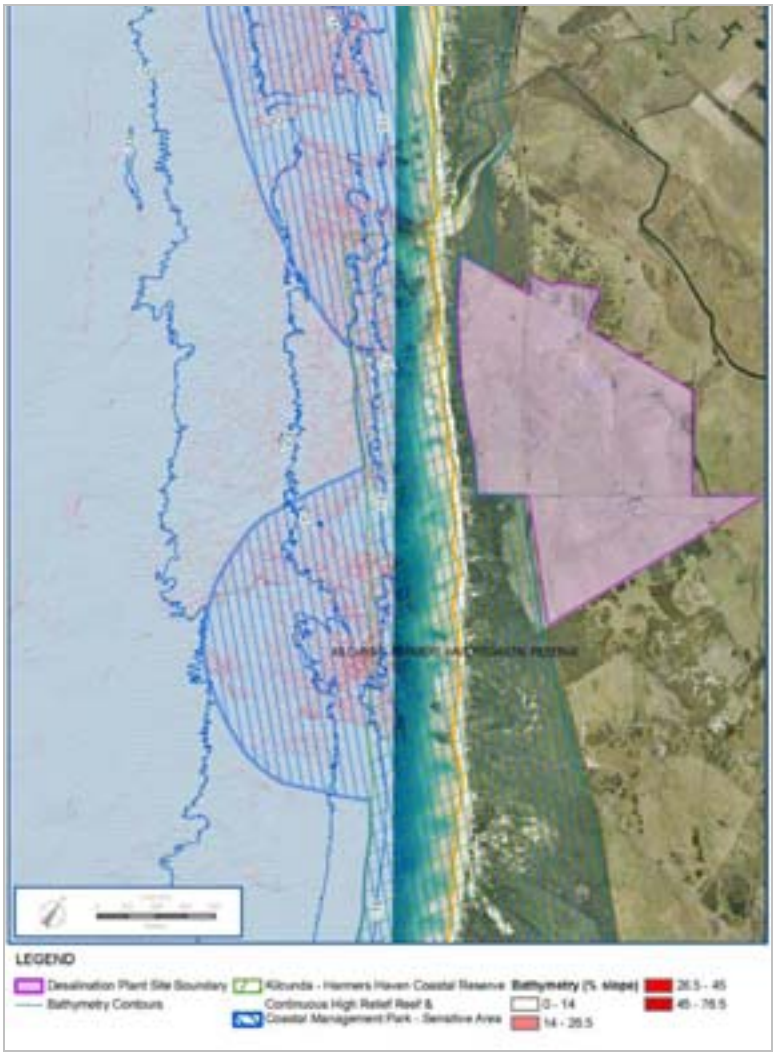
High relief reef comprises relatively extensive rock with topographic variation up to 2m with substantial pinnacles, undercutting and dissection with crevices, which provide a range of habitats. The top of the reef provides habitat for a range of plants including kelps and other seaweeds with pinnacles, undercut ledges and crevices providing habitat for a range of reef fish, and large and small invertebrates.

Moderate relief reef is similar to the High Relief Reef except with a topographic variation up to 1m.

Low relief reef and rubble is seabed, comprising rock with topographic variation up to 0.5m, with little undercutting or dissection and limited habitat variety. It provides habitat for a range of plants including kelps and other seaweeds (depending on depth), but the reduced structure provides limited habitat for reef fish or invertebrates.

The marine environment at the study site has been mapped to identify areas of high marine sensitivity which are proposed in the EES to be avoided by the construction and operation of the marine structures. The marine sensitive areas are identified in the EES as areas containing high relief reefs and are shown in Figure 5.

Figure 5: Marine Sensitive Areas



5.1 Description and Key Issues

The marine structures and their effects on the marine environment were addressed in the EES in Volume 1 – *Summary of Environmental Effects*, Volume 2 – *Environmental Effects of Marine Structures* and in the EPA Works Approval Application. More detailed information and assessment of the marine structures and the marine environment and environmental effects were outlined in a range of Technical Appendix reports as summarised below:

- Socio-economic (Technical Appendices 11 and 56);
- Flora and fauna (Technical Appendix 13);
- Hydrodynamic and particle dispersal modelling of the marine environment (Technical Appendices 18, 20, 21, 29, 30 and 33);

- Geology and geomorphology of the marine and coastal dune environment (Technical Appendices 19 and 37);
- Underwater noise and vibration (Technical Appendix 22);
- Water and sediment quality and eco-toxicity assessment (Technical Appendices 23 and 24);
- Marine pests (Technical Appendix 27);
- Marine biology (Technical Appendix 31); and
- Cultural heritage (Technical Appendix 45).

A supplementary report from Dr Kerry Black was tabled during the hearing *Mid-Field and Far-Field Modelling of the Desalination Plant Outlet Plume* (Document 5), and evidence was provided on marine issues on behalf of the Proponent from:

- Mr Greg Finlayson, Manager Water Treatment and Design with GHD and Chemical Engineer;
- Dr Kerry Black, Managing Director with ASR Ltd and Coastal Processes Engineer;
- Mr Scott Chidgey, Marine Biologist with CEE Consultants Pty Ltd;
- Mr Ian Smales, Zoologist with Biosis Research Pty Ltd; and
- Dr Michael Warne, Principal Research Scientist with CSIRO Land and Water and Ecotoxicologist.

In addition, the Inquiry heard evidence on behalf of Watershed Inc. from Dr Jochen Kaempf, Senior Lecturer in Oceanography from Flinders University (SA), and numerous submissions regarding the effects on the marine environment associated with the marine structures.

(i) The Reference Project

Construction of Marine Structures

The VDP outlines a Reference Project design identified in the EES as satisfying the project and environmental objectives and capable of meeting the Performance Requirements. The marine structures are proposed in the Reference Project to be constructed to connect to the Desalination Plant via two separate underground tunnels below the coastal sand dunes, Williamsons Beach and the seabed.

Site selection of the location of the intake and discharge tunnels has been informed by an analysis of the marine environment. Areas of the marine and coastal environment considered sensitive to disturbance or having higher biodiversity value have been identified and mapped as sensitive areas. The location of the marine

structures have been proposed in the Reference Project design to avoid these sensitive areas by selecting alignments that avoid high relief rocky reefs and construction occurring below the dunes, beach and seabed. The location of the intake and discharge outlet has also been informed by:

- The need to ensure adequate seawater quality to reduce the level of waste produced from pre-treatment and acceptability for desalination; and
- To minimise short-circuiting (i.e. the intake of concentrate from the discharge outlet because of the proximity between the intake and outlet).

Construction of the marine structures involves the following:

- Onshore shafts which link the tunnels with the Desalination Plant and allowing the tunnelling to commence and the installation of a seawater pumping station. The shafts will be approximately 65 to 70 metres in depth.
- An intake tunnel approximately 4 metres in diameter and 1.25 kilometres long and tunnelled approximately 15 metres below the seabed. The intake head is proposed to be located in around 20 metres water depth, approximately 8 metres in total height and the base height at least 4 metres above the seabed to reduce the intake of sediment. Flow velocity of the intake at the entrance grill is proposed to be approximately 0.1 to 0.15 m/s (17.4 m^3/s).
- A discharge outlet tunnel approximately 3.2 metres in diameter and 1.5 kilometres long tunnelled approximately 15 metres below the seabed with both tunnels approximately 500 metres separated from each other to minimise short-circuiting. The discharge outlet will contain diffusers which will be approximately 2 metres above the seafloor in about 20 metres water depth. The flow velocity of the discharge from the diffusers will be approximately 6-7 m/s with the rate of discharge approximately 10.5 m^3/s.
- Connection of the risers and intake and discharge outlet heads with the tunnels would be assisted by Self-Elevating Platforms (SEPs).
- A temporary exclusion zone (approximately two by two kilometres) would preclude all marine activities including commercial fisheries and recreational uses within this zone in order to prevent the interaction between construction activities and other public and commercial activities.

Operation of Marine Structures

The operation of the marine structures is proposed to be on a 24 hour basis with the approximate operating capacity of the marine structures set out below:

Table 3: Approximate Capacity of Marine Structures

Indicative Volume	Design Capacity	
	150 GL per year	200 GL per year
Seawater Intake	360 GL per year	480 GL per year
Saline Concentrate Outlet	210 GL per year	280 GL per year
Potable Water	150GL per year	200 GL per year

The operation of the intake will collect seawater which will contain marine material including plankton, eggs, larvae, marine vegetation and sediments. Larger marine materials and biota is proposed to be prevented from entering the intake structure because of a screening grill. The intake water is proposed to be screened onshore via additional screens, which would be periodically cleaned to remove coarse particulate material. The coarse particulate material is proposed to be sent to landfill. The seawater would be pre-treated to remove finer material such as suspended particles and dissolved organic material from the seawater which goes onto the desalination process while the waste stream will be dewatered to produce a sludge which is proposed to be sent to landfill. The pre-treated seawater or supernatant from this waste stream could either be returned to the pre-treatment process for desalination or combined with the brine concentrate and discharged to the ocean.

Following the Reverse Osmosis desalination process brine concentrate (approximately twice the salt content of seawater or 65ppt) will be discharged to the ocean via the discharge outlet. The operation requires the Reverse Osmosis membranes used for the desalination process to be periodically cleaned depending on the quality of the seawater. Cleaning agents and chemicals will be used for this process which will be contained initially on site for neutralisation after which this cleaning wastewater would be discharged with saline concentrate in the discharge outlet.

The intake structure is also proposed to be cleaned using chlorine to minimise marine growth which can reduce the efficiency of the intake and seawater pumping operation. Chlorine dosing of the intake structure is proposed from the intake head and is not expected to be released into the marine environment due to the constant flow of seawater into the intake structure preventing its escape.

An operation exclusion zone would also be required to preclude all marine activities including commercial fisheries and recreational uses within this zone in order to prevent damage to the marine structures and avoid interaction between the

operation of the intake structure and discharge outlet and the mixing zone and other public and commercial activities.

(ii) Project Variations and Options

For the Marine Structures, the Variations are:

- Multiple smaller conduits in place of large marine conduits with potential for pipes placed on the seabed. These comprise either multiple smaller diameter tunnels which results in the potential to use other methods of construction such as horizontal directional drilling or pipejacking etc or a tunnel constructed under the dune, beach and nearshore area with a longer section of pipe(s) running on the surface of the seabed outside of the mapped areas of marine sensitivity to the location of the intake and outlet.
- Passive fine screens at the intake head. This would comprise a finer screen with approximately 0.5 to 10mm openings fitted at the intake head to screen out smaller sized marine particles and reduce entrainment. It would screen out a higher quantity of marine biota and produce less waste onshore but would require cleaning at sea to maintain intake efficiency.
- Pipeline diffusers, which would involve diffusers of desalinated concentrate running along a pipeline structure above the seabed.
- Marine structure locations. These include running further out to sea or in different locations in the study area, but ensuring that the mixing zone for the concentrate discharge avoids the mapped areas of marine sensitivity.

Options for the Marine Structures include:

- Indirect intake – seabed infiltration. This involves a sub-surface infiltration intake system consisting of submerged low sand media filter constructed on the bottom of the ocean, which is connected with pipelines or tunnels to a series of intake wells located on the shore. The infiltration intakes are constructed by excavating the seafloor, and placing the intake piping and covering with filter media of sands and gravel which minimises the entrapment or impingement of marine biota.
- Shore to intake/outlet conduits: Tunnels part way and pipes part way – trenched. This method is a combination of tunnel constructed under the dune, beach and high profile reef and a section of trenched pipe running just under the seabed surface to the intake.
- Ocean disposal of pre-treatment waste. This involves the backwash from pre-treatment including either the supernatant or dewatered sludge or both being blended with the saline concentrate and discharged to sea with no landfilling.

(iii) Potential Environmental Impacts and Risks

The environmental impacts and risks identified in the EES Volume 2 stem from the works proposed to be undertaken on the seabed and the operation of the marine structures on the biology of the marine environment.

Impacts were identified from the direct effect from construction of the marine structures involving drilling through to the seabed surface for the erection of risers, connecting the subsurface tunnels with the intake and outlet heads and the associated lay down areas.

Indirect impacts were identified involving the effects from underwater noise, noise and vibration effects on birds, the risk of marine pest and disease introductions, night lighting and operation of a construction exclusion zone.

From an operational viewpoint, key risks and impacts were identified regarding the intake of seawater and the impingement and entrainment of larvae. The EES identified that the operation of the intake will entrain larvae which may have a particular effect on local reef species. The operation of the outlet structure was also identified as producing an impact from the discharge of concentrate from the desalination process and how the behaviour and makeup of the discharge plume would have on the surrounding marine environment.

To some extent, the key drivers of the extent of impact from the operation of the marine structures will be where they are located in relation to the type of seabed and the composition of the local biological environment; the effectiveness of the operation of the outlet diffusers particularly during periods of low current flows or low dilution events and the effectiveness of the maintenance of the low intake inflows to reduce the extent of larvae entrainment.

(iv) Submissions and Inquiry Hearings

The major issues in relation to the marine structures raised in the submissions and in the presentations to the Inquiry included:

- Commercial impacts on the rock lobster fishery through larvae entrainment;
- Detrimental impacts from construction and disturbance of the seabed;
- Loss of marine habitat;
- Impacts on marine flora and fauna;

- Underwater noise and vibration impacts on whales and the Great White Shark;
- Changes to the food sources of King George Whiting and its stocks from entrainment with the intake;
- Effects of night lighting on avifauna;
- Impacts from the discharge of concentrate from the Desalination Plant including pooling of concentrate and lack of dispersion of the concentrate plume;
- Appropriateness of hydrodynamic modelling;
- Appropriateness of the toxicity testing of the constituents of the concentrate;
- Impacts on marine recreation including surfing and fishing; and
- Cumulative effects of the operation of the marine structures.

Watershed Inc. presented comprehensive submissions to the Inquiry on the issues of modelling, underwater noise, ecotoxicity and the impacts of the operation of the marine structures. Watershed Inc. also submitted a detailed list of matters requiring further action and/or monitored. The Inquiry heard from Mr Beasley who expressed concern over direct construction impacts while Dr Heislers raised issues over indirect impacts associated with underwater noise on whales and Mr Duncan likewise raised issue over noise on species like the Great White Shark.

Mr Winfield raised issues over the eco-toxicity testing regime and potential impacts associated with sand entrainment associated with the intake structure. The Inquiry had the benefit of hearing evidence from both Dr Black, on behalf of the Proponent and Dr Kaempf on behalf of Watershed Inc. in relation to the operation of the outlet structure and the behaviour of the concentrate plume.

The Inquiry benefited from a submission from the EPA, which identified some important matters requiring further attention in relation to the outlet structure. These matters included:

- The need to provide further information on the frequency, duration, severity and extent of low dilution events such as calm conditions or low velocity currents and their ecological effects in relation to reducing the dilution effectiveness of the outlet structure on the concentrate discharge plume and its dispersion.
- The need for further information on whether the diffuser can be designed and configured to improve plume dilution by minimising re-entrainment and reducing diffuse plume merging.
- The need for a comparative assessment of the plume behaviour and ecological impact associated with the marine structure variations to provide confidence

that the project variations can meet 30:1 dilution beyond the near field region.

- The need for additional information on the potential for large scale gyre formation, its frequency of occurrence and its ecological significance.
- The detailed and specific assessment and confirmation of risk associated with treatment chemicals as part of the finalisation of the detailed design.
- The need for a more quantitative characterisation of the benthic flora and fauna of the study area to embellish the initial characterisation of the various biological assemblages such as high relief reef, moderate relief reef, low relief reef and sand to:
    - Assist in confirming the final location of the diffusers as part of the detailed design process with the aim of avoiding impacts on high value marine assets.
    - Provide an adequate baseline from which future ecological changes may be measured.

(v) EES Performance Requirements

As a result of the assessment of the environmental impacts and other legislative and regulatory requirements, the EES sets out the Performance Criteria and Requirements that will govern the project and be the basis for the contract with the Project Company. A component of these criteria and requirements relates to the construction and operation of the marine structures, and is included under the following headings:

- Coastal – Coastal Processes (26.1-26.4), Coastal Integrity (27.1-27.3), Coastal Flora and Fauna (28.1-28.3).
- Marine – Marine Flora and Fauna – General (29.1-29.5), Marine Flora and Fauna – Intake (30.1-30.5), Marine Flora and Fauna – Outlet (31.1-31.9), Marine Amenity – Recreational (32.1-32.3), Commercial Fishing and Marine Tourism (33.1-33.2), Marine Pests (34.1-34.3), Underwater Noise and Vibration – Ecological (35.1-35.2), Underwater Noise and Vibration – Marine Diving Activities (36.1-36.3) and Marine – Navigation (37.1-37.2).

(vi) Key Issues

The Inquiry has considered the information put before it in relation to the Marine Structures and concludes the key issues to be addressed include:

(i) Construction Issues – Direct Impacts
(ii) Construction Issues – Indirect Impacts
(iii) Operation Impacts – Marine Structure Location

(iv) Operation Impacts - Intake
(v) Operation Impacts - Outlet
(vi) Cumulative Effect of Marine Structures
(vii) Variations and Options
(viii) Investigations and Monitoring

5.2 Inquiry Response

The Terms of Reference for the Inquiry firstly requires that a sound understanding of the environmental effects of the project are established and to advise on the best approach to reduce or otherwise manage these effects. The level and scope of information contained in the EES and the Technical Appendices combined with the expert evidence and submissions presented to the Inquiry during its hearings have, in the consideration of the Inquiry provided a comprehensive baseline from which the key issues requiring consideration with the VDP have been identified.

(i) Construction Issues – Direct Impacts

The Inquiry notes that issues associated with the construction of the marine structures have not been raised by a significant number of submissions compared to the operation of the marine structures. With respect to construction issues, concerns were expressed about the direct damage to the seabed environment and in particular to the rocky reef areas. Mr Beasley perhaps best summed the position of those submittors raising issue with direct construction impacts by commenting that the placement of Self Elevating Platforms (SEPs) over the site of where the marine structures would be constructed "*in the vicinity of reef areas would result in sustained vertical scrape and crush of habitat as the feet of this structure seek a firm footing on the rubble of its own creation. The direct crushing and killing of marine creatures and the degradation of reef by such a destructive structure should not be allowed off Williamson's Beach*".

In response to questions from the Inquiry, Mr Finlayson provided information regarding the use of SEPs. This information was also reinforced in the Underwater Noise Technical report (Technical Appendix 22). The construction of the intake and outlet structure would involve the use of two SEPs, the first of which would most likely contain small drilling equipment and a large crane, and be employed for seafloor clearing and foundation laying while the second would most likely contain a large drill rig with a diameter of approximately 2.3m, and be employed for drilling the vertical holes for the intake and outlet risers. The SEPs could be approximately 100 metres by 60 metres in size and could contain three or four legs with feet of approximately 3m in diameter, i.e. approximately 7m^2 each that prevent the legs

from settling into the seabed. The total area of these SEP footprints would be approximately 500m^2, i.e. a square with a 22m dimension. For the Reference Project, all of the marine structures will be constructed on a circular concrete "pad" which are 11m diameter (intakes) and 8m diameter (diffusers). The permanent footprint of all the marine structures is therefore 590m2, i.e. a square with a dimension of 24m.

The SEPs may potentially be located at each of the inlet and outlet risers for up to 18 months. The EES concludes that the consequence of these activities are not considered to be significant as SEPs and associated infrastructure would be removed from the marine environment upon completion of construction of the marine structures and it is expected that the marine community impacted would recover over a two to five year period as indicated by Mr Chidgey.

The Inquiry notes that Performance Requirement 29.2 requires construction not to create a long-term impact on the mapped marine sensitive areas. This provides an assurance that long term impacts on the marine sensitive areas will be avoided. However, the qualification of construction not creating a long term impact is considered to create a potential problem given the construction activities are intended to be temporary in nature but with impacts that may result in parts of the marine community recovering slowly over time. In the view of the Inquiry, Performance Requirement 29.2 should be amended to require that no construction impacts either short or long term should occur directly within areas of mapped marine sensitivity. The impacts of construction activity on the moderate to low relief reef areas and on sand are considered to be lower than compared to impacts that may occur on the high relief reef areas due to the greater biological diversity afforded by the diversity of structural assemblage associated with the high relief reefs. Accordingly, the Inquiry considers it important that short and long term impacts on the high relief reef areas are avoided.

The Inquiry notes that its view in this regard is supported by the conclusion of the IEG in relation to direct construction impacts in its report that:

> *The seabed disturbance will occur over a relatively small spatial scale and the footprint will probably be within, or of comparable size to, the anticipated mixing zone boundaries. The EES states that the disturbed area will recover rapidly to its previous state. However, recovery rate is uncertain, and is likely to depend on the final siting of intakes and outlets. The IEG is of the opinion that this source of uncertainty is minor, given the consequence of even very slow recovery, or recovery to a different ecological state.*

The Inquiry considers that this point is important and recognises that if the marine structures are constructed over moderate to low relief reef areas then recovery may

be slower than compared to construction impacts and rates of recovery over sandy seabed areas. However, counter balancing this is the view that the erection of the intake and outlet structures will themselves provide a substitute surface area for habitat and colonisation, albeit, and as recognised by Mr Morris in his closing submission that there may be a possible gradation of species depending on their ability to thrive in an environment with elevated salinity (i.e. closer to the discharge source). The extent of colonisation of new structures in the marine environment was evident in the video footage of the marine structures operating at the Perth Desalination Plant clearly showing extensive biological growth.

With respect to direct construction impacts, the Inquiry acknowledges that the potentially most significant impacts from construction of the marine structures will be avoided through tunnelling the intake and outlet tunnels under the dunes, beach and seabed to the location where the risers will protrude from the seabed. Underground tunnelling, unlike trenching or pipeline construction on the surface of the seabed avoids substantial direct disturbance of the environment and importantly prevents a significant impact from occurring. Direct disturbance to rocky reef structures results in permanent disturbance and change to its structure but this does not necessarily mean that the area disturbed will not recover in biological terms. The Inquiry notes that subsurface tunnelling is proposed in the Reference Project design and supports this form of construction as having the least impact on the marine environment.

Given the above, the Inquiry considers that the direct impacts on the marine environment from construction of the marine structures will not be significant because the construction area can avoid the marine sensitive areas, the spatial size of impact will be relatively small and the time of impact will be relatively short with marine construction equipment removed upon completion of construction.

(ii) Construction Issues – Indirect Impacts

Indirect impacts from construction of the marine structures are associated with underwater noise on marine mammals, fish and biota, noise impacts on birds, risks associated with marine pests and disease transmission and economic and social impacts due to exclusion zone restrictions on commercial and recreational fishing and other recreational activities.

Underwater Noise and Vibration

The issue of underwater noise and vibration from construction of the marine structures was raised as a significant impact by Watershed Inc., who submitted that:

Noise to be emitted during construction and operation of the plant will be low frequency within the acoustic range of most marine species. Potential effects of underwater noise:

a. *Death due to secondary effects of reduced echolocation & communication as result of acoustic sensitivity loss via severe organ damage.*
b. *Death due to direct organ damage.*
c. *Relative loss of population due to reduced reproductive performance as result of reduced capacity to communicate due to acoustic organ damage.*
d. *Relative loss of population due to reduced reproductive performance as result of behavioural avoidance of migratory pathways.*
e. *Relative loss of local populations due to undesirable habitat.*
f. *Animal welfare concerns associated with negative behavioural effects and temporary or permanent tissue or organ damage.*

Dr Heislers on behalf of Watershed Inc. and Mr Duncan both were critical of the EES, the underwater noise Technical Report and the Biosis Research Technical report on marine mammals with regards to adequate assessment of noise on whales and the lack of reference to the effects of noise on the Great White Shark. Watershed Inc. indicated that whales do migrate through the study area as part of the migratory pathway through Bass Strait and indicated that whales are regularly sighted off the Wonthaggi coast. Evidence of whale sightings along the Wonthaggi coast was provided to the Inquiry through a number of statutory declarations. Concern was expressed:

That avoidance of the area affected by sound transmission by species, particularly cetaceans, could push them out of the migration zone and thus potentially prevent migration along traditional lines.

However, the Inquiry needs to place the issue of underwater noise effects on whales and sharks and other pelagic species into context that they are mobile species that are capable of travelling substantial distances. Whales are a migratory species that travel through parts of Bass Strait and which pass relatively close to the Wonthaggi coast. Sharks are a pelagic species that can travel large distances and at speed. The Inquiry acknowledges that whales and sharks can be regularly seen along the Wonthaggi coast. The Inquiry understands that the Wonthaggi coast is not an area where whales will spend considerable amounts of time feeding, breeding, calving or for use of the area as a nursery like that used by Southern Right Whales at Logans Beach in Warrnambool, where the whales spend some months using the waters as a nursery. Likewise, with respect to the Great White Shark, the Inquiry understands that the shark may travel through the area but that its foraging range is extensive and most likely focussed on seal breeding locations which are not located off

Williamsons Beach. The likelihood of effect on whale habitat is addressed in the referral response from Ms Skippington, Assistant Secretary of the Environment Assessment Branch of the Department of the Environment, Water, Heritage and the Arts, (Document 25, 6 March 2008) that:

> *I found that listed threatened cetacean species, including the Southern Right Whale (Eublaena australis) and Humpback Whale (Megaptera novaeangliae), may occasionally pass through or close to the marine environment in the vicinity of the proposed action. However, I found that the coastal marine environment in the Wonthaggi area does not provide important feeding, breeding or calving habitat for any listed threatened fauna species. I found that listed marine species that may occur in the area are widespread and pelagic and would generally visit inshore coastal areas infrequently.*

The likelihood of effect of underwater noise on whales is further addressed by Ms Skippington in that:

> *I found that, having regard to the high energy environment of the local marine environment and the high level of shipping activity in the area, noise associated with construction of the intake and outlet pipes and structures would be highly localised and would fall below existing background levels over a relatively short distance. I found that any disturbance impacts resulting from construction activities in the marine environment would be temporary and would be unlikely to significantly affect any migratory or biological behaviour exhibited by cetaceans, if present. I found that any seismic activity for survey or construction of the project will be taken in accordance with the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales. I found therefore that significant adverse impacts on listed cetacean species are unlikely from any marine seismic activities associated with the proposed action.*

The Inquiry notes that the Department, in its response dated 9 October 2008 (Document 4), has supported the requirement to undertake any marine seismic geographical surveys in accordance with the EPBC Act Policy Statement 2.1.

The Inquiry acknowledges the comment of the Department and agrees that the level of impact attributed by Watershed Inc. to whales from underwater noise from the construction of the marine structures to be highly unlikely. The Underwater Noise report (Technical Appendix 22) clearly identifies that underwater noise from construction of the marine structures will dissipate over distance from the noise source. The report indicates that a permanent threshold shift in hearing will occur for fish and whales with geophysical survey work generating 230dB, at a distance less than 2 kilometres from the noise source, while at less than 5 kilometres distance a temporary threshold shift in hearing may occur.

The Inquiry considers that the impacts from underwater noise associated with construction of the marine structures will not be significant in the study area. Impacts on pelagic species of fish and whales will be transient and temporary during construction. The Inquiry is satisfied that the achievement of a low level of impact can be supported with Performance Requirement 35.2 which requires that the Project Company:

> *Conduct geophysical survey of Project Activities in accordance with the procedures outlined under the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales.*

The EPBC Act Policy Statement 2.1 sets outs a number of requirements including the establishment of precaution zones with observation areas extending beyond 3 kilometres from noise sources and low power and shut down zones where whales that are observed to be heading too close to noise sources where impacts may occur result in management to either power down or shut down the noise source. The policy also contains appropriate management protocols for night time and low visibility operations and soft start procedures to ensure that whales are alerted to noise sounds in order to minimise harm. The policy recognises that:

> *In fact, it is likely that whales in the vicinity of seismic surveying will avoid the immediate area due to an aversive response to the sound. This aversion is relied upon as a form of mitigation to prevent whales from approaching or being approached closely enough to cause acoustic injury from intense or prolonged sound exposure. At the scale of a seismic survey, such temporary displacements are unlikely to result in any real biological cost to the animals unless the interaction occurs during critical behaviours (e.g. breeding, feeding and resting), or in important areas such as narrow migratory corridors.*

The Inquiry, having considered the policy requirements, is satisfied that significant environmental impacts on whales and other pelagic marine species from underwater noise will be unlikely and can be appropriately managed.

Noise and Vibration Impact on Birds

Noise and vibrations impacts were expressed by submittors particularly with respect to disturbance of Hooded Plovers nesting on Williamsons Beach. The main concern expressed was in relation to construction noise and frequent use of helicopters servicing the SEPs during construction activities. Other impacts expressed by

submittors were the disturbance to Hooded Plovers from vibration during tunnel construction.

The Inquiry considers that helicopter traffic should be of limited impact associated with the construction period and that helicopter flight paths can be managed to ensure that helicopters fly at an appropriate altitude above the Williamsons Beach area to reduce the level of disturbance for Hooded Plovers, and recommends accordingly.

Impacts associated with vibration from tunnel construction are not expected to occur due to the depth of tunnel construction beneath the dunes and beach. The Inquiry considers that impacts from noise during construction will not be significant and can be mitigated through careful management of the use of equipment such as management of helicopter use and machinery. The Inquiry considers that impacts from construction noise will be buffered by the dunes and the ambient sound of waves on Williamsons Beach. The Inquiry considers that impacts on the dune and beach environment can be satisfactorily mitigated under Performance Requirement 28.2 which requires the development and implementation of a range of measures such as personnel induction, access control, protective fencing, controlled lighting and monitoring.

Marine Pests and Disease Introduction

The use of vessels and divers during construction from outside the local area may result in the introduction of marine pests and the introduction of disease such as the abalone virus (*Abalone Viral Ganglioneuritis*). This issue has not been highlighted in submissions as a significant issue and the Inquiry considers the risk of introduction of marine pests and disease will not be significant.

Night Lighting Impact

The issue of impacts from night lighting of marine vessels and above sea structures during construction particularly on the flight paths of sea birds and in particular the Short-tailed Shearwater has been raised by submittors. The Inquiry considers that night lighting on the marine construction vessels is required for occupational health and safety requirements. The level of impact should not be significant given the size of the vessels that will be lit at night and the temporary time frame within which construction will occur and the removal of offshore construction vessels when the construction phase is completed.

Construction Exclusion Zone Impacts

Exclusion zones established during construction are not anticipated by the Inquiry to contribute to a significant impact on the community and in fact will be a necessary requirement to ensure adequate public safety. The size of the exclusion zone is large for the construction phase and is certainly larger in extent than that required for the operational phase of the VDP. Restrictions on commercial fishing and recreational activities, although large in area during construction should not be disrupted to any significant extent due to the temporary nature of the construction activity.

(iii) Operation Impacts – Marine Structure Location

The location of the intake and outlet structures is proposed under the Reference Project design to be on moderate relief reef and adjacent to, but outside of the high relief reef area mapped as marine sensitive areas. This location was questioned by Watershed Inc. where Mr Kane drew the attention of the Inquiry to comments made by Mr Chidgey in his Marine Biology Technical report (Technical Appendix 31) that a sandy seabed environment would be the best preferred location for the marine structures. Mr Kane submitted that:

> *Instead, the Government proposed to place the intake and discharge outlets:*
>
> *a. In a known area of upwelling.*
> *b. On top of a reef system (or as Mr Finlayson said "next to a High Profile Reef"). Reef systems = Areas of high biodiversity value.*
> *c. Not on sand (Due to, recalling the re-examination of Mr Finlayson, the expense and longer construction time).*

The Inquiry understands that the final positioning of the intake or outlet structures will be a balance of marine environmental considerations, engineering practicalities, economic constraints, facility location options and overall project factors including the necessity for the development.

Mr Chidgey describes the marine environment in his report (Technical Appendix 31) as follows:

> *The seabed appears to predominantly comprise reef of varying relief between the 10 m and 25 m depth contours, which are approximately 300 m and 1,000 m offshore respectively. Much of the seabed between the shoreline and the 10 m depth contour is mobile sand. The coastal park extends to 600 m offshore.*
>
> *The main body of the reef offshore from the proposed site comprises various areas of*

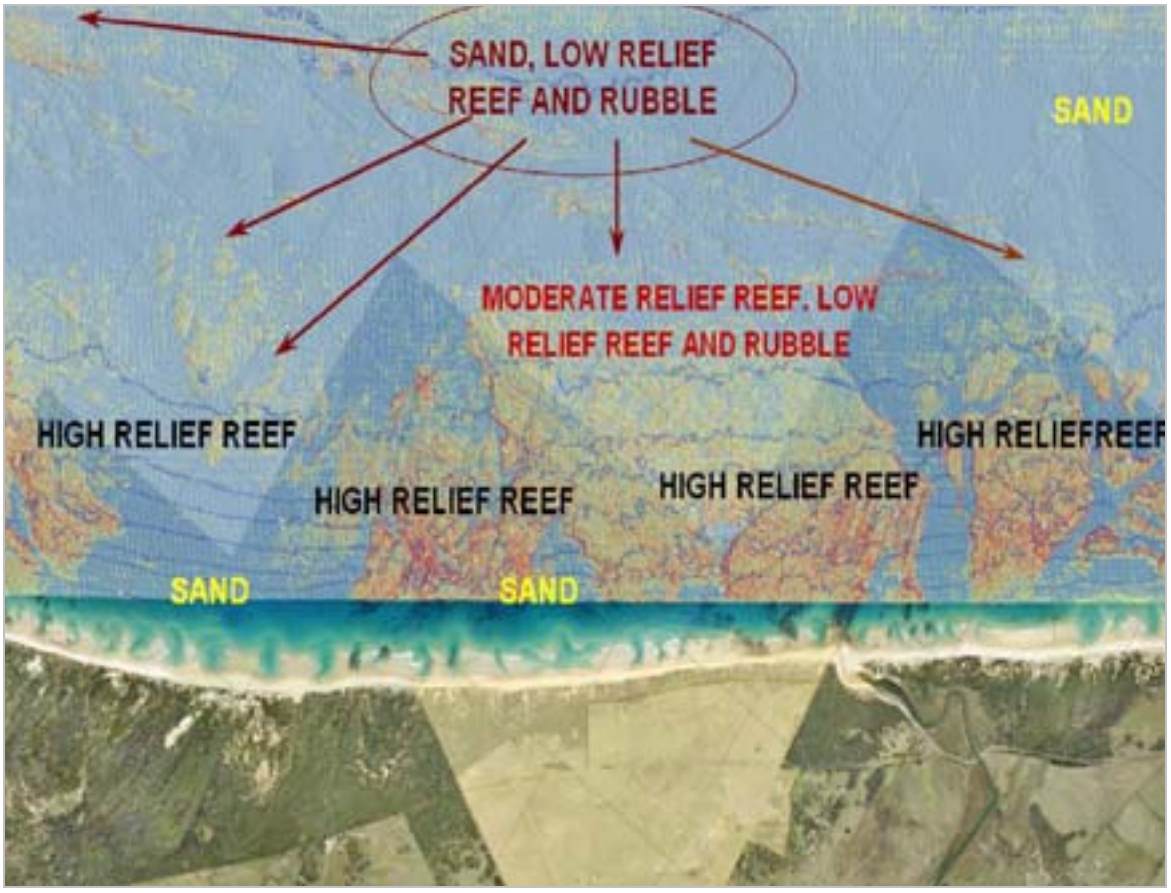
continuous high relief reef which generally extend to or define the 20 m and 23 m depth contours. Continuous high relief reef extends furthest offshore on the northwestern and southeastern parts of the reef, and is coincidentally closest to shore (less than 1 km) directly offshore from the centre of the main Project site.

The seabed immediately beyond approximately 23 m depth generally appears to be low relief reef, with patches of a thin veneer of sand.

Sand increases in proportion as seabed depth and distance offshore increases. The seabed beyond 2 km offshore (approximately 33 m depth) appears to be predominantly sand with patches of low reef and rubble.

Figure 6 shows the character of the marine environment found offshore from the site of the Desalination Plant.

Figure 6: Distribution of Habitat Offshore



The Inquiry understands that the siting of the intake structure further out to sea in deeper water may result in the opportunity to access better water quality and reduce

the potential risk of excessive sand entrainment and larvae entrainment. The Inquiry notes the comment from Mr Morris in relation to the siting of the intake that:

> *For an efficient plant there is an operational imperative to design and locate the intake to limit sediment and organisms entering the Plant. In the Reference Project the intake is located to the north-west of the diffusers to suit the prevailing currents and outside the high relief reef.*
>
> *Mr Chidgey recommends a 50 metre separation from the high relief reef. This is sufficient to avoid the ecological communities in the more complex rock formations. Mr. Chidgey's recommendations informed the location of the intake notwithstanding his initial preference for construction on relatively sparse sandy areas.*

Siting the intake in deeper water allows for the structure to be located over sand resulting in a lesser impact on the entrainment of larvae associated with the local rocky reef environments and so reduce the potential for long term impacts on local reef biota communities.

Placing the intakes in deeper water may also allow for the intake to achieve a higher clearance from the seabed and hence reduce implications of sand entrainment and coastal processes associated with beach erosion and accretion. This was an issue raised in the submission from Mr Wingfield where he expressed concern that ongoing sand entrainment may lead to an altered sand budget which may upset beach recession and accretion processes. The constraints however, relate to cost and timing given the need for urgency in obtaining additional water for Melbourne and the benefits that may accrue from such additional costs.

Likewise, the Inquiry understands that the outlet structure, if placed in deeper water, further out to sea, may achieve improvements in the operational efficiency of the diffusers. Operational efficiency improvements would occur through the ability to use greater discharge velocity to improve dilution and hence reduce the mixing zone for the dissipation of the discharge concentrate plume without the plume hitting the sea surface. Another benefit from extending the location of the outlet structure further offshore would be that it would be located on sand and away from reef areas which would improve the rate of dissipation of the discharge plume and hence dilution. The dissipation of the plume is more efficient over sand compared to reefs. The plume would travel downslope from the outlet diffusers and dissipate faster over a smooth sandy seabed compared to a rough, undulating rocky reef seabed because of the increase in the roughness of the seabed which slows the movement of the plume and may cause salinity to build up in the core area of the plume. It would also avoid potential for pooling of the concentrate plume in

crevices and hollows associated with rocky reef structure on the seabed. The overall benefit for the marine biota would be a lesser impact because biodiversity would be lower over a sandy seabed compared to a rocky reef seabed and the timing of exposure of biota to high salinity levels would be lessened.

Constraints associated with placing the outlet in deeper water is the potential for less wave action reaching the seabed to assist in dissipating the plume although it was acknowledged by Dr Black that currents were stronger further offshore, which would potentially carry the plume away from the shoreline into deeper waters in Bass Strait with continual dilution of the plume.

In terms of the Reference Project design, the Inquiry understands that the location of the intake and outlet structures is proposed to avoid the mapped marine sensitive areas containing the high relief reef areas, which are the areas of higher biodiversity due to their greater variability of habitat structure. Mr Chidgey commented that:

> *The areas of continuous high relief reef are considered the least preferred position for the intakes. They provide the greatest physical habitat complexity and are therefore likely to provide habitat for a high diversity of marine plants and animals relative to areas of lower complexity or rugosity. They are also preferred habitat for commercially fished species such as rock lobster and abalone. As discussed previously, many reef biota are likely to produce relatively short duration larvae which are susceptible to the consequences of entrainment at a local scale.*
>
> *It is likely that many reef species with short larval periods have larval behaviour that keeps the larvae close to the seabed – including abalone and some reef fish. The more complex the reef, the higher the diversity and quantity of short lived reef larvae and the greater the consequence of entrainment. For these reasons it is also preferred to keep the return water discharge and associated effects away from areas of moderate relief reef.*
>
> *The areas of low relief reef beyond the 20 m depth contour may be acceptable locations for the intake and outlets. These seabeds provide structure for a range of marine plants and animals. They have comparatively limited complexity and therefore provide habitat for a simpler community structure than areas of high relief reef.*
>
> *The soft seabed beyond the 33 m depth contour is likely to be the most acceptable habitat for the intakes. This general habitat is widely distributed along the coastline.*

The Inquiry notes that a 50 metre separation from high relief reef areas would mitigate impacts from larvae entrainment and considers that although this may well be correct for the high relief areas, the Inquiry still notes that the effect of larvae

entrainment on the biodiversity associated with the moderate relief reef area may well remain significant for the local area.

In terms of the level of significance of impact from locating the marine structures and the balancing of competing issues, the Inquiry considers that the location of the marine structures outside of the marine sensitive areas (areas with high relief reefs) as proposed in the Reference Project design is acceptable. However, the Inquiry points out that given that the final design of the marine structures has yet to be determined including their location, it supports the need identified by the EPA for a more quantitative characterisation of the benthic flora and fauna of the study area to establish the initial characterisation of the various biological assemblages such as high relief reef, moderate relief reef, low relief reef and sand. This can assist in confirming the final location of the marine structures as part of the detailed design process and better avoid impacts on high value marine assets. It would also provide an adequate baseline from which future ecological changes may be measured.

(iv) Operation Impacts – Intake

The operation of the intake structure has raised issues concerning impacts on marine ecology associated with the combined effects of impingement (trapping of larger marine organisms against the initial screens due to the intake current velocity) and entrainment (entry of very small organisms such as larvae and fish eggs into the intake system and their eventual removal via screen filters and the pre-treatment process at the plant). The issue of impingement has not generated as much concern as entrainment. The Inquiry understands that the intake velocity will be in the range of 0.10 - 0.15m/s in still conditions which are considered low flow rates by Mr Finlayson when compared to typical current strengths in Central Bass Strait of the range of approximately 0.04 - 0.08m/s or offshore currents which are faster at up to 0.20m/s. The intake velocity is close to background currents. The Inquiry noted the subtle effect of such a low flow intake velocity when viewing the video footage of the intake structure at the Perth Desalination Plant.

The Inquiry notes that the intake structure will be designed to have a "*velocity cap*" which is a device which controls the direction of water flow into the intake so that it is horizontal and ensures that fish and other free swimming marine biota can sense the intake current and swim away safely without becoming impinged or entrained. The intake will also have a screening grill with spaces 100mm by 100mm in dimension to prevent larger organisms such as penguins from entering the intake and becoming trapped, injured or killed.

The Inquiry considers that the issue of significant impacts arising from the operation of the intake due to impingement will be unlikely given the combination of low intake flow velocity and design. The view of the Inquiry is supported by the comment of the IEG that:

> *Impingement is considered to be a relatively minor issue. The intakes will be engineered to keep intake water velocities low and it is intended that coarse mesh screens will keep larger organisms from entering the intake system.*

The Inquiry considers that the operation of the intake will require careful management particularly with respect to maintenance in terms of ensuring the intake screens remain free of blockages which may interfere with velocities flows. It is unclear how this will be undertaken apart from physical removal by divers on a regular basis. With respect to this matter, the Inquiry acknowledges that Performance Requirement 30.3 (b) will require that the low intake flow is maintained and that this outcome is achieved. Therefore it will be up to the Project Company to establish a management protocol for intake head maintenance to satisfy this performance requirement.

The maintenance of the intake tunnel to prevent marine growth build up will be undertaken by regular dosing with chlorine. It is anticipated that the constant inflow will prevent chlorine escaping from the intake structure. Accordingly, the Inquiry is satisfied that this aspect of the operation of the intake will not create an impact.

With respect to entrainment, at maximum capacity the plant will draw approximately 1,500 ML per day of seawater from the area offshore from the Desalination Plant. The water contains holoplankton (phytoplankton, zooplankton) and meroplankton (the eggs, larvae and 'propagules' of a wide range of marine plants, invertebrates and fishes). Watershed Inc. expressed concern over the long term and cumulative effects associated with the loss of larvae, eggs and planktonic flora and fauna. The effect of the entrainment would be changes to both marine ecological community structure and the marine food chain. The submission from Mr Kane sums up the majority of concern expressed in submissions that:

> *The effect of entrainment is that up to 250,000 larvae/eggs/planktonic flora and fauna will be removed from the local ecosystem every second. Whereas this is in reality a relatively small overall figure in the short term, the cumulative effects long term are significant.*

The Inquiry understands that the dispersal of larvae can be highly variable and notes the comment from Mr Chidgey in his report (Technical Appendix 31) that:

> *The duration of propagules and their position in the water column affects the distance to which adults disperse. Some propagules are released into the water column where they drift with the currents and disperse widely depending on the duration of their planktonic period and the strength of currents. Some propagules are released into the water but remain within the confines of the local habitat where they are sheltered from dispersing currents and many settle back to the seabed close to where they originated. Others have very short planktonic periods or are motile and stay very close to the seabed and may select habitat close to where they originated.*

The effects of entrainment on species distribution at the larval stage of life is complex and compounded by uncertainties over whether the status of species in the study area are potentially limited by larvae supply or not (i.e. whether marine populations are regulated by larval supply or by adult resources and/or predation). This point was noted by the IEG. It is noted that the Proponent has attempted to model the effect of entrainment on larvae that have differing life cycle stages including short and long term larval periods. This modelling seeks to determine what effects may accrue with the operation of the intake structure. The Inquiry notes that the IEG supports this approach.

The results of this modelling show that the percentages of loss of larvae abundance revolve around 1.5%. With regards to larvae and plankton with larger dispersion patterns, the Marine Biology Technical report (Technical Appendix 31) states that:

> *Particle modelling for plankton duration of these periods show that reductions in plankton abundance is less than 0.5 percent over a range of distance around the intake. In terms of the magnitude of natural mortality and natural variability of planktonic population, 1 percent to 2 percent may normally be a tolerable addition to natural mortality for replenishment of populations by planktonic recruitment processes. Such reductions would most likely be unmeasurable in plankton population numbers because of the small size of samples in relation to large populations and natural variations in space and time and natural replenishment rates. Hence, the effect of entrainment on highly dispersed, rapid turnover populations of phytoplankton and holo-zooplankton is likely to be minor and the reductions are not likely to be detectable. As a result of this minor impact on holoplankton, the entrainment of this group is not likely to have any flow on effects on the food chain.*

These results are supported by the IEG where they comment that the modelling is appropriate for widely dispersing species. However, the IEG also comment that the models may not be accurate for species with short lived larval periods and which originate from the local area, namely reef based species such as abalone and reef fish

(wrasse). The conclusions of changes to the marine ecosystem from the modelling of the effects of entrainment contained in the Marine Biology Technical report (Technical Appendix 31) are summarised below:

Near-field: (up to 500 m of intake)

- Potential gradient of effect on abundance of certain species within 500m of the intake.
- Recovery will not occur during the operational period of the plant, but could occur within 2 to five years of the plant shutting down depending on duration of effect.

The report indicated that that there will be a high proportion of entrainment of local short duration larvae in the proximity of the intake during very low currents. The proportion decreases rapidly as the distance from the intake increases from 30 percent removal in an area 500m from the intake (total of 1000m longshore distance) to 2 percent removal in an area 2 km from the intake (total of 4,000m longshore distance). The removal of 30 percent of the population within 500m of the intake is likely to be a substantial over-estimate because of the effect of the intakes drawing a substantial volume of external source-water. Larvae travel shows considerable differences with water depth. Larvae close to the seabed will travel shorter distances than those at the surface. The report suggests that the proportion of entrained larvae can be reduced by positioning the intake in areas of higher currents – that is, as far above the seabed as possible. In addition to these hydrodynamic factors, it is likely that many species with short larval periods (particularly reef species) may have larval behaviour that keeps the larvae close to the seabed. On the other hand, some larvae may be found near the sea-surface boundary for other reasons (i.e. dispersion). Overall, therefore it seems likely that the optimal position for the intake is in the middle of the water column where:

- Water current is optimal;
- Possible larval accumulations at physical boundaries (at sea surface or seabed) are avoided; and
- Habitat specific (reef) larval aggregations are avoided or reduced.

Mid-field: (500m to 2km from intake)

- Unlikely that a biological gradient will establish in this area over duration of project, where reduction in larval abundances is generally less than 1 percent.

Far-field: (2km to 10km from intake)

- Unlikely that a biological gradient will establish in this area over duration of project.

Marine Park: (7km from intake)

- Highly unlikely (rare) that a biological effect would be detectable on marine community structure in the marine park over duration of project, where reduction in larval numbers is less than 0.5 percent.

Marine National Park: (14km from intake)

- Highly unlikely (rare) that a biological effect would be occur in the marine national park over duration of project.

The Inquiry considers that for widely dispersing larvae species, the extent of impact is relatively small and within a comparable size of impact associated with both the construction phase for the marine structures and the mixing zone from the operation of the discharge outlet. The area of influence is not considered significant in terms of the percentages of larvae loss with only a small percentage of larvae travelling past the intake being entrained, which represents only a small level of loss overall.

With regards to the above, however, the Inquiry notes the issue of entrainment effect on King George Whiting. The EES states that the intake structure is in the pathway of King George Whiting larval dispersion between western Victoria and Corner Inlet. These larvae require periods of moderate to strong east going current during spring to transport them from around the South Australian/Victorian border to Port Philip and Western Port Bays and Corner Inlet. The contribution of the King George Whiting stock in Corner Inlet to the breeding population in South Australia and western Victoria is uncertain, but is likely to be relatively small considering the relatively large adult stocks in South Australia and large recruitment in South Australia, Port Phillip Bay and Western Port Bay.

Overall, it is possible that the stocks of juvenile and adult King George Whiting in Corner Inlet could be reduced by up to 0.5 per cent over a period of three to four years (the period of maturation of juvenile to adult fish) due to entrainment, although the proportion is likely to be far less. In any case, the effect on the total Victorian and South Australian population is likely to be minor. The Inquiry does not disagree with this finding but does consider that the EES has overlooked the effect on the King George Whiting stocks on the commercial and recreational fishery

that occurs within Corner Inlet. The Inquiry understands that the King George Whiting fishery in Corner Inlet is a particularly important one because of its environmental attributes and the commercial value of the species. The nature of any economic and social effects of any reduction in the Corner Inlet King George Whiting fishery is uncertain. This level of uncertainty was evident when the proponent's economic witness, Mr John Noronha responded to a question that no analysis of impact was undertaken. The Inquiry considers that this matter should be further considered during the final design stage of the VDP so that any impacts are known and suitable mitigation measures, if any, developed.

With respect to the impact of entrainment on local short duration larvae (i.e. larvae produced from the local reef environments) the Inquiry considers that there is potential for impacts to be locally significant. If significant species such as abalone are affected, the Inquiry considers that the level of impact may be significant for the local reef environment given the high value of this species as a commercial fishery and the pressure it is under at present with disease impacting communities on the far west coast. The term potential is used because there is uncertainty over whether the entrainment of larvae from local reef dwelling species will result in dramatic changes in the composition of species in the local area. The IEG recognise this uncertainty. This is compounded by the lack of information over the composition of species found within the reef areas where the intake structure is proposed to be located and whether their population structure is determined by larval supply or other factors such as habitat availability, predation patterns and food supply. Such uncertainty is difficult to reconcile because no evidence was produced at the hearings to better quantify the significance or otherwise of entrainment effect on local larvae and species abundances.

The Inquiry considers that the design of the intake proposed in the Reference Project will assist in mitigating its effects by being located 4 metres above the seabed within the middle of the water column. This will reduce the extent of entrainment on pelagic larvae positioned close to the sea surface and benthic larvae species and notably those related to the reef environment.

The Inquiry believes that there is uncertainty in knowing how extensive changes to the structure of marine communities may be over the long term from entrainment. It is considered that the effects from the operation of the intake will not generally be significant except potentially for local short duration larvae species. Accordingly, the Inquiry supports the following to inform design and detect significant changes for management:

- A pre-construction survey to identify species population structure on the local

reef areas to determine whether the siting of the intake may significantly affect larval supply and to guide the final location selection for the intake to minimise such effect.
- A monitoring program to detect possible changes to recruitment, marine community indicators and community structure over spatial gradients extending from the intake structure to detect potential risks in the area of the marine structures in the short and long term.

The Inquiry considers that additional Performance Requirements should be included in 30.3 to require pre-construction survey and that the location and design of the intake structure minimises impact on moderate relief reefs and amend Performance Requirement 30.5 to ensure monitoring addresses recruitment and community structure changes.

(v) Operation Impacts – Outlet

The operation of the outlet structure raised issues about the nature and toxicity of the saline concentrate to be discharged, the effectiveness of dilution, the nature of dispersion of the saline concentrate plume following its discharge into the marine environment and its effects on marine ecology.

The composition of the discharge concentrate from the Desalination Plant is proposed to include:

- Saline concentrate: the result of removing the freshwater component from seawater, which will effectively be concentrated seawater, with salinity proportionately increased by the amount of freshwater removed from seawater. The salinity of the concentrate will be approximately 65 psu (practical salinity units).
- Antiscalants and biocides: are dosed into the filtered seawater stream to prevent accumulation of inorganic and biological material on the Reverse Osmosis membranes.

The EES has used a number of hydrodynamic models from broad regional scale to fine local scale which were nested together to simulate the effects of the saline concentrate discharged from the outlet structure. These models include:

- Farfield Models - The South Eastern Australia (SEA) Model which covered the whole of Bass Strait and which identified differences in current strength at Wonthaggi with weaker currents inshore and stronger currents offshore. The other model was the Bass Strait and Bays (BAS) Model which focussed on

upper Bass Strait and Port Phillip and Western Port Bays areas.

- Local Fine Scale Model – A local fine scale model, which could depict local features in the study area.
- Nearfield Model – The VISJET Model, which is used to develop options for the diffuser design and determine the effectiveness of initial dilution.

With respect to the modelling regime, the Inquiry notes that the IEG considers that the modelling approach is appropriate for the VDP.

The interplay between the models is important in terms of assessing how the saline concentrate reacts and affects the environment. The interaction between the saline concentrate plume and the environment is linked between the dilution factor of the concentrate over time and space and the level of toxicity of its constituents.

Toxicity testing of saline concentrate including additive constituents from the Perth Desalination Plant was undertaken against representative species at their most sensitive life stages to determine toxicity levels and appropriate dilution factors needed to ensure that chronic effects on marine biota can be avoided. With regards to this the Inquiry notes from the evidence of Dr Warne that the safe dilution factors to protect 99% of species for concentrate alone is 20:1, while for the addition of pre-treatment wastes it is 29:1.

The Inquiry notes that Performance Requirement 31.3 in the EES seeks to achieve a dilution target of at least 50:1 into the local ambient water column within 100 metres of the diffuser. The effect of this level of dilution would be for the salinity level of the concentrate to dilute from 65 psu to 36.1 psu or less than 1 psu above ambient salinity which is identified in the EES as 35.5 psu.

The concentrate from the Desalination Plant is returned to the sea under gravity from the plant to the discharge outlet and is discharged from the diffuser nozzles. The concentrate dilutes with seawater as it is "*squirted*" from the nozzles upward into the water column. The initial velocity of the water jet is in excess of 6 m/s.

The velocity rapidly decreases as the plume entrains surrounding seawater and begins to spread as it travels down to the seabed. The density of the concentrate plume decreases but is still denser than the surrounding seawater and so follows a curve through the water column progressively changing direction from the upward trajectory as the plume slows to the downward direction with gravity acting to pull the dense plume towards the seabed around 35 metres from the location of the diffuser depending on currents. The process of dilution is modelled to drop the salinity of the concentrate from 65 psu to 36 psu in about 60 seconds from discharge.

The mid field modelling in the EES outlines what happens to the concentrate plume within the wider marine environment once discharged and is summarised below:

- The seawater concentrate plume sinks to the seabed after initial dilution from the diffuser and tends to drift downhill (offshore) and alongshore with the ambient currents;
- Salinity in the water column more than 3 m above the seabed beyond the jets is close to ambient background salinity of 35.5 psu;
- The density-driven (gravitational) circulation causes the plume to spread out over the sea floor in a roughly circular shape, but the spread is biased towards the deeper water offshore and down current;
- Higher water currents produce greater dilution than low currents;
- Wave action increases dilution and dispersion;
- Dilution and dispersion are lowest during periods of low currents, which may occur during autumn;
- Low levels of elevated salinity above background (i.e. 1 psu) may spread over a distance of approximately 500 to 700 m from the discharge diffuser;
- Levels of salinity greater than 1 psu above ambient can occur over small patches of seabed within this region;
- Levels of salinity up to 1.5 psu above ambient may occur over smaller patches during extended periods of very low currents;
- The patches of elevated salinity are transient in nature and are likely to move with tidal currents; and
- During infrequent periods of very low current, the induced density current of the higher saline water across the seabed may induce a vertical circulation pattern over an area of several kilometres. The modelled velocities associated with this pattern were estimated to be of the order of 0.2 m/s on the seabed, 0.08 m/s on the surface, and no more than 1 to 20 mm/s in the vertical.

The effectiveness of the waters offshore at Wonthaggi to dilute the concentrate plume all year round was challenged by Watershed Inc. and a number of submittors on the basis that Bass Strait is not an open ocean and is not subject to large swells and waves all year round. The modelling employed in the EES was also challenged by Watershed Inc. who produced evidence from Dr Jochen Kaempf that sought to highlight that the waters offshore from Wonthaggi exhibit varying current, tidal and wave conditions with periods of low current flow and calm conditions which will not be conducive to effective dilution all the time.

The result of this effect is that there would be extensive periods of concentrate pooling around the outlet structure and elements of high salinity from the

concentrate being brought closer to the shore as a result of local upwelling events. Upwelling refers to periods when bottom waters from offshore are brought to the surface and closer to shore through wave and current action.

The Inquiry heard evidence from both Dr Black and Dr Kaempf on the issue of the outlet plume and its behaviour in the local marine environment. The degree of evidence and testing during the Hearing provided the Inquiry with the opportunity to review the conclusions presented in the EES.

The evidence presented to the Inquiry from the witness statement of Dr Kaempf was that as a result of undertaking his own modelling he found that:

> *Zones of salinity elevated to 37ppt (i.e. 1.5ppt above ambient) are typically observed in an asymmetric region of an area ranging between 40 and 80 hectares. The minimum dilution requirement of 20:1 is violated in these zones.*
>
> *Zones of salinity elevated to 38.5ppt (i.e. 3ppt above ambient) are typically observed in an asymmetric region of an area ranging between 10 and 40 hectares. Dilution is below 10:1 in these superficial zones.*

In response, Dr Black informed the Inquiry that he undertook further modelling using the same circumstances as that used by Dr Kaempf in an attempt to compare "*apples with apples*" and found that the model of Dr Kaempf is compatible with the model used by Dr Black when the same input conditions are adopted. Dr Black contended that Dr Kaempf made several inaccurate assumptions which have led to exaggerated predictions of salinity around the outlet.

In relation to the comparison between Dr Black and Dr Kaempf's modelling the Inquiry notes the comment from Mr Morris in his closing submission on behalf of the Proponent that:

> *An important input is the initial dilution of the concentrate by the diffusers. In Dr Kaempf's model this initial dilution is negligible or, in his words, worst case scenario.*

Another important assumption not considered by Dr Kaempf is the mixing qualities of non–tidal currents, deep wave action and rough bed friction. Concerns were expressed over the impact of the concentrate over reef areas where crevices and undulating surfaces may act to inhibit dispersion of the plume and create situations where the concentrate may pool. However, the Inquiry was told by Dr Black that while the rate of dispersion of the plume may slow and lead to a higher level of salinity in the core of the plume as a result of an undulating seabed, these

undulating surfaces would contribute to further dilution and breaking up of the plume because of bed friction forces as the plume travelled along its downslope trajectory along the seabed.

Mr Morris submitted to the Inquiry that:

> *Dr Kaempf ultimately accepted that key assumptions in Dr Black's model were conservative. Dr Black allowed for a greater discharge than the design discharge (and greater than the discharge volumes assumed by Dr Kaempf). Dr Black assumption of initial mixing was demonstrated to be conservative by Dr Black's reply statement which acknowledged the potential for more even mixing through the water column.*
>
> *Dr Kaempf did not model or have data to support his "suspicion" that upwelling may occur. This was based on his general knowledge. Dr Black explained that he had included upwelling in his modelling and concluded that any upwelling will not include concentrate. This is because the currents that lead to upwelling are thin water layers. They will move around or over the denser discharge water. He drew the comparison of pushing a truck up hill. Dr Black demonstrated that even in still conditions the concentrate remains outside the marine sensitive area.*

The Inquiry considers that the effect of upwelling is unlikely to create a problem and in fact would more likely assist in further dilution of the plume through shear forces at the surface of the denser plume (i.e. act to strip away higher saline water from the plume). Concerns were expressed, for example by Mr John Gemmill from the Bass Coast Boardriders Club about upwelling bringing the plume close to shore and affecting surfers. However, the Inquiry considers that given the outlet structure is proposed to be located over several hundred metres from the beach and surfers use the surf breaks out to approximately 150 metres from shore that impacts from upwelling on the surfing community will be most unlikely.

The Inquiry agrees with the comment of Mr Morris with respect to the expected extent and behaviour of the concentrate plume that:

> *Combining the Visjet and the far field model Dr Black modelled a plume less than 1 PSU above ambient conditions based on the 95th percentile occurrence (i.e. the plume is smaller than modelled 95% of the time). The plume scales at approximately 500 x 700 metres. The plume oscillates back and forward with the tidal currents and dilutes with wind driven currents, sea floor friction and wave action. Because of the density of the plume it is largest at the seabed and gravity directs the concentrate downhill away from the shoreline.*

The Inquiry considers that this information provides an important insight into a potential mixing zone for the purposes of the EPA Works Approval Application.

The issue of the toxicity of the concentrate was raised by some submittors who expressed concern that the species tested for toxicity effects were not endemic to the marine environment offshore from Wonthaggi. Dr Warne indicated that at present the number of Australian marine species for which there are standardised toxicity tests is limited. However, the available tests adequately represent the required number of taxonomic groups required in the Australian and New Zealand Water Quality Guidelines. Dr Warne indicated that the method of deriving the dilution factors is a statistical method. One of its requirements is that the species that are used are randomly selected and are representative of the organisms found in the environment to be protected.

Concern was also expressed by Mr Wingfield that toxicity testing had not been undertaken for all possible chemicals used in the Project. Dr Warne advised the Inquiry that the following substances were assessed in the EES:

- Saline concentrate;
- Chlorine & sodium hyperchlorite;
- Acids used to adjust the pH;
- Ferric chloride (coagulator);
- PolyDADMAC, polyacrylamide (flocculants);
- Sodium bisulphite (de-chlorinator);
- Sodium polyacrylate, polyphosphate (anti-scalants);
- Caustic soda (pH adjuster); and
- Acids, phosphonates, potassium hydroxide, EDTA, alkyl glucosides, DBNPA (membrane cleaners).

In response to these concerns, Dr Warne acknowledged that Whole Effluent Toxicity (WET) testing was conducted on representative samples from the Perth Desalination Plant and that, not all possible chemical constituents were assessed, but advised that ongoing WET testing of the pilot and full scale plants was recommended. The Inquiry notes that ongoing toxicity monitoring will also be required. The IEG recognised this and suggested that further investigation of the potential impacts of chlorine, acid, polyDADMAC, sodium bisulphite and polyphosphate may be warranted.

The Inquiry is satisfied that the ecotoxicity testing that has been undertaken in the EES has been appropriate and that it has identified safe dilution factors for use in the design of the Reference Project. The Inquiry notes and supports the requirement

under Performance Requirement 31.9 for further testing and water quality assessment of representative concentrate and chemical constituents to ensure compliance with the State Environment Protection Policy (Waters of Victoria).

In relation to the mixing zone, the Inquiry acknowledges the above discussion and the response from the Proponent to the questions asked by the EPA in relation to low dilution events and gyre formation. In particular, the Inquiry is satisfied that under low dilution events the operation of the diffusers will continue to achieve appropriate dilution and that density driven currents will continue to enhance plume dilution. The Inquiry considers that marine communities can survive in the salinities likely to be experienced around the outfall. There are examples around Australia where high salinities occur such as the South Australian Gulfs and although such high salinities would not be a regular occurrence offshore at Wonthaggi, it seems that there may well be some opportunities for biota to survive and continue to occupy the seabed around the outlet structure. This was evident with the extent of marine growth on the diffuser at the Perth Desalination Plant. In fact, the Inquiry considers that there is a distinct possibility that the nature of the marine community occupying surfaces of the outlet structure may resemble the natural community structure currently found offshore at Wonthaggi.

The influence of the high salinity plume around the outlet structure and within the mixing zone as determined by the EPA would conceivably see a change over the long term of the marine community structure. However, the Inquiry does not believe that the extent of change to the marine community to be such that the area within the mixing zone becomes completely depauperate of marine life. As far as the pelagic marine community is concerned the Inquiry agrees with the conclusion of Mr Chidgey that:

> *Planktonic and pelagic communities will have short durations of exposure to the return water discharge. Typically, the salinity of the return water jet in the water column will reach background concentrations within 100m of the discharge. Water column communities (plankton and pelagic species) are most unlikely to be affected beyond this distance. Hence a mixing zone of 100m around the discharge array appears to be reasonable for protection of planktonic and pelagic species.*

With respect to the benthic marine community the Inquiry notes the view of Mr Chidgey that benthic biodiversity on the seabed may have more exposure to the concentrate plume as it disperses along the seabed. Although the community structure may change within the mixing zone compared to marine communities outside, marine life will continue to occur. Given the uncertainties involved, Mr Chidgey considers that:

Consequently, it is recommended that the boundaries of the mixing zone for the benthic biological component of the marine ecosystem should be determined by direct measurement during the initial period of operation. At this stage, ecosystem integrity should be protected and the size of the ecosystem mixing zone boundary should be minimised by the requirement for a return water diffuser design to achieve a dilution of no less than 50:1 dilution of return water with local ambient seawater.

The issue of the generation of large scale gyre formation was addressed by the Proponent in its response to the question from the EPA (Document No 175). Fundamentally, the formation of gyres does occur naturally within the study area. The response indicates that the discharge is likely to change current patterns in the region of the outlet structure with small vertical currents and stronger lateral currents being induced. The differences in density between the concentrate plume and the surrounding seawater will create density driven currents and gyre formation. It is to be expected that under little or no current flow this gyre formation will assist in continuing dilution of the plume.

The Inquiry considers that the operation of the outlet structure will not lead to significant impacts on the marine environment. The size of the mixing zone may be from 500 to 700 metres in extent around the outlet structure and possibly up to 1 kilometre in extent on the offshore (downhill) side from the outlet structure to acknowledge where the plume would be dominantly heading. The level of impact is not likely to be catastrophic and it is anticipated that the marine communities will adapt to the presence of slightly higher salinity levels within the mixing zone. The marine environment outside of the mixing zone is not expected to experience impacts from the outlet concentrate plume.

The Inquiry acknowledges and agrees with the response from the EPA that the Project Company will need to verify that the size of the mixing zone has been minimised to limit the environmental risks to the surrounding marine environment and that an additional Performance Requirement 31.10 for the outlet structure should be included that:

"Prior to construction the Project Company must demonstrate to EPA that the diffuser has been designed, and will be operated, in a manner that minimises the size of the mixing zone to the extent practicable and does not result in environmental risks to beneficial uses outside the mixing zone."

Amending the Performance Requirement will also ensure that the Project Company looks at a comparative assessment of the performance of the alternate diffuser designs and configurations to minimise entrainment and reduce plume merging.

The Inquiry considers that to reinforce the protection of the moderate relief reef areas as well as the high relief reef areas, Performance Requirement 31.6 (d) should be amended to include reference to moderate relief reef areas in conjunction with high relief reef areas for documenting their condition. Further, to reinforce the protection of the moderate relief reef areas, Performance Requirement 31.6 has been amended to include reference to pre-construction and post-commencement survey, and implementation of monitoring programs.

(vi) Cumulative Effect of Marine Structures

With respect to the cumulative effect of the operation of both the intake and outlet structure, the Inquiry notes the conclusion from Mr Chidgey in his report (Technical Appendix 31) that:

> *It is apparent from the above discussion that the combined effects of the proposed development on the marine ecosystem offshore from Wonthaggi are:*
>
> - *Likely to have a negligible effect on pelagic and planktonic communities; and*
> - *Likely to have an effect on the rocky reef/seabed communities due to the combined effect of the intake and outlet structures. The effects are likely to be a change in the structure of the hard seabed community, with some species becoming less abundant and others becoming more abundant. A spatial and temporal gradient of effects is likely. The extent and nature of these effects is uncertain due to the variable nature of oceanographic currents and should be measured during the initial period of operation of the plant.*
>
> *It is most unlikely that any species or populations will be at risk of substantial reduction in abundance in the region.*
>
> *It is most unlikely that the effects of the proposed development will extend to the marine communities of the Marine and Coastal Park, the Marine National Park or intertidal and shoreline marine communities.*

Having regard to this comment, the Inquiry considers that the combined impact of the marine structures will not lead to an overall significant impact in terms of loss of species or altered habitat. However, the Inquiry considers that the marine structures may have a long term cumulative effect specifically on the local benthic marine

communities associated with rocky reef areas. The Inquiry considers that this impact could be mitigated through more careful assessment of the reef communities within the sphere of influence of the structures which can inform the final location of the marine structures to avoid impact on high relief reef areas and minimise impacts on moderate relief reef areas.

(vii) Variations and Options

With respect to Variations to the Reference Project outlined in the EES, the Inquiry considers that the Reference Project offers an appropriate design which does not generate significant environmental effects.

Multiple subsurface tunnels or series of pipes on the seabed instead of one each large subsurface tunnel for intake and outlet

The Inquiry considers that the variation for multiple tunnels and multiple marine intake and outlet structures may offer benefits. This may be associated with reducing the size of subsurface tunnels and hence allow the use of other construction technology that may not create noise or vibration impacts as substantial as that generated by a single larger tunnel. However, the cost and time for construction may be greater and the construction impacts may be greater because of the multiple structures on the seabed and consequent larger area of damage to offshore reef areas.

With regards to the pipe on the seabed, this variation would allow a subsurface tunnel each for the intake and outlet structure which could be shorter, of equal length or longer than that proposed in the Reference Project. This would allow the intake and outlet to be extended further offshore via weighted pipelines constructed on the seabed and clear of the reef areas. However, the seabed surface construction mat represent an impact from direct damage to reef areas which does not overcome the extent of impact associated with the Reference Project design.

Passive fine screens at the intake head instead of a grill screen on the intake head and active screens onshore

This variation offers the opportunity to reduce the extent of pre-treatment onshore and hence reduces the significance of the waste management issue. However, it increases the maintenance effort required underwater at the intake head. This may increase difficulties associated with obtaining diver access to clean the screens and maintain the efficient operation of the intake. Access may not be readily available due to sea conditions when required or at all times. Accordingly, the practicality of this variation may be questionable.

Pipeline diffusers instead of rosette-style diffusers connected to the outlet tunnel

This variation may offer the opportunity to construct a shorter tunnel for the outlet structure and provide the flexibility to construct additional diffusers to better achieve dilution of the concentrate. Similar to the multiple outlet variation there is an increase in construction impact due to the additional structures located directly on the seabed. An appropriate design could be a subsurface tunnel longer than the Reference Project design and pipeline diffusers which locate the diffusers further offshore that minimises the possibility of plume impacting the reef areas.

Marine structure locations

The EES highlights that subject to technical feasibility and compliance with the Performance Requirements alternative locations for the marine structures including extension further out to sea are possible and acceptable. The Inquiry has discussed the issues regarding the location of the marine structures. The Inquiry considers that subject to pre-construction survey to determine the biological community of the moderate reef areas where the marine structures are proposed in the Reference Project, the level of impact will be localised and not significant. Extending the marine structures further offshore may assist in further minimising the low level of impacts that are expected by:

- Locating the intake over sand, the effects of entrainment on short lived larvae coming from reef based species may be reduced; and
- Locating the outlet structure over low relief reef interspersed with sand, the effects of limiting the time of exposure to benthic communities because of restricted plume dispersion in low current conditions may be reduced.

Certainly implementing this variation would further reduce the level of environmental impact on the local reef environment but the benefits of which would need to be weighed against cost and time constraints.

Seabed filtration instead of direct intake in deep water

With regards to this option, the Inquiry agrees with the comment of the IEG that:

> *… the seabed filtration option mentioned would seem to be highly impractical without further and extensive investigations, in the context of the geology understood to exist in the discharge area.*

The extensive area of offshore reefs would mean that this variation would be too damaging to the environment at the study site.

Ocean disposal of pre-treatment waste

With regards to this option, it appears to the Inquiry that there is no technical reason why it is not practical to implement the disposal of the pre-treatment waste to sea blended with the desalination concentrate. This is dependent upon further toxicity testing of the final suite of chemicals that may be used in the desalination plant. There appears to be considerable variation between different desalination plants and countries in terms of how they individually deal with the pre-treatment waste. Most overseas plants discharge to sea, while plants like the Perth Desalination Plant do not mainly because of the aesthetic issues. No plants in Australia are proposing to discharge pre-treatment waste to sea. Yet, the information presented to the Inquiry indicates that the toxicology of the pre-treatment wastes added to the desalination concentrate will not be significant. Concerns are expressed regarding discolouration of the water due to the use of ferric chloride as a coagulant, which produces a reddish appearance to the waste stream. Impacts on the marine environment relate to smothering of benthic communities and added nutrient loads, which could attract biota and generate algal blooms.

The Inquiry notes that the IEG considers that ocean disposal of pre-treatment waste are not best practice. Given the size of the VDP and the quantities of concentrate discharge proposed combined with the higher level of dilution required to be provided to ensure compliance with meeting the SEPP (Waters of Victoria) it is considered that disposal of pre-treatment waste with the saline concentrate should not be pursued. The implication of this course of action may result in greater reliance on onshore disposal of the pre-treatment waste to landfill. This may be problematic depending on the EPA classification of this waste stream.

Certainly, if the option to dispose of pre-treatment wastes to sea is further considered then testing of the pre-treatment chemicals once they are known in the final design should be undertaken to ensure compliance with EPA requirements.

(viii) Investigation and Monitoring

Investigation of the marine structures and the marine environment to gather further information to assist in informing detailed design and function will be required and is recognised in the EES. Monitoring of the operation of both the intake and outlet structure will also be an important component of the VDP. The intake will have effects due to entrainment while the outlet will have effects due to the concentrate

discharge. The cumulative effect of both marine structures will be predominantly on the benthic community of the local marine reef environment.

Monitoring programmes will be needed which consist of repeated observation of the system with the purpose of detecting a change. They should be designed to identify any potential signs of disturbance in an ecosystem at an early stage. Therefore, they need a regular sampling in time with an adequate replication at more than one location. Environmental monitoring usually focuses on data collected from relevant biological or physical parameters that are considered as useful targets for assessing the studied impact, and acceptable ranges of variation for these parameters must be established.

The EES has recognised the importance of monitoring both prior to commencement and during operation of the VDP as a means by which compliance with the performance criteria and requirements are met and any other approval conditions required to be met by the Project Company.

With respect to investigation and monitoring, Mr Chidgey commented that further detailed spatial, temporal and ecological information will be required to refine the design and location of the intake and discharge structures, to initiate baseline investigation and monitoring and determine the mixing zone.

With regards to monitoring, the Inquiry supports the monitoring program concept outlined in Section 20 of the Marine Biology Technical report (Technical Appendix 31), particularly with respect to the following:

- Targeting benthic species;
- Looking at recruitment and settling devices to determine the characteristics of larval settlement to seabed habitats;
- Quantifying cryptic reef biota including ecologically significant invertebrates and commercial species (abalone, lobster) at key reef locations;
- Toxicity monitoring particularly at times when Reverse Osmosis membrane cleaning wastes are discharged with the saline concentrate;
- Identification of monitoring impact sites within the mixing zone and around the area of intake entrainment;
- Identification of control sites;
- Monitoring before commencement (at least three years of information on conditions before commencement is desirable to establish a baseline for future post-commissioning conditions). This will also allow for refining monitoring methods; and

- Monitoring post-commissioning (at least three-year post-commissioning) to document the initial changes in existing biological communities.

The Inquiry notes that the Performance Requirements 30 for the intake structure and Performance Requirements 31 for the outlet structure both require investigation and monitoring to be undertaken. The Inquiry considers that these Performance Requirements are adequate, subject to minor amendment to allow for suitable investigation and monitoring to be undertaken for the VDP.

5.3 Findings and Recommendations

With respect to the marine structures the Inquiry finds that the overall impacts of the construction of the marine structures will not be significant because they will be temporary and that following completion of works, the source of the impacts will be removed thus allowing the environment to recover over time.

Further, the overall impacts of the operation of the marine structures will not be significant on the regional marine environment (i.e. the broader marine area including nearby marine parks).

The impact on the local benthic marine environment may be significant with respect to the cumulative effect from entrainment of short lived larvae from reef based species and the length of timing of exposure to elevated levels of salinity resulting from a slower dispersion of the concentrate plume due the moderate relief reef seabed. However the extent of such an effect is expected to be limited to the local area.

The investigations and monitoring required under the Performance Requirements for the marine structures are considered adequate to assist in informing detailed design processes and assessment and verification of operating impacts on the local marine environment.

With respect to the environmental impacts of the Marine Structures, the Inquiry makes the following recommendations:

(i) Amend the Performance Requirements as follows:

- Add a new Performance Requirement 28.2 (f) to read: *"Manage helicopter use to avoid low level flyovers of Williamsons Beach to minimise impacts on Hooded Plovers".*

- Amend the second Performance Criteria in 29 to read: "*Avoid impacts on ecology of high relief reef*".

- Amend Performance Requirement 29.2 to read: "*No construction and impacts from construction in the designated areas presented in Figure PR Sensitivity Area – Marine Area, in Technical Appendix 5*".

- Add a new Performance Requirement 30.3 (d) to read: "*Minimise impact on moderate relief reef*".

- Add a new Performance Requirement 30.3 (e) to read: *"To inform final site selection and hydrodynamic modelling, undertake a pre-construction survey to identify species composition and community structure to determine larval supply and behaviour to demonstrate compliance with the relevant Performance criteria".*

- Amend Performance Requirement 30.5 to read: *"Monitor and report on possible effects of entrainment on marine biota including changes to recruitment and marine community structure and demonstrate compliance with the relevant Performance Criteria".*

- Amend Performance Requirement 31.6 header to read: "*Develop and implement a pre-construction and post-commencement survey and monitoring program to demonstrate performance ….".*

- Amend Performance Requirement 31.6 (d) to read: "*Document condition of high and moderate relief reef ecosystems*".

- Add a new Performance Requirement 31.10 to read: "*Prior to construction the Project Company must demonstrate to EPA that the diffuser has been designed, and will be operated, in a manner that minimises the size of the mixing zone to the extent practicable and does not result in environmental risks to beneficial uses outside the mixing zone*".

6. TRANSFER PIPELINE

The proposed Transfer Pipeline will transport approximately 450ML/d of potable water from the Desalination Plant, along approximately 85 kilometres to Melbourne Water's Cardinia-Pearcedale main, south of Cardinia Reservoir. From there, the water will be predominantly transferred via existing Melbourne Water infrastructure to Cardinia Reservoir.

The endpoints of the Transfer Pipeline are the Desalination Plant in the south near Wonthaggi, and the Cardinia-Pearcedale main at a point near Soldiers Road in Berwick. The pipeline would be underground and would not be visible, audible or generally noticeable. It may surface for a small length at locations such as river crossings.

6.1 Description and Key Issues

Issues relating to the Transfer Pipeline were addressed in the EES under Volumes 1 – *Summary of Environmental Effects*, and Volume 4 – *Environmental Effects of Transfer Pipeline*. More detailed information and assessment of the Transfer Pipeline were outlined in a range of Technical Appendix reports as summarised below:

- Waste (Technical Appendix 8);
- Flora and Fauna (Technical Appendix 15);
- Agricultural Impacts (Technical Appendix 17);
- Social Impacts (Technical Appendix 56);
- Service Impacts (Technical Appendix 57);
- Landscape and Visual Assessment (Technical Appendix 58);
- Land Contamination (Technical Appendix 59);
- Geology and Geomorphology (Technical Appendices 60 and 61);
- Water (Technical Appendices 62 and 63);
- Cultural Heritage (Technical Appendix 64 and 83);
- Dust (Technical Appendix 65);
- Noise and Vibration (Technical Appendix 66); and
- Traffic (Technical Appendices 53 and 67).

Additionally, a number of submissions provided commentary on particular issues relating to the Transfer Pipeline.

(i) The Reference Project

The VDP outlines a Reference Project design identified in the EES as satisfying the project and environmental objectives and capable of meeting the Performance Requirements. The Reference Project identifies a Transfer Pipeline corridor that crosses the Powlett River coastal plains, traverses the ridge to Woolamai, follows adjacent to the South Gippsland Rail Trail and then up the Bass Valley to near Kernot. It then turns and approaches the Bass Highway at The Gurdies, continues parallel to Monomeith and then north to Ballarto Road, and onto the connection point near Soldiers Road, Berwick.

Figure 7: Topography of Transfer Pipeline

Pipeline Alignment

Three pipeline corridors were initially considered as presented in Figure 8 below. Corridor C was adopted for the Reference Project by the Proponent.

Figure 8: Alignment Corridors Considered

The alignment traverses over 100 waterways including rivers, streams and drains. It is essentially located on private land and intersects or crosses a number of private and public land uses including:

- Bass Highway;
- Various road reserves;
- Agricultural and farm land;
- A disused rail easement;
- Strzelecki Ranges;
- Western Port Flood plains;
- Koo Wee Rup swamp area;
- Grazing land south of Narre Warren; and

- Utility easements, including the Bass Gas pipeline and other easements.

Details of the corridor and alignment are shown on a series of maps in Technical Appendix 3 of the EES.

The investigation corridor for the Transfer Pipeline is 400 metres wide. The resulting pipeline easement would be sized to Melbourne Water's requirements, and is likely to be 15 to 20 metres wide. It would be preceded by a construction easement approximately 30 metres wide.

The Reference Project is based on a nominal 1,800 millimetre diameter cement lined mild steel pipe with fusion bonded medium density polyethylene coating on the outside of the pipe.

Key components of the pipeline are:

Transfer Pump Station

The Transfer Pump Station is proposed to be located within the Desalination Plant site. The station would house pumps and vertical surge tank vessels. The Transfer Pump Station is incorporated into the overall layout of the Desalination Plant and will be powered by the Plant Power Supply.

Booster Pump Station

A Booster Pump Station, and associated power transmission line to supply 20 MW of power, is required along the pipeline alignment. The pump station will provide additional pressure to deliver the required flow through the pipeline to Cardinia Reservoir. A 2.5ha site has been identified for the Booster Pump Station at approximate chainage 71 kilometres located near the corner of Ballarto and Pound Roads. However the EES notes the option to locate the Booster Pump Station elsewhere along the route to provide optimum hydraulic efficiency. The 20 MW power supply is not addressed in the EES as it is to be supplied by others.

Chemical Dosing

Chemical dosing is intended to occur at the plant site to produce potable water that would run through the Transfer Pipeline. However there is an Option to provide dosing at the Booster Pump Station.

Air and other Valves

Air Valves will be used to exhaust air from the pipeline. They will be located at high points along the Transfer Pipeline and are envisaged to have a similar appearance to stock water tanks. Section Valves are required for isolating sections of the Transfer Pipeline and Scour Valves will be provided at low points to enable draining of the pipe sections.

Surge Vessels and other Ancillary Infrastructure

Surge vessels would be used at the plant and the Booster Pump Station to balance pressure changes from operation of the pipe. The pipe will require ancillary infrastructure such as access points for testing, divide valves, cathodic protection anode beds, and test points.

Sampling Station

A small sampling station, to allow for testing of water quality, is proposed at or near the point where the pipeline connects to the Cardinia-Pearcedale main. The building will house online water quality monitoring equipment and a laboratory and would occupy approximately 20 square metres.

Construction Methodology

The Reference Project specifies that the pipeline will be underground, except possibly at some river crossings. Construction will be by trenching, except at identified sensitive areas.

Two construction techniques (open trenching or pipe jacking) are proposed to cross rivers, creeks and other waterways. A waterway could be open trenched when the watercourse is dry, or alternatively while flow in the waterway is diverted or pumped around the construction works. Pipe jacking may be used for ecologically sensitive waterways and to protect listed fauna species.

In response to Inquiry Question (v), the Proponent tabled its comments about the justification of the identified pipeline construction at the various sensitive locations on 23 October 2008 (Document 47), and said:

> *For the Powlett River, Bass River and Lang Lang River, pipejacking is likely to be necessary in the context of water volumes, environmental sensitivities and the need to*

create a stable post-construction environment to mitigate flood risk and potential impacts of flood-borne sedimentation on the Westernport Ramsar wetland.

For all other waterways, it is proposed to carry out a risk identification before construction commences at any location and to determine the most practical and least risk construction technique, commencing from the preferred approach of protected open trenching. The final crossing methodology will be determined by the relevant water authority.

The Reference Project assumes that when the pipe alignment crosses other services in the pipeline corridor, such as underground power lines, water mains, telecommunications conduits and gas mains, it will be constructed to pass under the other service.

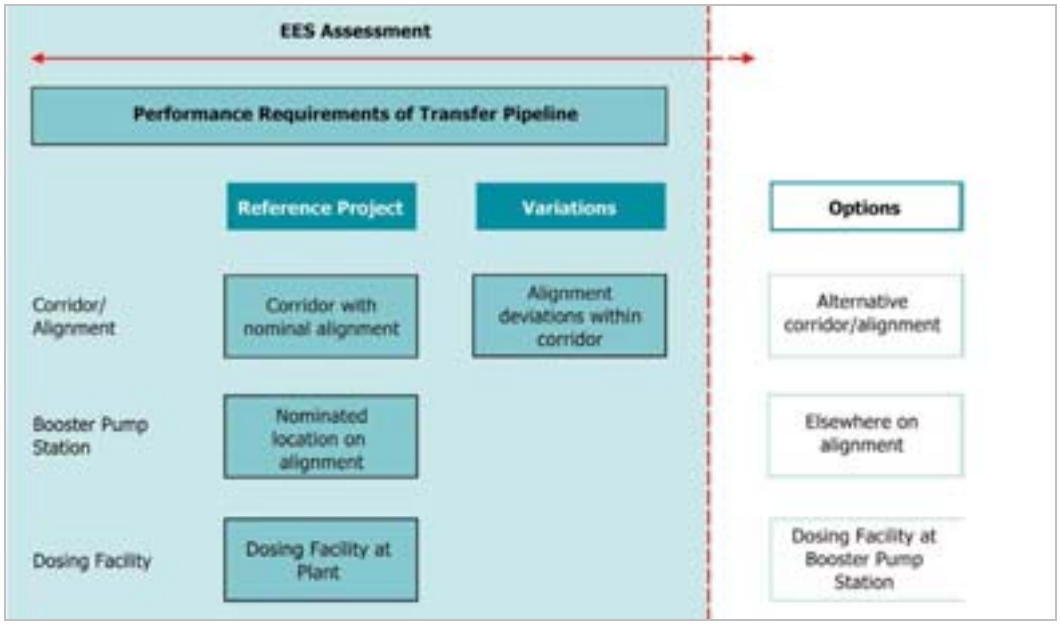
Details of the project description for the Transfer Pipeline are presented in Figure 9 below (this lists the Reference Project, Variations and Options).

(ii) Project Variations and Options

The Reference Project allows for variations of the pipeline alignment within the Reference corridor. This could be used by the Project Company to refine the alignment to meet landholder requests or when local issues are encountered during detailed design and construction.

As well, the Proponent has identified three options that the Project Company may seek to use - an alternative corridor alignment, situate the Booster Pump Station at an alternative location and incorporate the dosing facility at the Booster Pump Station. While these are discussed, they are not presented in any detail in the EES.

Figure: 9: Reference Project, Variations and Options for Transfer Pipeline



(iii) Potential Environmental Impacts and Risks

Geology, Geomorphology and Soils

The Transfer Pipeline passes through a variety of geology and geomorphology which are described in Table 1 of Technical Appendix 61.

The EES identifies the crossing of the Powlett River as a site highly likely to encounter Potential Acid Sulfate Soils (PASS) and notes the potential for PASS at other waterway crossings. However no detailed investigation has been undertaken to confirm the presence or coverage of PASS, and it is understood that this is proposed to be undertaken at the plant site as ongoing investigation.

The Proponent has assessed PASS issues as Low, but has noted the need to avoid disturbing PASS and to investigate alternative construction (eg. Pipe jacking under waterways to minimise PASS exposure).

A portion of the Transfer Pipeline corridor passes through the Koo Wee Rup Swamp Special Use Zone, which comprises flat swampy land with high agricultural value due to both the fertility and the presence of shallow aquifers which are typically used for the irrigation of high value crops. Reinstatement issues were considered a Medium risk by the Proponent.

The EES identifies the construction of the Transfer Pipeline will generate approximately 7,000m^3 of excess spoil for each kilometre of the pipeline, resulting in a total of approximately 600,000m^3 of spoil. Other than to note the potential to use on site or dispose to alternative sites, the EES provided limited discussion in relation to the disposal of the large quantities of excess excavated material. Technical Appendix 8 identifies that "*uncontaminated construction spoil could potentially be used for a wide range of onsite and off site reuse applications",* and further, "*The risk of spread of Phytophthora cinnamomi [cinnamon fungus] may limit the movement of spoil between sites."*

Much of the northern section of the corridor traverses the catchment of Western Port Bay, which is a Ramsar wetland. Soils vary across the catchment but many areas contain fine clays and dispersive soils. It was noted in Technical Appendix 63 (Section 2.2.2) that "*On some of the smaller waterways without formal levees, a relatively minor rainfall event can inundate large areas within the district due to the extremely flat nature of the district*." Further in Technical Appendix 61 (Table 1) it is identified that the soils are dispersive and this is confirmed in Technical Appendix 63 (Section 2.3.4) which notes that the waterways "*contribute significant amounts of sediment to Western Port (CSIRO 2003)."* Pipeline construction will therefore require careful management to minimise erosion and sediment problems.

Surface Water and Ground Water

Technical Appendix 23 of the EES notes that the waterways affected by the Transfer Pipeline are generally ranked as Poor or Moderate in terms of river health and most of the major waterways have nutrient levels above the SEPP guidelines. The exception is the Bass River which is in Moderate to Good condition. It is noted that the Bunyip River exceeds SEPP guidelines for suspended solids and contributes significant amounts of sediment to Western Port. The Powlett River downstream of Wonthaggi has high readings of nutrients, turbidity and suspended solids. Due to the already degraded condition of the majority of waterways and the fact that they generally discharge into the Western Port Ramsar site or locally valuable waters, the Project Company will have to undertake careful management of drainage and storm water for the whole of the pipeline.

Technical Appendix 62 notes that much of the pipeline corridor is predicted to encounter unconfined shallow aquifers, with deeper aquifers encountered where the Transfer Pipeline passes under waterways. Approximately 371 bores are located within 1km of the corridor with the majority extracting water from below 20m for stock and domestic and irrigation purposes. The majority of the bores are situated in the northern section of the corridor. Shallow ground water quality, flow direction

and interaction is poorly understood and has been noted by the Proponent as requiring sampling and testing. Tidal impacts on ground water are also noted as requiring investigation in coastal sections.

The majority of the corridor is covered by a DSE declared Water Supply Protection Area. This will require the Project Company to seek approval for the extraction of any ground water during construction, including dewatering activities.

Technical Appendix 15 assessed issues associated with dewatering as Medium for impacts on flora and fauna, other ground water users and dislocation of ground water flows.

In relation to surface waters, the Proponent provided a Medium risk to alteration of flood regimes, disturbance of water ecosystems and alteration of flood regimes at the Booster Pump Station.

Flora and Fauna, Terrestrial Ecosystems

Most of the proposed pipeline corridor traverses pasture and other areas of predominantly introduced vegetation. Some areas of native vegetation and scattered remnant trees are found along the corridor.

Surveys prepared for the EES (Technical Appendix 15) recorded EPBC listed Growling Grass Frog and Dwarf Galaxias (August 2007) and Swift Parrot (August 2008) and state significant Veined Spear Grass and Pale Swamp Everlasting. The September 2008 survey identified high numbers of Veined Spear Grass towards the eastern side of the proposed alignment.

Other EPBC Act listed species that may inhabit areas along the pipeline alignment are the Australian Grayling (Mudfish), Giant Gippsland Earthworm, River Swamp Wallaby-grass and Southern Brown Bandicoot.

The Minister for Environment, Heritage and the Arts found (March 2008) that construction of the pipeline is likely to have an adverse impact of the Growling Grass Frog if works interfere with the breeding or dispersal of frog populations. The Dwarf Galaxias species may also be adversely affected by construction works interfering with migration of the species. Trenching and tunnelling activities in the stream banks, soaks and southern facing hillsides of the alignment are likely to have an adverse impact on the potentially important populations of the Giant Gippsland Earthworm.

The flora and fauna assessment by Biosis Research in Technical Appendix 15, and the evidence of Mr Smales concluded that apart from the Growling Grass Frog and the Giant Gippsland Earthworm, the majority of areas along the pipeline alignment had a low likelihood of supporting threatened fauna.

The EES assessed as Medium the risks to Flora and Fauna from the pipeline of:

- Depletion of ground water tables impacting on flora and fauna;
- Waterway construction disturbing surface water ecosystems, and the Giant Gippsland Earthworm; and
- Dust impacts on flora and fauna and surface water.

Human Safety and Visual Amenity

As the majority of the pipeline will be buried, there will be limited visual impacts following restoration of the pipe route. The three exceptions are the Booster Pump Station, the Water Quality Monitoring Station, and potentially the above ground water way crossings. The Monitoring Station will be a relatively small structure, similar to a small house, which is proposed near or in the residential area at the northern end of the pipeline. The Booster Pump Station is envisaged as a large shed approximately 100m x 12m x 7m high located immediately north-west of the Cardinia Township.

No risk assessment was provided for visual impacts for the Booster Pump Station.

Technical Appendix 65 presents the modelling of the potential dust from pipeline construction activities and has included Performance Requirements to comply with EPA policies and guidelines. The Proponent has assessed the pipe construction risk on health and amenity as Medium.

Traffic

The EES provided information on the characteristics of a number of roads, crash statistics and traffic counts, and limited information in relation to the vehicle numbers, types, safety and traffic movement issues, related to the construction of the Transfer Pipeline.

Construction of the Transfer Pipeline may generate significant heavy vehicle movements, associated with delivery of pipe and removal of spoil. These impacts will be widely dispersed along the pipeline length. The EES concludes that as the majority of the rural roads carry low volumes of traffic there is capacity to absorb the

additional traffic due to construction activities.

Noise and Vibration

Existing noise conditions along the proposed pipeline corridor is representative of rural land. Typically there are very low noise levels throughout the day and night.

Noise and vibration impacts will occur during construction. The mobile nature of construction activities will mean that exposure to elevated noise levels will be for relatively short periods. While noise impacts and, to a lesser extent, vibration impacts may occur, it is expected that these can be minimised throughout the course of the construction process by adherence to the Best Practice Environmental Management – *Environmental Guidelines for Major Construction Sites*, EPA Publication 480.

Operation of the Booster Pump Station will also generate noise and vibration. This component of the project has been assessed as an industrial noise source in Technical Appendix 66. The construction and operation noise goals are set out in these reports consistent with the relevant EPA noise guidelines.

The results of the noise studies undertaken for the EES suggest that noise emissions from the Booster Pump Station should comply with the adopted noise goals for the majority of the time, provided that mitigation measures are incorporated in the final design.

Socio-economic

Technical Appendix 56 (Section 8) details the findings of a community attitude survey for the Transfer Pipeline which identified the following concerns:

- Farming practices impacts - it is noted that construction will occur for over 6 months at any point;
- Potential damage to farm property and infrastructure;
- Farm access and road damage; and
- Compensation values (loss of future development opportunities).

In addition respondents identified the following issues related to construction traffic:

- Impact on farming operations;
- School Bus routes;
- Milk truck routes;

- Horse riding;
- People on bikes and walking on roads; and
- Noise and dust.

The Proponent has advised that discussions with land owners in relation to minor alignment changes within properties are ongoing.

Aboriginal and Cultural Heritage issues were dealt with and summarised in Chapter 3, and it is noted that an Aboriginal Cultural Heritage Management Plan is being developed by the Proponent.

(iv) Submissions and Inquiry Hearings

While there were a number of submissions made about the alignment of the Transfer Pipeline, in the context of the overall project, these tended to focus on site specific issues, as well as some environmental concerns.

Ms Walker noted that the Powlett River mouth area is listed with the Gippsland Coastal Board as a Coastal Acid Sulfate Area and is identified on Department of Primary Industries (DPI) mapping. She advised of the potential for old water course meanders under the Plant site as having potential to include PASS. She submitted that PASS adjacent to sand areas is particularly problematic as the sand allows rapid flow during dewatering and hence rapid formation of acid conditions or transfer to other areas when the dewatering is discontinued. Other submittors, including Bass Coast Shire Council advised of the potential for acid conditions to seriously affect the adjacent waterways and the impact on flora and fauna. Bass Coast Shire Council requested the requirement for PASS to be managed in accordance with state and other relevant guidelines.

The Proponent and several submittors, including the Victorian Farmers Federation and the Horticultural Peat Farmers Group stressed the high value of the Koo Wee Rup swamp land for agricultural production for Melbourne, and noted that with continuing drought conditions in the north of the state, this area could become increasingly important as a food producing area.

Many submissions identified concerns related to modification of soil profiles and potential impacts on both topsoil fertility and shallow ground water tables. The potential for such impacts was confirmed by Phillips Agribusiness. In response to the Inquiry, Mr Morris advised that reinstatement plans would be addressed in the contractual documents with the Project Company (Document 180).

In discussing rehabilitation, Mr Phillips notes in Technical Appendix 17 (Section 4.2 Adequacy of Rehabilitation): "*This is usually one of the greatest areas of conflict. … The lack of contractor rehabilitation skills, poor timing of operations and the failure to consult are three of landholder's most common grievances to the restoration process. The pipeline provider is usually optimistic in achieving a satisfactory state of rehabilitation within one year. This is often not the case…*"

While there were a number of comments in relation to the off site disposal of Potato Cyst Nematode and *Phytophthora cinnamomi* contaminated soils and the protocols required, there was limited discussion of uncontaminated construction spoil by submittors.

Many submittors raised concerns in relation to the extent of habitats of various flora and fauna which had not been identified by Biosis Research. In reply, Mr Smales advised that where potentially suitable habitat had been identified, but not confirmed it was assumed to be suitable and included in the Proponents' evaluation. Mr Smales submitted that much of the pipe route corridor was across disturbed pasture and therefore unlikely to provide habitat for fauna. However many submittors advised of the presence of native fauna in a variety of disturbed areas.

Ms Jobe submitted that the Southern Brown Bandicoot "*exists in highly degraded habitats, including flood mitigation drains, road reserves, disused rail lines, private plantings, and narrow corridors of rank pasture, blackberry and box thorn. Individuals have been found sheltering under houses, car bodies, wood heaps, gorse, etc.*" She further submitted that the Project should be used to establish corridors for the various fauna in the region.

Following a question from the City of Casey, Mr Morris advised (Document 177) that the Thompsons Road revegetation corridor identified by Council had not been identified as an area of significant vegetation, but would be subject to localised management during construction.

The Westernport Swamp Landcare Network raised concerns in relation to flora and fauna, citing Appendix 15 which indicated that "*less than 5 Hectares of endangered EVC's*" would be impacted and the risk was assessed as Low. The Network advised that "*it has been estimated that only 2% native vegetation remains*" and further that this is spread across a great many very small sites which provide *"connectivity"* for native fauna. The Network and others acknowledged the Net Gain requirements but expressed their concern that in accordance with current requirements the offsets could be provided some distance from the affected areas. The Network also advised of the Port Philip and Westernport CMA *Spirit of the Bunyip Project* to create flora and

fauna links in the region and requested that this project be used as an opportunity to further the development of linkages.

Other submittors raised concerns that plantings undertaken through Landcare and other programs would be adversely affected and were concerned that if these were impacted, the communities would lose interest in improving the environment.

The City of Casey raised concerns in relation to the northern end of the pipeline. The key issue was the construction impacts of the pipeline along the pipe track between residential areas at the end of the pipe. In particular they were concerned with traffic, school children safety and rehabilitation. The Council requested that the pipe track section be constructed by pipe jacking and be undertaken when the two primary schools fronting the pipe track were closed for school holidays.

In response to a question by the Inquiry, Mr Morris submitted Document 46, which outlines how the Proponent has reviewed alignment requests from individual land holders.

Many submittors queried why the pipeline route was primarily on private property and not constructed on road reserves or the disused rail reserve. Mr Morris advised that the public reserves hold much of the remnant vegetation and have therefore been avoided.

The submission from Ms Manning on behalf of the Cardinia Ratepayers and Residents Association included a petition that requested the Booster Pump Station be moved further away from the Cardinia township. The reasons for this included:

- Increased traffic resulting from the recent opening of the Pakenham bypass, the safety of the school crossing and the town would be further compromised by the increased construction traffic (approximately 250 traffic movements per day). Ms Manning noted that much of the construction traffic would be required to pass the local primary school which is situated near the corner of Cardinia and Ballarto Roads. Further, the traffic impacts were assessed as Low despite the intersection and school crossing being located near a raised drain crossing which reduces the sight distance;
- The roads in the area of the Koo Wee Rup swamp are constantly "*moving and cracking, despite constant efforts to 'patch' them*." These could be further compromised by the increased heavy construction traffic;
- The visual impact and operational noise of a 100m long by 7m high building close to the township;
- There has been no consultation with the community or consideration of the

impacts of the Booster Pump Station on the community; and
- There has been no environmental consideration of the impact of the proposed 66 kV electricity supply route to the site.

The group suggested an alternative location further away from the township and away from houses.

Many submittors raised the issue of construction impacts on farm operations for both the construction period of 6 months and the rehabilitation period. As an example, dairying requires the coordinated movement of herds around each farm on a daily basis. Construction and rehabilitation across a property has the potential to seriously impact on farm operations, an aspect confirmed by Mr Phillips.

(v) EES Performance Requirements

A component of the Performance Criteria and Requirements governing the project relates to the construction and operation of the Transfer Pipeline.

Performance Requirement 1: Visual Amenity – Plant Site and Transfer Pipeline contains a number of relevant requirements, including that the Transfer Pipeline must be underground and those ancillary structures such as pump stations must comply with Performance Criteria.

Performance Requirement 7: Waterways and Wetlands set out that construction methods and site rehabilitation plans should be developed and implemented which protect habitat values of waterways and wetlands. It also requires that maintenance and emergency management plans be developed for both the construction and operation of the Transfer Pipeline which meet the performance criteria. Other relevant Performance Requirements include those relating to Social and Economic; Public Safety, Performance; Agriculture and Performance; Terrestrial Flora and Fauna; Aboriginal Heritage; Heritage; Geology and Geomorphology; Resource Efficiency; Flooding Control; Groundwater; Surface Water Quality; Erosion and Sediment Control; Acid Sulfate Soils; Contaminated Land; Hazardous Materials and Dangerous Goods; Waste – General; Site rehabilitation; Air Quality – Dust; Airborne Noise; Vibration; Traffic and Transport; and Greenhouse Gas.

(vi) Key Issues

The Inquiry has considered the information put before it in relation to the Transfer Pipeline and concludes the key issues to be addressed include:

(i) Geology, Geomorphology and Soils;
(ii) Surface Water and Groundwater;
(iii) Flora and Fauna, Terrestrial Ecosystems;
(iv) Traffic, Noise and Vibration;
(v) Socio-Economic Impacts; and
(vi) Pipeline Alignment.

6.2 Inquiry Response

(i) Geology, Geomorphology and Soils

Acid sulfate soils

The Inquiry has concerns over the risk assessment undertaken, especially in relation to the Powlett River Crossing. Technical Appendix 61 (Table 1) lists a high likelihood of encountering PASS yet Table 5 lists the likelihood as "*unlikely*".

The likelihood of dewatering being required is listed as "*Almost Certain*" by the geotechnical consultant (Rosengren and Boyd). The Inquiry understands that dewatering would be required for many months as the Powlett River crossing will be a significant construction. The Inquiry notes that dewatering can lead to exposure and oxidation of PASS, this in turn leads to acidification of ground and surface water. This is considered a risk both within the Plant site, the Powlett River crossing site and potentially at other waterways, especially in the northern area of the Transfer Pipeline, where PASS may be present.

In the northern section of the pipeline, the Inquiry is concerned with the potential impact on the adjacent Ramsar wetlands of PASS being dewatered and dispersive soils being exposed for approximately 6 months on flat plains and waterway crossings which are subject to flooding.

The Inquiry notes that the Proponent acknowledges that detailed investigation into the location of PASS is required both at the Project Site and along the Transfer Pipeline alignment. The Inquiry recommends that a performance requirement is added that ensures all PASS at the Powlett River crossing and on the Plant site is identified, and that an environmental management plan is developed that avoids PASS where possible and mitigates any interactions with groundwater dewatering, floods, flora and fauna and construction technique.

Rehabilitation of the Pipeline Route

Some submittors raised concerns in relation to the adequacy and duration of rehabilitation of the pipeline route. In particular the Inquiry notes the issues with rehabilitation of the Koo Wee Rup peaty clays.

The Special Use Zone (SUZ1) under the Cardinia Planning Scheme covering Koo Wee Rup was established to protect the high agricultural value of this area. Any development proposals which impact on the agricultural use of this area should be avoided wherever possible.

The Inquiry notes that this land can be affected in several ways by the construction of the pipeline. Heavy equipment can compact the peaty upper layers reducing its suitability for agriculture. Submittors advised that this impact can be permanent. The soil horizons have different properties and must be carefully replaced to avoid mixing and with the correct compaction. If this is not done the hydraulic properties can be affected which may impact on the adjacent land due to interference with the flow patterns of the high water table. During periods of rainfall the land is very difficult to traverse using mechanical equipment.

The Proponent advised that the requirements for rehabilitation will be addressed in the Deed of Agreement with the Project Company. The Proponent referred to the success of reinstatement associated with the BassGas project, which was apparently managed using a similar approach to that proposed for the Transfer Pipeline. Notwithstanding, a number of submittors advised of difficulties associated with ongoing settlement and weed related issues several years after completion of the BassGas project.

Performance requirement 20.1 and 20.5 directly relate to rehabilitation of disturbance and in particular to minimise settlement of backfill, and state.

> *20.1 Progressively and prior to its disturbance, conduct pre-construction surveys of the land within 50 metres of the Project Area to be disturbed. Develop a rehabilitation plan with each private landowner.*
>
> *20.5 Reinstatement works should seek to avoid or minimise settlement of backfill along the Transfer Pipeline and Power Supply corridors.*

The Inquiry is satisfied that these measures, along with some realignments of the pipeline route will allow appropriate rehabilitation and mitigate impacts.

Construction Spoil

The Inquiry notes that the Proponent has not identified specific sites for the disposal of approximately 600,000m^3 of excess spoil. While the Inquiry accepts that a portion may be able to be disposed on site with the farmers' approval, it is considered likely that much of the spoil will require off site disposal.

Many submittors raised the issue of the transfer of weeds and soil borne infections such as *Phytophthora cinnamomi* and Potato Cyst Nematode.

Technical Appendix 8 (Section 7.6) identifies the difficulties related to the disposal of spoil from areas affected with *Phytophthora cinnamomi* and Potato Cyst Nematode. In response to questions to Mr Phillips in relation to the offsite disposal of Potato Cyst Nematode contaminated soil, Mr Morris (Document 178) submitted that "*the most likely solution is to remove the spoil to a registered landfill site. Involvement of the Plant Standards Group within DPI is required to interpret the regulation.*"

The Proponent further advised that this issue would be addressed in the Construction Management Plan, and Individual Property Rehabilitation Plans prepared by the Project Company and is covered by the relevant Performance Requirements.

However there is no estimate of the likely volume of contaminated spoil involved, or identification of potential landfills. The Inquiry is concerned that this aspect has not been adequately addressed and may result in serious environmental issues for the Project Company. Further the Project Company should consider route design variations which minimise crossing affected land.

Western Port Bay

As noted in the EES, the pipeline construction will result in exposed soil near waterways for at least six months at any location and at least eight months where pipe jacking is used (Document 177). As Western Port Bay is a Ramsar site, additional evaluation is required in relation to dewatering impacts on acid sulfate soils if encountered along the pipeline route and also on the potential for increased sediment load to Western Port Bay from exposed lengths of pipe easement and waterway crossings during rain and flood periods.

In his closing submission, Mr Morris advised "*In relation to wetlands of international importance, the only wetland of relevance to the Project is the Western Port Ramsar site, which is more than 20 km distant from the Plant site and other Project works.*" The Inquiry

notes the Transfer Pipeline passes within 600m of the shore of Western Port Bay, and for the majority of its length the Transfer Pipeline route traverses the Western Port catchment, including crossing approximately 100 water courses which drain into the Bay.

Due to the length of the Transfer Pipeline, the chlorine residual at the northern end of the pipe could be difficult to continuously maintain within Melbourne Water requirements for discharge direct to consumers. The EES provides no discussion of the procedure to be used if the water is not suitable for consumption when it reaches the monitoring station. When questioned on this aspect, Mr Morris for the Proponent advised that if necessary the water would either be discharged from the scour valves or returned to the VDP and to sea. Neither of these options is considered environmentally or socially suitable due to the very large volume of water involved (over 200ML). This is considered especially important in relation to scour valve discharges as the Proponent has noted that the Growling Grass Frog was *"found in the highly modified channelised lower reaches of the water courses that drain the area formerly occupied by Koo Wee Rup Swamp. …. Potential habitat in the form of farm dams, other drainage channels and stream crossings occurs elsewhere along the Transfer Pipeline corridor*."

(ii) Surface Water and Ground Water

The Inquiry supports the Proponent's identification of the requirement to undertake investigations into the environmental impacts of dewatering during construction in the northern sector and the potential for saline intrusion in the coastal section. Further, it supports the Proponent's requirement for the following additional field investigations to be undertaken:

- Potential for Flora and Fauna impacts due to dewatering;
- Establishment of monitoring bores;
- Lithological logging;
- Collection of ongoing ground water level monitoring to enable water table mapping, seasonal variations and hydraulic gradients;
- Collection of water quality data;
- Aquifer testing; and
- Evaluation of tidal impacts.

(iii) Flora and Fauna, Terrestrial Ecosystems

The Inquiry heard evidence from the Proponent and submittors in relation to remnant vegetation for various endangered fauna, in particular the Southern Brown

Bandicoot. The Proponent in its closing submission (Document 180) said *"The studies of Biosis, and the evidence of Mr Smales, support the conclusion that the majority of area along the Pipeline alignment has a low likelihood of supporting threatened fauna species, with the exception of the Giant Gippsland Earthworm and Growling Grass Frog."* Technical Appendix 15 notes *"The species has also been recorded utilising rank pasture on occasions …. introduced vegetation in road and rail reserves and along drainage lines and streams …."* Many submittors advised of the presence of endangered species, including the Southern Brown Bandicoot in severely modified areas, including under houses and in gardens.

The Inquiry notes that many fauna species rely on the presence of widely dispersed pockets of habitat and traverse between them. The Inquiry therefore notes that if offsets are required, the current requirements allow the offsets to be created at some distance from those removed.

(iv) Traffic and Noise

There is little information in relation to traffic numbers, potential impacts, duration and routes during construction of the pipeline. The Performance Requirements provide for traffic impacts to be addressed to ensure safety of the public and to minimise the impacts on both landholders and the regional communities.

Cardinia Shire and others noted that the Booster Pump Station "*noise assessments have confirmed there may be exceedances of EPA noise requirements …*". In response to a question from the Inquiry, Mr Morris advised that the Booster Pump Station site is located on land that is zoned Green Wedge, which seeks to protect the natural environmental aspect of the area.

The EPA advised that EPA Publication 1254 has superseded TG302/92EPA and this should be reflected in the Performance Requirements for construction noise (Performance Requirement 22.5). In addition to compliance with current EPA requirements, the Proponent has made a number of recommendations in relation to minimising noise during pipeline construction. These should be reflected in the Performance Requirements.

The Inquiry notes that the Proponent's modelling of operational noise from the Booster Pump Station exceeds the EPA requirements. This, combined with visual intrusion on the local township, indicates that an alternative site should be identified and further development of the acoustic design of the building undertaken.

(v) Socio-Economic Impacts

The Inquiry notes the Performance Requirements in relation to ongoing consultation with affected communities and property owners.

Many submittors raised the issue of compensation for loss of land, loss of production, additional costs associated with managing the farm during and after construction, health impacts on animals, impacts on farm infrastructure, etc. As these issues are outside the scope of the Inquiry they have not been addressed. It is noted however that the Project Company could assist in minimising these impacts by working closely with the landowners at the design stage to identify routes which minimise farm impacts and during construction to coordinate construction and rehabilitation activities with farm activities.

Despite the Proponent advising of community engagement activities, including route selection, many submittors complained about the lack of discussion in relation to both the corridor selection and the detailed route selection. For example, Dr Laemmle advised the Inquiry that despite meeting with the Project Manager to discuss the original alignment through her property and identifying a more acceptable alignment, the revised current alignment was not discussed with her and has resulted in an increased impact on her property. The Inquiry recommends that the Transfer Pipeline final route design be carefully coordinated with landholders to follow boundaries wherever possible.

The Inquiry previously commented that the visual impact and noise impacts of the Booster Pump Station will have some impacts on the adjacent township of Cardinia, and supports that it be sited elsewhere in a less intrusive location.

Dust generation during construction of the pipeline has potential to cause visual and potential health issues and the provision of stringent dust control and monitoring requirements will be necessary to minimise the impacts along the route. The Inquiry notes that the Proponent identified additional dust management measures which were required to provide the moderate risk ranking, the Inquiry is satisfied that these are reflected in the Performance Requirements.

(vi) Pipeline Alignment

Ms Rappell of Casey Council strongly argued that the construction of the Transfer Pipeline should be undertaken outside of school term times. As it is proposed to use a number of construction teams at different locations along the pipe route, the Inquiry considers it feasible for the section of pipeline in the northern pipe track

adjacent to the two primary schools to be constructed during school holidays. The Inquiry supports this position and has made a recommendation in this regard.

Additionally, the Project Company should evaluate the option of constructing all or sections of this area using pipe jacking. The Inquiry notes information provided by Ms Rappell advising that pipe jacking is feasible for up to 600m.

The Inquiry notes that the location of the Booster Pump Station was indicative and could be modified by the Project Company based on hydraulic analysis of the final Transfer Pipeline design. It further notes that based on the Proponent's modelling, the Booster Pump Station was required at approximately the 70km position. Thus the submission by the Cardinia Ratepayers and Residents Association that the pump station be situated near the Ballarto/Wenn Road intersection appears to have some merit and should be further explored. The impacts of the construction of the HV power supply to the Booster Pump Station (to be constructed by others and not addressed by the EES) may further impact on the road safety impacts on this site.

Appendix 58 assessed the visual impact of the Booster Pump Station as being similar to farm sheds. However, as it is situated near to the Cardinia township, it may be visually intrusive, even with plantings around the base. Mr Wyatt provided a number of recommendations in Appendix 58 (Section 10) which should be upheld through out the process.

The Inquiry raised the issue of floatation of the buried empty pipeline due to high water tables and potential tidal influences. In its response, the Proponent advised: *"This issue arises in pipeline designs where a water table can influence the pipeline and would be expected to be addressed in the detailed design of the pipeline by the PPP proponent. If a risk of floatation is identified then there are a range of possible mitigation measures available. …. These matters will be addressed as part of the normal construction design process for the Project, which will require certification by the designers, a separate Design Reviewer and an Independent Reviewer as part of the Project Agreement*." In Volume 4 (page 6-21), the EES advises that to avoid impacts on the surface groundwater "*the period of dewatering would be short*" which implies a structural solution to hold the pipes down.

The Inquiry notes that overhead river crossings are commonly used on other pipelines due to their relatively lower construction costs. It is possible that an overhead river crossing could be interpreted from Volume 4 (page 2.12) where the EES advises that the pipeline will be underground but *"it may surface for a small length at locations such as river crossings."* The Inquiry is not clear whether the Project Company could use overhead river crossings or not. In addition to reviewing water

way crossings which might require pipe jacking for water quality and hydraulic reasons, further pipe jacking locations need to be reviewed in relation to sites where flora and fauna issues require consideration. These are documented in Appendix 15 (Table A7.1) and also in the recommendations in Appendix 15. Typical locations could include under potential or actual Giant Gippsland Earthworm habitat, minor waterways with Dwarf Galaxias habitat where there is remnant vegetation, the Growling Grass Frog habitat, and the Southern Brown Bandicoot habitat.

6.3 Findings and Recommendations

With respect to the Transfer Pipeline, the Inquiry finds that the overall impacts of the construction of the pipeline will not be significant, because they will be temporary works and that following completion of works, the source of the impacts will be removed thus allowing the environment to recover over time.

The Inquiry supports avoiding or disturbing PASS and investigating alternative construction methods, for example pipe jacking to minimise PASS exposure, especially in the Western Port Ramsar catchment area and at the Powlett River and for the preparation of Environmental Management Plans *"for all proposals likely to disturb ASS."*

The alignment of the Transfer Pipeline should be modified to avoid the Koo Wee Rup Special Use Zone wherever possible. Where this is not possible, the Project Company should develop detailed and site specific design and construction protocols to minimise adverse environmental affects on this valuable agricultural area.

For all properties along the pipeline, but in particular in the Koo Wee Rup Special Use Zone, the Rehabilitation Plans should carefully address the maintenance of the various soil horizons, compaction requirements and ground water issues to ensure that all disturbed land is returned to as close to original condition as possible.

Additionally, prior to finalising the alignment, the Project Company should undertake a detailed investigation of the route selection impacts on the volumes and cost of disposal of spoil from areas affected with Cinnamon Fungus and Potato Cyst Nematode. Further the Project Company needs to identify specific locations which are environmentally suitable for the disposal of the large volumes of spoil and develop handling protocols and an audit program. The Inquiry recommends that a new performance measure be added that requires the Project Company to detail the methodology for any soil removal, assessment, reuse and management to manage biohazard risk including Potato Cyst Nematode and *Phytophthora cinnamomi*.

As Western Port Bay is a Ramsar site and the majority of the pipeline route drains into the bay, the environmental impacts of the construction phase must be carefully managed to minimise the impacts. The key areas requiring attention are sediment control due to flooding and stormwater, ground water dewatering and excavation impacts on areas of PASS and water quality impacts on the waterways crossed by the pipeline. The method of construction of the waterway crossings can have significant impacts on the potential for sediment discharge to the Ramsar site.

The Inquiry supports the Proponents effort's to minimise the areas of habitat to be removed, and recognises that the offsets may be created away from the local area and the loss of small pockets of habitats may adversely affect endangered fauna. The Inquiry suggests that the Project Company supports local initiatives to establish flora and fauna corridors where appropriate.

The Project Company should consider the option of alternative locations for the Booster Pump Station which result in reduced noise and visual impacts on the township of Cardinia.

The Inquiry notes the Project Agreement requires the Project Company to prepare specific Traffic Management Plans to meet the requirements of the relevant road authority. The Project Company needs to work closely with the landowners at the design stage to identify routes which minimise farm impacts and during construction to coordinate construction and rehabilitation activities with farm activities.

The Performance Requirements allow for a community engagement program to gain the input and support of the local communities in all aspects of the Transfer Pipeline, in particular in relation to developing traffic management plans, route finalisation, pipe construction and rehabilitation plans.

The construction program and construction methodology should minimise impacts within the northern pipe track and on the two primary schools.

The Inquiry supports the requirement to undertake investigations into the environmental impacts of dewatering and tidal influences during construction of the pipeline to be carefully evaluated as part of the design to minimise potential impacts on the pipeline integrity, flora and fauna and ground water users. The method of construction across all waterways, especially the Lower Powlett River and all waterways in the Western Port catchment require the careful evaluation and review by the relevant authorities to ensure that potential environmental impacts from

PASS, sediment, nutrients, storm and floodwaters are minimised.

With respect to the environmental impacts of the Transfer Pipeline, the Inquiry makes the following recommendations:

(i) Amend the Performance Requirements as follows:

- Amend Performance Requirement 1.11 to read: *"The Transfer Pipeline must be underground unless superior environmental outcomes at waterway crossings can be achieved with an above ground solution*".

- Amend Performance Requirement 5.2 to read: "*In design, minimise impact on agricultural productivity including following road reserves and/or property boundaries where practical".*

- Add a new Performance Requirement 5.6 to read: "*Detail the methodology for any soil removal, assessment, reuse and management to manage biohazard risk including Potato Cyst Nematode and Phytophthora cinnamomi."*

- Add a new Performance Requirement 16.4: "*Ensure that the environmental management plan for the Powlett River crossing addresses the location of all Potential Acid Sulfate Soils in the vicinity of the Powlett River and the Project Site, and interaction with groundwater dewatering, floods, flora and fauna and construction technique".*

(ii) Ensure that construction of the Transfer Pipeline in the vicinity of the Berwick South Primary School and St Catherine's' Catholic Primary School/St Francis Xavier College Junior Campus are undertaken to coincide with school holiday periods.

(iii) Consider alternative locations for the Booster Pump Station to reduce noise and visual impacts on the township of Cardinia.

7. POWER SUPPLY

The fourth component of the Victorian Desalination Project (VDP) is the supply of energy for the operation of the Desalination Plant (the Plant) and the pumping of the desalinated water via the Transfer Pipeline to Cardinia Reservoir. A power supply of approximately 133MW annually will be required to produce 200GL of potable water per year when the Plant is fully developed.

This quantity of electricity exceeds the capacity of existing electricity infrastructure in the Wonthaggi and Phillip Island area and thus a new power supply is required to operate the Plant and associated infrastructure. Upgrading the existing power supply network to Phillip Island and Wonthaggi will be an ancillary outcome of the Project.

There is a strong Government and community preference for powering the Plant and associated infrastructure using renewable energy. The EES states "*Considerable effort has been invested in identifying renewable energy sources for use in the Project*" and this issue is further discussed in Chapter 8.2 of this report.

7.1 Description and Key Issues

Issues relating to Power Supply were addressed in the EES in Volume 1 – *Summary of Environmental Effects*, and Volume 5 – *Environmental Effects of Power Supply*. More detailed information and assessment of the Power Supply and its environmental effects were outlined in a range of Technical Appendix reports as summarised below:

- Waste (Technical Appendix 8);
- Flora and Fauna (Technical Appendices 12 and 16);
- Agricultural Impacts (Technical Appendix 17);
- Landscape (Technical Appendix 34);
- Geology and Geomorphology (Technical Appendices 38, 39, 70 and 71);
- Surface water, groundwater, hydrology and waterway crossings (Technical Appendices 41, 72, 73 and 74);
- Cultural heritage (Technical Appendices 44, 75 and 84);
- Air quality (Technical Appendices 46 and 76);
- Noise and vibration (Technical Appendices 49 and 77);
- Traffic (Technical Appendices 52 and 78);
- Landscape (Technical Appendix 68);
- Contaminated land (Technical Appendix 69);

- Services (Technical Appendix 79);
- Electro magnetic assessment (Technical Appendix 80); and
- Electrical network connections (Technical Appendix 81).

Evidence was provided on matters relating to power supply from:

- Mr Greg Finlayson (project overview);
- Mr Ian Smales (flora and fauna);
- Mr Neville Henderson (power supply options);
- Mr Ray Phillips (agricultural impacts);
- Mr Alan Wyatt (landscape);
- Mr Stephen Boyle (electro-magnetic fields);
- Ms Ruth Davies (social impacts);
- Mr Steve Schutt (landscape);
- Dr Ric Simes (economics);
- Mr John Gallienne (agricultural impacts);
- Mr Mark Koller (waste);
- Mr Rob Milner (planning); and
- Mr David Dreadon (landscape).

Numerous submissions about the Power Supply were made in response to the EES, and many presented at the hearing, including Cardinia Shire Council, Bass Coast Shire Council, Baw Baw Shire Council and South Gippsland Shire Council, the Power Grid Option Group and individuals and community groups.

The EES explores three alternatives for power supply: - grid connected, gas-fired and hybrid options.

The Extra High Voltage (EHV) transmission network (220 kV and above) is located approximately 70 kilometres north of the plant site and has the capacity to supply the power needs of the Desalination Plant at 200 GL capacity and enhance the local network supply. This network is owned and operated by SP PowerNet (a subsidiary of SP AusNet).

Nine alternative grid connections to provide a secure electricity network connection for the VDP were initially assessed (Technical Appendix 81). The northerly 220 kV overhead transmission option was determined to be the most viable having regard to technical feasibility, capacity to service the VDP and the region, economic feasibility and ability to be constructed within the VDP timeframe.

(i) Reference Project

The EES proposes the northerly 220 kV overhead connection option as the Reference Project. The design capacity will be approximately 270 MW, which would allow 130 MW for the Plant and transfer pump station (based on ultimate 200 GL capacity) and 140 MW in augmented supply to the region. This connection would have:

- A new connection to the existing 220 kV transmission lines from the Latrobe Valley to Melbourne by way of a new 220 kV terminal station at Tynong North;
- A new double circuit 220 kV overhead transmission line from the 220 kV terminal station southwards to a new 220/66 kV terminal station at Woolamai, to provide a high level of reliability (N – 1); and
- South of the Woolamai Terminal Station, three 66 kV lines to the Desalination Plant would be underground cables, which for the most part (nine of the 10 kilometres) would be directly adjacent to and parallel with the Water Transfer Pipeline.

A 40 metre wide transmission line easement is located within a 500 metre wide investigation corridor from the Plant site to the proposed Tynong terminal station. From the Woolamai Terminal Station to the plant, the route of this corridor will be broadly the same as the investigation corridor for the Transfer Pipeline with underground 66 kV cables installed directly adjacent to the pipeline.

North of the Woolamai Terminal Station, the overhead 220 kV transmission line would run in a north-easterly direction up the Bass River Valley, along a similar alignment to the pipeline, until north of Kernot. North of Kernot, the alignment would diverge east and traverse the hinterland of the Strzelecki Ranges before dropping onto flat land near Heath Hill and crossing intensive farmland where horticultural cropping occurs under irrigation.

Steel lattice towers are the preferred type of structure for the 220 kV transmission line from a capital cost and maintenance viewpoint. Poles may be used where the easement width is constrained or where poles are perceived to have less visual impact. Access tracks will need to be established to each tower site for construction, maintenance and operational purposes.

An upgrade of local electricity distribution lines and use of onsite generators will be required to provide adequate power for construction of the Plant and marine structures. This will involve rebuilding approximately 8 kilometres of existing distribution lines from Wonthaggi. It will also include onsite generators (likely to be

diesel powered) for additional power supply during construction peak demand periods.

Power is required to operate the Transfer Pipeline Booster Pump Station. A new 66 kV line and upgrades to existing infrastructure are required. This expansion is already planned by SP AusNet. Construction of this line would be brought forward as a result of the VDP.

At the commencement of the hearing, the Inquiry asked the Proponent to provide a response on the final preferred options of the powerline (and the pipeline), taking into account the issues raised in submissions and any further investigations. A response from the Proponent in relation to the powerline was provided on 21 October (Document 26). In part, the response opened by saying: "*The Government has not made a decision about the form of power supply*". The response went on to advise of the current bidding process, it acknowledged there may be variations to the alignment within the corridor being assessed, and acknowledged the submissions seeking an underground power connection north of the Woolamai Terminal Station.

Many submittors did not challenge the VDP, or the need for it to have a power supply. This position was best put by Cardinia Council who said they did not "*question the merits or otherwise of the proposed Desalination Plant. It does not comment on other aspects of the proposal, save where relevant to the configuration of the power supply".* Numerous other submittors had a similar position, and advocated the power supply be underground along the full length.

In this regard, the Proponent's response was: "*there are a range of concerns as to whether such an underground power connection would meet the objectives of Government, or indeed, could be delivered at all. Those issues may be addressed by the bidding process which will determine whether an underground solution is possible within time and with value for money*".

(ii) Project Variations and Options

Realignment within the 500m wide investigations corridor and alternations to the terminal locations are proposed as Variations to the Reference Project. Variations represent other design and management solutions which also meet the Performance Requirements and are covered by the EES assessment.

The EES and Technical Appendices also identify a range of Options. These were described by the Proponent in their closing submission in the following terms:

The Options have not, technically, been put forward for assessment by the Inquiry. However, the Inquiry Terms of Reference clearly enable it to assess and make recommendations on the Options to the extent that it sees fit.

The Options in the EES Volume 5 and Technical Appendix 81 and expanded on by Document 180 tabled during the hearing are described below.

Northerly 220 kV AC Underground

A technically feasible option of two 220 kV AC underground circuits (6 cables) running from Woolamai to Tynong North along the proposed corridor alignment was presented in the EES. The EES estimated the capital cost of this option to be more than double the cost of the northerly 220 kV overhead proposal envisaged in the Reference Project.

Northerly HVDC Underground

The EES offers a High Voltage Direct Current (HVDC) option which would replace the 220 kV AC underground cables with underground HVDC cables. This option would require an AC/DC converter station at the Tynong North Terminal Station. An underground HVDC link (3 cables to achieve supply redundancy) would then be constructed (approximately 60 kilometres) to the Woolamai Terminal Station. A converter station would be included in the Woolamai Terminal Station to convert DC to 66 kV AC. From there the 66 kV underground circuits would connect to the Desalination Plant as proposed in the Reference Project.

The HVDC solution using voltage sourced converter is technically achievable and is suited for the provision of power from strong to weak AC systems. This solution has not been fully scoped in the EES.

Northerly Alternative Alignment (the Longwarry Option)

The EES makes a brief mention of an alternative northerly grid connection that seeks to minimise disruption to agricultural properties and farming practices, and attempts to manage the potential risks of the Potato Cyst Nematode and on the Koo Wee Rup Special Use Zone areas. This option leaves the existing Reference Project alignment near Heath Hill and tracks north east to meet the existing 220 kV power line near Longwarry.

Gas-Fired Power Station Option

Construction of a new gas-fired power station at or near the plant site was considered for the Project. There is gas pipeline infrastructure quite close to the Plant. Two locations were assessed:

- A gas-fired power station near the existing BassGas processing plant at Lang Lang. A power station located away from the plant site will require a transmission line of significant capacity to transmit power to the site; and
- A gas fired power station located on the plant site. Less infrastructure would be required between the power station and the plant and transmission losses would be negligible.

Three gas pipeline routes were identified. All the gas pipelines would be operated at a pressure above 1,050 kPa. In each case, a new compressor station would be required at the Pakenham Metering Station to meet the pressure requirement at the power station.

- Route 1: A new gas pipeline from the termination point of the South Gippsland Natural Gas Pipeline at Wonthaggi;
- Route 2: A new gas pipeline from the outlet of the BassGas processing plant along the existing BassGas raw gas pipeline easement; and
- Route 3: A new pipeline to run from the Principal Transmission System (PTS) near the Pakenham Metering Station.

Hybrid Options

Two hybrid options were investigated for Power Supply. These draw on a combination of wind power and a gas fired power station.

- ***Hybrid A***

The key components of Hybrid A were:

- Wonthaggi Wind Farm;
- Bald Hills Wind Farm;
- Gas-fired power station located next to the Lang Lang Gas Processing Plant;
- Connection from the gas-fired power plant to the Desalination Plant;
- Connection from the Bald Hills Wind Farm to the Desalination Plant and a connection from the Bald Hills Wind Farm to the grid; and
- Connection from the Wonthaggi Wind Farm to the Desalination Plant.

- ***Hybrid B***

Hybrid B omits the Wonthaggi Wind Farm and locates the gas-fired power station on the Desalination Plant site which is considered to avoid the extent of duplication of Hybrid A. The key components of Hybrid B were:

- Bald Hills Wind Farm;
- Connection from the Bald Hills Wind Farm to the grid;
- Gas-fired power station located on the Desalination Plant site;
- Gas supply to the gas-fired power station; and
- Connection from the Desalination Plant site to the Wonthaggi zone sub-station.

(iii) Potential Environmental Impacts and Risks

Table 3.2 of Chapter 3 of Volume 5 of the EES summarises the likely construction risks of the Power Supply component of the Reference Project. This assessment rates the following elements as having a High risk rating:

- Destruction of Aboriginal artefacts and sites due to earthworks;
- Impact on agricultural production of above ground and underground power lines; and
- Translocation of the Potato Cyst Nematode through earthworks.

Another 10 elements covering areas such as geology, geomorphology and soils; groundwater and surface water; flora and fauna; dust, noise and vibration related to the Power Supply Reference Project construction have a Medium risk rating.

For operation of the Power Supply (Powerline Reference Project), the following elements are rated as a High risk in Table 3.3 of Chapter 3 of Volume 5 of the EES:

- Creation of the power line easement and land acquisition (social impact);
- Social impact of powerlines on households and communities by severance and dislocation; and
- Visual impacts of the powerlines.

Other elements related to noise and vibration and creation of easements are rated as having Medium level of risk.

(iv) Submissions and Inquiry Hearings

The overhead Power Supply (the overhead section of the Northerly Grid Connection put forward as the Powerline Reference Project) was by far the project component that generated the most submissions. Submittors raised many concerns regarding the overhead powerline proposals including:

- Impact on agricultural activities;
- Economic losses to agriculture;
- Land value losses (related to primary production and 'lifestyle' properties);
- Landscape and visual impacts;
- Uncertainty regarding the proposed Longwarry alignment;
- A sense of significant impact without the benefit of the water supply;
- Social impacts on communities; and
- Electro-magnetic fields.

The Proponent (Document 177) identified that the proposed alignment traverses 42 private properties in the Bass Coast Shire, 28 properties in the South Gippsland Shire and 62 private properties in the Cardinia Shire. Many more submittors not directly affected submitted that they would be impacted by overhead lines being in the vicinity because of land value and visual impacts.

It is clear to the Inquiry that the many submittors who expressed deep concerns about the Power Supply option, especially with regards to the visual impacts, were distressed about this proposal. Additionally, much of the concern expressed has come about due to the uncertainty surrounding the Powerline Reference Project route, and the possibility of an alignment through Longwarry.

(v) EES Performance Requirements

The EES in Volume 5 contains Performance Requirements for a number of areas of the Power Supply. The first of these is to minimise visual intrusion. The requirements for visual impact mitigation include undergrounding the line between the Plant and the Woolamai Terminal Station, designing and locating the Power Supply to minimise impacts on rural and residential properties and offering landscape screening to selected properties.

A number of land management Performance Requirements that cover the Transfer Pipeline are applicable to the Power Supply. These cover geology and geomorphology; erosion and sediment control; acid sulfate soils; construction vibration; rehabilitation and contaminated land.

Similarly general Performance Requirements related to the whole project are put forward to include the Power Supply component of the VDP in relation to surface water quality; waterways and wetlands; groundwater quality; and flooding.

Performance Requirements in relation to flora and fauna are put forward and these relate primarily to achieving net gain in accordance with the *Native Vegetation Management: A Framework for Action* policy of the State Government. Management of significant fauna species, Ramsar wetland values, and pathogens also have Performance Requirements. Sensitivity mapping has been undertaken (shown in Appendix 5 of the EES) for particular areas of flora and fauna to be avoided and these are tied in to a Performance Requirement.

Aboriginal cultural heritage Performance Requirements are related to avoiding sites where possible and compliance with the Cultural Heritage Management Plan when developed and approved. Performance Requirements for non-Aboriginal cultural heritage relate to protecting listed sites and managing project "*interaction*" with sites.

Performance Requirements for noise and vibration (particularly during construction) are related to achieving compliance with the relevant EPA guidelines and State Environment Protection Policies.

Social and economic impacts have Performance Requirements that apply to the whole VDP and include issues such as informing the community about the Project and particularly activities that will be occurring. Managing the construction workforce has a Performance Requirement to develop a strategy to minimise impacts on the local accommodation sector. Agricultural impacts from the Power Supply are addressed by Performance Requirements related to design, rehabilitation (including preparation of rehabilitation plans) and management of pathogens.

(vi) Key Issues

The Powerline Reference Project, and the Variations and Options raise a number of issues that will require management as the Project proceeds. Particular issues that will need careful management during construction will include:

- Aboriginal cultural heritage through a Cultural Heritage Management Plan;
- Noise, dust and vibration;
- Traffic management (for safety, road management and rehabilitation);
- Detailed consideration of fauna and avoidance/protection measures related to the Giant Gippsland Earthworm, the Southern Brown Bandicoot, the

Growling Grass Frog, the Dwarf Galaxias and the Australian Grayling;
- Detailed consideration of flora and avoidance/protection/offset measures related to the Plains Grassland EVC, River Swamp Wallaby-grass, Veined Spear Grass and Pale Swamp Everlasting; and
- Water and soil protection, management and rehabilitation.

The Reference Project and Options are conceptual at this stage. In line with the Performance Requirement approach adopted for managing Project impacts, the Inquiry has recommended amendments to improve Performance Requirements for many of the issues above (summarised in Chapter 13).

The main focus of the Inquiry in relation to Power Supply has been on the longer term environmental effects that have been identified as likely to occur following construction. In this regard, the Inquiry has considered the information put before it and concludes the key issues to be addressed include:

(i) Agricultural use impacts;
(ii) Economic value of agricultural production;
(iii) Land value impacts;
(iv) Landscape and visual impacts;
(v) Social impacts;
(vi) Electro-magnetic fields; and
(vii) Project Variations and Options.

7.2 Inquiry Response

(i) Agricultural Use Impacts

The potential impact of the Powerline Reference Project on agricultural production can be grouped into three main areas (not in order of importance):

- General agricultural impact;
- Impact on the Koo Wee Rup Horticultural Area protected by the Special Use Zone 1 in the Cardinia Planning Scheme; and
- Potential for the Reference Project to increase the spread of Potato Cyst Nematode (PCN).

The extent of the Special Use Zone and the Potato Cyst Nematode is shown in the following Figure.

Figure 10: Special Use Zone and Potato Cyst Nematode Control Area

The report of Mr Phillips at Section 4.3 of Appendix 17 of the EES provides a good overview of the types of agricultural impacts that might be expected from the overhead 220 kV powerline. These include movement restrictions on vehicles and equipment of a certain height under the line; restrictions on irrigation; the need to avoid conductive materials (pipes, fences etc.) in the vicinity of the powerline; restrictions on aerial spraying; construction impacts on soil profile and health; biosecurity; and construction impacts on pipe work and fencing.

Mr Gallienne identified additional impacts such as infrastructure relocation costs and the effects of electro-magnetic fields on computerised dairy technology and global positioning systems.

Land valuation impacts in relation to agriculture were raised by Mr Phillips and a number of submittors, and these are discussed separately below.

A number of submittors were concerned about the impact of the powerline on their agricultural activities, and particularly the above ground section of the line from Woolamai to Tynong North. These concerns were shared across all types of agriculture from intensive horticulture to dairy and beef production. It was submitted by experts and landowners alike that the agricultural productivity of the area (particularly the Koo Wee Rup horticultural area and the Bass Valley) are highly productive agricultural soils that may become even more strategically significant with increasing climate change impacts.

The Powerline Reference Project above ground section goes through the Koo Wee Rup horticultural area, an area of highly productive peat swamp soils located between Western Port and Pakenham. The area is protected by a Special Use Zone (SUZ1) in the Cardinia Planning Scheme which has, among others, the purpose "*To preserve land of high agricultural quality for horticulture and other farming activities*".

The potential impacts on this area are perhaps best illustrated in the submission of Mr and Mrs Tymensen of Garfield, which was presented as part of the submission from the Horticultural Peat Farmers Group. In summary, Mr Tymensen submitted that their business, which employs four full time staff in producing 6,000 tonnes of potatoes a year and rearing 400-500 dairy heifers will be impacted as follows:

- Prevention of use of lateral irrigators resulting in reduction or loss of intensive production;
- Impacts on extensive underground drainage (600-1500mm depth);
- Loss of aerial spraying (ground rigs not suitable during wet soil conditions);
- Biosecurity (PCN discussed below);
- Inability to use large machinery due to height restrictions; and
- Consequent significant economic losses due to land value loss and change in agricultural practices required.

The above ground power lines as shown in the Powerline Reference Project cross a number of properties in the Special Use Zone 1 at an angle. This has the effect of maximising the negative impact on the use of lateral irrigators by preventing them from having a clear run up the paddock and 'stranding' sections of paddock behind the power line. Submittors stated that this form of irrigation is critical in parts of the intensive horticultural area. Gun irrigators, which may be an alternative in some areas also have problems as they can not irrigate all corners of a paddock and are

restricted in their use adjacent to powerlines.

The Inquiry considers that the powerline alignment should follow property boundaries wherever possible to minimise disruption of farming activities.

Several submittors drew the Inquiry's attention to the fact that the State Electricity Commission of Victoria, when putting overhead lines through this area in the 1970s, specifically planned the power line route to avoid these high quality horticultural areas.

The Inquiry considers that overhead lines through the Special Use Zone 1 horticultural area should be avoided as much as is practicable to protect the well recognised strategic value of this agricultural asset. As mentioned by Cardinia Shire Council: *"With the modelled likelihood of changed rainfall patterns and increasing uncertainty, management of Cardinia's agricultural capacity will become more important to the Victorian economy in years to come. Cardinia's role as a food bowl in the coming decades is likely to become even more important to the State economy".*

The Potato Cyst Nematode (PCN) control area is traversed by the Powerline Reference Project route. Not all properties within this area (and indeed not all paddocks within each property) are infected with PCN, but being within the PCN area requires a high level of soil hygiene regulated by the Department of Primary Industries.

Many submittors were worried about the spread of PCN on construction equipment and expressed concern whether the Project Company would be able to maintain the high hygiene standards required in the face of time and cost pressures.

For example, Mr Hobson (submission 229) who is currently PCN free put it thus:

> *I believe it is would be basically impossible and impracticable to complete a power line project of this proportion and comply with Department of Primary Industries guidelines to prevent the spread of PCN.*

Mr Phillips in his report (Appendix 17 to the EES) rated the overall risk of PCN spread as '*medium*' based on an unlikely likelihood, but a major consequence.

Cardinia Council said in this regard:

> *The EES assesses the PCN risk relating to the construction of the power supply and identifies it as being likely, having major consequences and ascribes it as a "High" risk*

rating. While there is a reference in Volume 1 to the development of 'protocols' for the management of this pathogen during construction, the relevant performance requirements merely require compliance with the relevant legislation, being the Plant Health and Plant Products Act 1995 with no definition of the likely relevant protocols.

The Inquiry considers that the final Power Supply alignment should avoid the PCN control area as much as is practicable.

With respect to direct impacts on farming land, the Inquiry considers that the second Performance Criteria in Section 5 should be reinforced to include individual landowner input into the preparation of rehabilitation plans, and has made a recommendation in this regard.

(ii) Economic Value of Agricultural Production

The EES (Volume 5) estimated the effect on agricultural productivity would be in the order of a loss of $4.4 million. Mr Phillips revised this down to $2.3 million following refinement of the route through the Special Use Zone 1 horticultural area.

Mr Gallienne estimated that agricultural losses within the Shire as a result of the Powerline Reference Project would be in the order of $6.3 million for grazing and $6.1 million for horticulture, and there could be considerable savings by placing the powerline underground.

In his response to Mr Gallienne's evidence, Mr Phillips suggested the long term economic loss could be in the order of $3.187 million in the Cardinia Shire, an order of approximately three times less than Mr Gallienne's figures.

Mr Tymensen, in a specific example of potential loss, submitted that 16ha of his land may not be able to be accessed for irrigation in future, and on a 30% decrease in income moving from irrigated horticulture to non-irrigated grazing, this amounted to a loss of approximately $52,000 a year or $1.3 million over a 25 year period.

Mr and Mrs Marson submitted that 50 acres (20 ha) of their Catani property could be taken out of irrigation due to the overhead powerline leading to an annual net loss of $260,000. The Marson's submission provides a clear explanation of some of the key issues in this area relating to impact on horticultural production and consequent economic losses.

Mr and Mrs Lineham were other submittors, as an example, where the likely Reference Project will traverse four of their properties (currently used for irrigated

horticulture) at an angle, therefore limiting their future options for irrigation with consequent economic effects.

Figure 11: Tymensen Properties (Part of Tabled Document 75)

Given that the final alignment is not known coupled with the difference in approach adopted by the experts, it is difficult for the Inquiry to gain an accurate estimation of the potential lost value of agricultural production. In his closing submission, Mr Morris suggested that "…*long term agricultural losses are unlikely to have a present value of more than $10 million"* which he went on to suggest is not substantial in a project cost of approximately $3 billion.

Mr Morris further submitted that agricultural production impacts can be addressed under the *Land Acquisition and Compensation Act* 1987 and this will provide an adequate framework for compensation. While the Inquiry considers this framework responds to the direct and individual economic impacts, and whilst this may be strictly correct in economic terms, the broader issue of the strategic significance of the horticultural peat area and the other productive agricultural land along the Powerline Reference Project route through the Bass Valley needs to be reconciled as part of the final design and development stages of the Project.

(iii) Land Value Impacts

Impacts on land values were raised by many submittors along the Powerline Reference Project route. There were generally three scenarios, where the property is

being used for:

- Agricultural production and maybe collateral for finance for farming activities on the land;
- Collateral to fund a business (on or off site); and
- Lifestyle, and where devaluation of land may affect the financial well-being of residents.

A report from Westlink Consulting was submitted by Cardinia Shire Council as part of its submission. This report calculated land value losses in Cardinia Shire in the order of $15 - 20 million, being $7 - 9 million in easement acquisition and $8 - 11 million for people who would be nearby to the Powerline Reference Project but would not receive direct compensation.

Westlink used a paired sales analysis to compare property sales that are next to and not next to similar infrastructure as that proposed here. Properties up to 1.4km away were included as those being affected value wise whilst not receiving direct compensation as this was found to be the threshold where there was no effect on values in the paired analysis.

Westlink applied their methodology to South Gippsland Shire and Bass Coast Shire, albeit not with the same level of detailed investigation. For these Shires they estimated property compensation and other losses between $18 - 24 million.

Over 200 submissions raised impacts on land values from the Powerline Reference Project as a serious concern, both for the impact on the viability of business' (farm and other) and its impact on people's financial wellbeing. Many submittors at the hearing were visibly upset at the likely impact on the reduction in property value due to 220 kV overhead powerlines in an area where they currently do not exist.

Even those who may be entitled to receive compensation for direct easement acquisition had remaining concerns related to broader property devaluation. For example Mr and Mrs Kendall purchased a 20ha lifestyle property at Nyora and whilst being told they might be entitled to some compensation for towers on their land, they were advised by a local real estate agent that the value of their property may drop by a third. This 30% devaluation figure was quoted by a number of submittors.

Submittors who may not have the powerline crossing their land and are therefore not entitled to compensation but may suffer significant amenity impacts were particularly upset. Mr Raabe for example said:

*The transmissions lines are not over my property. They run on the other side of Ferrier's Road, thus according to the law as it stands I am not able to claim compensation. Given the proponents own experts opinion (*Panel note: of high impact*), this is neither fair or just! Despite a large loss of amenity I will not be protected.*

Submittors who consider they may be losing development opportunities (for example subdivision or developments) also expressed concern at the potential loss of value. For example Mr and Mrs Coleman expressed concern in relation to allotments they hold that already have building permits, and suggest that the value of these allotments may have been reduced from $250,000 to $40,000.

The Pakenham Racing Club has purchased a property at the northern end of the Powerline Reference Project alignment with the aim of relocating. The investigation corridor runs south to north through the middle of the property and would make it difficult for the club to proceed with its extensive development plans. Mr Morris (Document 44) indicated that it is not an issue with any easy resolution, as moving the proposed easement east or west raises other environmental issues or places the line closer to other properties. This is an issue that the Proponent and the Pakenham Racing Club will need to negotiate on, and the Inquiry can offer no particular guidance other than confirming that it needs to be resolved.

More broadly on the issue of land valuation, in normal statutory planning matters (for example decisions at VCAT), land devaluation of surrounding properties due to a development proposal is generally not subject to compensation and Mr Morris comments on this in his closing submission paragraph 3.35. The Inquiry accepts this general principle, as it has been established through a number of planning decisions.

However, a number of broader and specific perspectives and considerations could be said to apply in this particular project. Mr Morris himself stated in his closing submission that this is a "*vital state project*" and the adoption of the PPP approach and the concurrent timetable for the EES process and procurement process has significantly influenced the character of the EES and the focus of the Inquiry. In particular, this has led to the development of the Powerline Reference Project that because of its conceptual nature and the generality of the information available, has created considerable uncertainty and stress in the regional communities affected by the VDP as to exactly what might eventuate in relation to Power Supply.

The timetable adopted for the development of the VDP has clearly restricted the capacity for more appropriate levels of consultation and negotiation with specific communities along possible routes. The Inquiry considers that these factors may

provide the opportunity for additional one-off individual and community ameliorative measures to be developed in consultation with the affected parties when the Power Supply design is finalised.

(iv) Landscape Impacts

The landscape and visual assessment of the Powerline Reference Project were undertaken by ERM in Appendix 68 of the EES. ERM identified 7 landscape units along the length. For each unit landscape sensitivity was then assigned based on the viewer location, scenic quality and rarity. The units were rated as shown in Table 4 (from Table 7.1 in Appendix 68).

An assessment of visual impact was then undertaken from 22 public viewing points along the Reference Project route which included considering the landscape sensitivity, the viewer numbers and the distance to the power line. This assessment rated the visual impact nil, low, medium or high.

An assessment of residential properties near the proposed overhead powerline component was also made and this identified 27 houses within 200m and 174 houses within 700m. Of these 201 houses, 25 were selected for more detailed assessment, and a similar exercise undertaken as for the public viewing points.

Table 4: Landscape Units and Sensitivity

Landscape Unit	Sensitivity	Comments
Landscape Unit 1 – "Coastal Cliffs and Shoreline"	HIGH	Planning controls, strategies and guidelines all support the value of this coastal edge.
Landscape Unit 2 – "Scrubby and Low Coastal Heathland"	HIGH	This area of remnant vegetation appears intact in an area that has been largely cleared. Therefore, partly because of its rarity, there would be a high degree of sensitivity to development that would impact on the visitor experience to these areas.
Landscape Unit 3 – "Coastal Plains"	LOW	These areas contain many man-made modifications in a landscape that has been largely cleared and the vegetation that is evident is often planted wind breaks.
Landscape Unit 4 – "Moderate to Steeply Undulating Cleared Farmland"	MODERATE	The rolling hills of the hinterland are an attractive landscape type. They offer varying views back to the coast as well as views into the foothills of the Strezelecki Ranges.
Landscape Unit 5 – "Riverine"	HIGH to LOW	In some areas the Powlett River water course is greatly degraded, little more than a drain. However, as the river approaches the coast the riverine environment along the Powlett River is increasingly attractive. Coastal policies also highlight the sensitivity of the area where the Powlett River flows into the sea.
Landscape Unit 6 – "Townships"	MODERATE	Views from residential townships are always important so there is an increased sensitivity. However, urban areas are also able to accommodate change as that is a regular occurrence within this Landscape Unit.
Landscape Unit 7 – "Alluvial Plain"	LOW	These plains are located north of the foothills and to the Princes Highway. This area is an alluvial plain and is an area comprised of market gardens and open cleared farmland with many dams. From the air, this area is characterised by a rectilinear mosaic of paddocks.

The landscape analysis related to the overhead powerline attracted considerable negative sentiment in submissions. This covered many areas but key points were:

- Significant Landscape Overlays in both Cardinia Shire Council and Bass Coast Shire Council traversed by the overhead route were not considered;

- National Trust Classified Landscapes of Lang Lang, Bass River Valley, George River and Bass Hill were not considered;
- Different treatment of the coastal landscapes (via powerline undergrounding) compared to the rural landscapes of the Bass Valley and further north;
- The impact on individual properties from a landscape and visual impact would be severe from overhead powerlines; and
- Considerable scepticism that vegetative screening or other measures could be used to screen views of the line and towers.

Both Cardinia Shire and Bass Coast Shire drew attention to the lack of recognition of their planning controls for landscape protection. Cardinia Shire, whilst acknowledging that this was not a Panel hearing for an amendment or permit application noted:

> *If one accepts the basic and undeniable proposition that the NGC* (Panel note: Northerly Grid Connection) *will have a significant impact on the landscape within the Cardinia Shire, it becomes difficult to reconcile the proposal with the objectives of the relevant controls.*

Many submittors stressed that the undergrounding of power is the "*new*" way to provide the Power Supply that will, in the words of submittor Mr Hayes, "*not permanently scar the landscape"*. Mr Hayes expressed the views of many when remarking that the undergrounding of the Power Supply at the Woolamai end was a "*kick in the guts*" to those elsewhere along the route who would have to put up with the overhead line.

Another submittor, Ms Knox expressed the impact of the Powerline Reference Project thus:

> *When I heard about the proposed powerline through our farm in June this year I was dismayed and worried. What was to me a lovely peaceful haven was to be suddenly changed into an industrial landscape with pylons in full view of the house and my bedroom.*

In relation to the undergrounding proposed in the Powerline Reference Project between the Desalination Plant and the Woolamai Terminal Station, the Inquiry was not provided with information or presentations on the environmental basis for this approach beyond the reference to coastal landscape values. The Inquiry does not question the coastal landscape values of this section of the Powerline Reference Project, or that it is appropriate that it be underground. However, from the perspective of the Inquiry and interested parties, a clearer outline of the landscape

and environmental imperatives considered relevant for this section would have assisted an appreciation of the basis for adopting overhead power lines north of Woolamai.

The Inquiry considers the description of the landscape unit 4 of "*Moderate to steeply undulating cleared farmland*" is misleading. There is significant vegetation (remnant and exotic) along many parts of the route through the Bass Valley and particularly in the section between Woolamai and north of Loch. Although subjective, the Inquiry does not consider that the rating of this area as being of "*moderate*" landscape sensitivity is reasonable. The scenic value of this area and further north is recognised by the National Trust and local municipalities in their planning schemes.

The Inquiry considers the expressed solution of vegetation being used to screen towers, poles or lines is likely to be ineffectual. Many views occur in an arc rather than at a point, and to screen an arc may remove the view of the landscape that is sought in the first place. It is also unclear as to how long this screening may take to establish, or if it is at all possible with the vegetation in the area.

Mr Schutt, the landscape expert for Cardinia Shire also suggested that he was not convinced that such intermediate screening was likely to be effective.

The Inquiry acknowledges that the Powerline Reference Project overhead route is not a pristine natural environment. It has roads, clearings, small distributor powerlines and buildings that can be found in any rural environment. However, the placement of the 220 kV powerline through this environment, and particularly the area from Heath Hill to Woolamai, is a paradigm shift in the type of man-made visual impact on this very attractive landscape.

It is important to note that many submittors concerned about this issue were not opposed in principle to a Power Supply along the Powerline Reference Project, but were strongly supporting it be placed underground, particularly for visual and landscape reasons.

Given the acknowledged landscape values along the Powerline Reference Project route, the Inquiry considers the overhead alignment should avoid areas covered by Significant Landscape Overlays where possible.

(v) Social Impacts

The social impacts of the Powerline Reference Project were addressed in Technical Appendix 56 to the EES. Many submittors to the hearing stressed the detrimental

effect the Powerline Reference Project has had on their lives and many were extremely distressed in putting their views forward. Many highlighted the effect of the project on their families and livelihoods and many children attended the hearings. Mr Dunn expressed the view that the social impact is affecting the whole community along the Powerline Reference Project Route, not just those directly affected.

Submittors heavily criticised the consultation process and suggested that the Proponent's trust had been lost in this community. Submittors related how contractor appointments to visit their properties were not kept, or if contractors did arrive, they were not allowed to discuss the Project.

Social impacts for such large projects are not uncommon and often unavoidable, but appear to have been exacerbated for the VDP by the development timetable for the Project; meaning communication between the Proponent and the community has frequently been irregular and inconsistent, and often not delivered in a timely manner. This has led to considerable uncertainty within those communities along the Powerline Reference Project route.

(vi) Electro-Magnetic Fields

Many submittors along the proposed Powerline Reference Project route expressed deep concern about the health effects of electro-magnetic fields. These fields were another reason put forward by submittors as to why the Power Supply, if the Northerly Grid Connection is pursued, should be underground.

The Proponent called Mr Boyle to give evidence on this issue. He concluded that modelling of the maximum magnetic fields likely to be produced resulted in figures of 6% of the allowed standard for the 66 kV underground cables and 4% of the allowed standard for the 220 kV overhead line. Modelling for the edge of the easements showed a much lower reading again. For example, the 220 kV double circuit line under outage conditions (worst case) produced a modelled result of 3.76 micro Tesla at the edge of the easement compared to the NHMRC guideline of 100 micro Tesla.

Mr Boyle further submitted that the guidelines allowable figure is likely to increase to 300 micro Tesla under new draft ARPANSA guidelines for electro-magnetic fields.

Mr Morris provided a legal submission to the Inquiry that in essence, the Inquiry should be bound by the accepted standards on this issue and ensuring that they can be met, rather than a broader review of the issues as they apply to health effects.

The Inquiry concurs with this view. Whilst acknowledging that this is an issue of great concern to submittors, it notes that the electro-magnetic field readings at the power line easement will be an order of magnitude below that allowed in the accepted Australian standard provided by the NHMRC. The Inquiry therefore does not consider that electro-magnetic fields is an issue that gives rise to significant environmental effects.

(vii) Project Variations and Options

The Reference Project can be varied by moving the 40m wide easement within the 500m wide investigation corridor to avoid obstacles and where it is agreed with the landowner, SP Ausnet, the Project Company and the Minister for Planning and where the effect is "*immaterial*". The Terminal station may be relocated under similar circumstances.

As the detailed evaluation of the Reference Project route has not been undertaken, the Inquiry can not comment specifically on this issue. However, if the Reference Project is pursued for Power Supply, then some scope for "*micro-siting*" adjustment of the route would appear sensible.

Northerly 220 kV AC Underground

The EES (Appendix 81) suggests that a double circuit High Voltage AC (HVAC) underground link poses some technical and timing challenges but is possible. The EES suggests that to place HVAC underground could cost in the order of twice as much as the Reference Project. Difficulties include greater lead time in sourcing cables, the care needed in installing cables alongside the transfer pipeline, and other linear metallic infrastructure to avoid induction affects and corrosion.

The Inquiry considers that the HVAC underground option, depending on alignment and detailed environmental management, could provide an acceptable outcome for the Power Supply, subject to the costings and supply timetable being in line with the overall Project Objectives.

Northerly HVDC Underground

The EES (Chapter 8, Appendix 81) provides an outline of the issues around the use of High Voltage Direct Current (HVDC) to provide the 220kV link from the main grid to the Woolamai Terminal Station. In summary, the EES concludes that the Option is technically feasible and offers some advantages but may cost in the order

of 3 to 4 times the Powerline Reference Project to achieve the submitted level of required grid performance (N-1).

The Power Grid Option Group (PGOG) through Mr Fraser made a detailed submission, and strongly represented the Groups community members in support of underground HVDC. He presented further information at the hearing and suggested that:

- HVDC is fit for purpose in terms of reliability and suitability and is used in Australia and overseas;
- The EES itself highlights the suitability and reliability of the technology for this application;
- The Proponent has confused the application of underground HVAC and HVDC in several instances (eg cable heat generation and difficulty in laying cable);
- The Proponent is confusing older technologies with current HVDC (eg in relation to the need for cable pits);
- Co-location of the cable with the transfer pipeline has many advantages for some of the route;
- The Proponent has not kept abreast of technological advances in HVDC technology and has thus significantly overestimated the cost;
- Underground HVDC has significant social and environmental advantages; and
- HVDC equipment can be supplied and installed within the timeframe for the project.

The PGOG provided a breakdown of costs for underground HVDC and submitted that the cost, when taken over 30 years and including greenhouse emissions, would be in the order of $304 million. In this comparison, the PGOG calculated that the total cost of overhead power would be in the order of $973 million.

The PGOG submitted a variety of route alternatives for the HVDC underground option, with their preferred route being south from Pakenham utilising existing rail and road corridors and the proposed pipeline easement. They submitted that this would minimise impacts on private property.

In his closing submission, Mr Morris provided a detailed response in his Attachment 1. Essentially this was a rebuttal of the PGOG submission, and on costing (shown in Appendix 2 to Attachment 1) concluded that underground HVDC to N-1 standard would be in the order of $700 million dollars.

The Inquiry notes that EES Appendix 81, Appendix A (*Distribution System Planning Report 2008-2012*, page 21), suggests that the deterministic planning standard (N-1) is not used in Victoria in favour of a more flexible probabilistic model. The Inquiry is not clear if this has any effect on the approach used to designing the Power Supply options.

The Desalination Plant may need to have a high level of availability, but it is also a plant is likely to have some flexibility in operation. For example planned maintenance and downtime on the plant could be timed to coincide with planned maintenance on the underground line (or whichever power supply is eventually chosen). A recent example from Perth is where the Kwinana Desalination Plant closed down during the recent gas crisis in Western Australia to help conserve the general energy pool.

The Inquiry notes the widely variant cost estimates from the Proponent and the PGOG for underground HVDC Power Supply. It is difficult for the Inquiry to test the assumptions and costing of the Proponent and the PGOG in any detail, due to the conceptual nature of the options under discussion, and in the absence of a fully costed proposal. The Inquiry accepts in principle the advice of the Proponent that if underground HVDC was installed to the standards that they submitted are required, then there is likely to be a significant cost penalty for underground HVDC.

On the issue of installation, as an example of the discussion in the hearing, the Proponent was adamant that three separate cable trenches would be required for underground HVDC, while the PGOG suggested that three cables could be laid safely and reliably in one trench or via side by side cable laying (a photograph was provided to the Inquiry showing an installation of three cables side by side as an example). These two proposals could carry significantly different costs.

In relation to other effects of underground Power Supply (HVDC or HVAC) options, the Inquiry makes the following observations. An underground option is likely to be superior in terms of social, local economic, and landscape impact to an overhead powerline as once construction and rehabilitation are complete, there is little above ground evidence of the project.

However, its relative performance (to overhead supply) in terms of flora and fauna and cultural heritage effects is likely to be inferior due to the need for trenching and cable laying operations. Whilst areas of environmental sensitivity may be able to be avoided, the level of impact is likely to be much greater than an overhead line. Trenching in PCN and high value horticultural areas would also be difficult.

The environmental performance in terms of cultural heritage and flora and fauna is difficult to determine without further investigation, but the opportunities for alternative approaches within, for example, the 500m investigation corridor or to use techniques such as horizontal direct drilling (HDD) should be capable of managing impacts.

The Inquiry considers an underground option, whilst technically feasible, potentially carries higher financial costs and project delivery risks (timing) than the Powerline Reference Project.

The Longwarry Alternative Alignment

The Longwarry alternative alignment is shown in Figure 2-10 of Volume 5 of the EES. The alignment has been put forward to try and minimise impacts on the horticultural Special Use Zone 1 but it has not been assessed in any detail. Many submittors along the route were concerned about this alignment for similar reasons to those put forward along the Powerline Reference Project including:

- Loss of land value;
- Impacts on agricultural production;
- Visual amenity; and
- Electro-magnetic fields.

In addition submittors were concerned that given the lack of detail on the alignment, they could not determine if they might be affected or not, and this uncertainty added to their distress.

Baw Baw Shire Council submitted that there were flaws in the process as notice did not appear to have been given adequately in the area, with the result that many people only became aware of the alternative alignment near the end of the exhibition period.

Baw Baw Shire pointed to strategic planning work done in conjunction with DSE that identified the Longwarry area as a gateway to the Shire that should be protected for its landscape values.

Given the lack of detail in the EES around this alignment, the Inquiry is not in a position to make definitive statements about its environmental effects. However, part of the corridor does appear to coincide with the PCN control area and this should be avoided. The general observations regarding underground power discussed in the Powerline Reference Project above also apply.

Gas Fired Power Station

The option of a gas fired power station on site was proposed in the EES. The EES concluded that the gas fired option would be in the same vicinity cost-wise as the Powerline Reference Project and is technically feasible, but may have practical constraints related to procuring gas supply. These gas supply constraints are elaborated on in Document 26 tabled by the Proponent.

Either a seawater cooled Combined Cycle Gas Turbine or air cooled Reciprocating Engine plant could be used. The likely site would be approximately 500m south east of the Desalination Plant. The footprint of the gas fired power station would only be approximately 10% of the Desalination Plant itself but it would be higher.

The Inquiry has some concerns regarding an on-site gas fired power station and these primarily relate to:

- The scale of the plant. It could be considerably higher (with stack up to 42m AHD) than the Desalination Plant itself resulting in a higher level of visual impact; and
- It will contribute to the industrialisation of the plant site in a coastal environment with a low level of development.

The gas plant will certainly be visible, but arguably in the site context of the Desalination Plant itself, it should not make the overall level of visual impact that much more. Mr Wyatt (Appendix 34 of the EES) suggests that the impact is unlikely to be significant and can be mitigated with appropriate planting on site and along roadsides in the area as well as targeting specific dwellings.

The Desalination Plant and its surrounding elements will be the major change in the coastal landscape and will cause some loss of landscape values. The power station will be one more element and with good design, the additional impact should not be significant.

The gas fired power station may reduce the need for a northerly grid connection with consequent positive landscape impacts along the Powerline Reference Project but this may be needed for local supply augmentation in future anyway.

The other issue the Inquiry has considered is whether the gas fired power station might be sought in addition to a northerly grid connection. There may be some commercial advantage in having both a gas fired power station on site and a 220 kV

grid connection to enable excess power from the gas fired power station to be fed into the grid during price spikes in the electricity spot market.

On balance the Inquiry considers that the gas fired power station option could be technically feasible, and subject to detailed design and environmental management measures its environmental effects should be able to be managed.

Hybrid Options

The hybrid options A and B as presented have not been considered in detail in the EES and further information on design or possible environmental effects were not provided to the Inquiry during the hearings.

The Inquiry can not draw any conclusions in principle on the acceptability or otherwise of these options. If they are to be considered as serious options by the Project Company, then it is likely further assessment will be required, while noting the view presented in the closing submissions by the Proponent that "*... a fixed supply agreement may in all likelihood be reached with a remote renewable energy source*".

That being said, it is unlikely that the options would raise any insurmountable issues that could not be addressed with suitable environmental management measures.

7.3 Findings and Recommendations

Power supply is the Project component with the most significant Options. It will be up to Government and the potential bidders to take the EES, the Reference Project (and Variations and Options) into account, and balance them against the Project Objectives and Performance Requirements to determine the final power supply.

The Project Objectives (Table 1 of Volume 1 of the EES) cover time, scope, value for money, environmental and social objectives. Balancing these objectives to provide an appropriate Power Supply, whilst minimising impacts on the local and regional community, may prove to be one of the most challenging aspects of the project. In particular, balancing the timing and value for money objectives against the social and environmental objectives is an important consideration.

The Options (particularly underground along the Reference Project route or another route) have not been assessed in any detail in the EES, but may offer advantages in reducing social, visual and agricultural impacts. However, they may increase flora and fauna and cultural heritage impacts. Some uncertainties remain as to the cost and whether these Options can be achieved in the timelines set for the Project.

The Powerline Reference Project is technically achievable and it can be delivered within the timelines proposed for the Project. If chosen as the power supply option it may result in significant social, visual and local agricultural and economic effects along the route in the area from Woolamai to Tynong.

The Inquiry considers that these factors may drive the necessity for additional one-off individual and community ameliorative measures to be developed in consultation with the affected parties when the Power Supply design is finalised.

The Inquiry notes that resolution of the power supply is ongoing, and as Mr Morris advised throughout the hearing, the Government has yet to finalise its position on this issue. As noted in Document 26:

> *If all issues were overcome within time and budget constraints, the PPP Company and hence the Proponent could consider an underground power solution. However, it is not possible to determine whether these issues can be overcome, including the implications for the project objectives, until the commercial bidding process is further advanced. Therefore, the Proponent continues to seek the assessment of the Reference Project and Variations so that the objectives of the Government may be met. The Proponent contemplates that the Minister for Planning be involved should the commercial process make the underground potentially viable in meeting the VDP objectives.*

These comments were reiterated in the Proponent's closing submission by Mr Morris who said, "*Those issues may be addressed by the bidding process …*" and concluded "*… it will not be possible to determine whether these issues can be overcome until the commercial bidding process is further advanced*."

With respect to the environmental effects of the Power Supply, the Inquiry makes the following recommendations:

(i) Undertake further investigations on the Power Supply Reference Project, Variations and Options as part of the ongoing procurement process.

(ii) Development of the alignment for the Power Supply Reference Project (and any Options and Variations) should, where possible:

- Follow property and/or road reserve boundaries;
- Avoid areas of the Significant Landscape Overlay as designated in the Bass Coast and Cardinia Planning Schemes;
- Avoid the Special Use Zone 1 in the Cardinia Planning Scheme to protect

its horticultural values;

- Avoid the Potato Cyst Nematode control area; and
- Investigate the use of different forms of Powerline construction to minimise impacts (eg Poles if an overhead Option is pursued).

(iii) Consider additional mitigation measures to address visual, agricultural productivity, and social impacts for those affected by the power line alignment.

(iv) Amend the Performance Requirements as follows:

- Amend the second Performance Criteria in 5 (Agriculture) to read: "*Prepare appropriate rehabilitation plans with individual landholder input in order to restore land to similar existing conditions*".

8. OTHER ISSUES

This chapter provides an overview of other issues that have not been specifically addressed in the preceding chapters of the report under consideration as part of the proposal.

8.1 Works Approval Application

A Works Approval Application (WAA) is required to be obtained from the EPA under the *Environment Protection Act* 1970 where a Desalination Plant has a design capacity to process more than 1 ML per day of drinking water. The WAA is required prior to undertaking works or operations that would result in the likely discharge, deposition or emission of waste to the air, water or land segments of the environment (including groundwater and noise).

For the VDP, the Proponent has prepared Works Approval Application WA 64404 for the Reference Project and variations. The Proponent has sought approval prior to the identification of a Project Company and a detailed design. Accordingly, the assessment of the WAA is based on a concept design (Reference Project) with some Variations.

The issues relating to the Transfer Pipeline and any Power Transmission line to the proposed Desalination Plant do not require consideration under a works approval and hence the focus of the WAA is primarily the Desalination Plant itself and its associated wastes and discharges.

The *Environment Protection Act* and its subordinate legislation establish a statutory framework for assessing the environmental impacts of the VDP. Decision making under the Act is guided by the principles of environment protection. Key statutory policies applying to the consideration by the EPA of the VDP include:

- State Environment Protection Policy (Waters of Victoria);
- State Environment Protection Policy (Air Quality Management), including the Protocol for Environmental Management (PEM) Greenhouse Gas Emissions and Energy Efficiency in Industry (2002);
- State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No N-1;
- Industrial Waste Management Policy (Prescribed Industrial Waste) including the Environment Protection (Prescribed Waste) Regulations 1998; and
- Industrial Waste Management Policy (Waste Acid Sulfate Soils).

EPA is required to refer works approval applications to the Department of Human Services (DHS), the responsible authority under the *Planning and Environment Act* 1987, and to any protection agency EPA considered may be directly affected by the application. EPA is required to take into account any comments received from referral authorities such as DHS. The EPA attached four letters from referral agencies in its submission from the Department of Human Services (DHS), WorkSafe Victoria, Bass Coast Shire Council and the West Gippsland Catchment Management Authority (WGCMA).

(i) EPA's Role in the Inquiry Process

On the opening day of the hearings, the EPA made an opening statement where amongst other matters, observed that the EES Inquiry is to be regarded as their consultation process. It defined the EPA's role in the Inquiry process as:

- Assisting the Inquiry in clearly identifying how the proposal relates to the statutory framework for environmental protection in Victoria as set out in the EP Act and relevant subordinate legislation; and
- Ensuring the proper identification and assessment of key potential environmental impacts and issues relevant to the statutory framework administered by EPA.

In making its decision on the WAA, the EPA will consider relevant submissions on the EES, submissions made during the Inquiry, the Inquiry's report and the EES Assessment report from the Minister for Planning.

The EPA then further outlined its role and the key issues it believed existed relating to the WAA.

In its response to the submissions received by the Inquiry, the Proponent included a response to EPA's written submission. The Inquiry asked the EPA to comment on the Proponent's response, and this was made through a letter sent on 31 October from Mr McConnell and which was tabled Document No 135.

On the final day of hearings, the EPA had a right of reply, where it made some general comments on the Performance Requirements. The Inquiry considered it would be beneficial if the EPA expanded on these and make some specific comments on the relevant Performance Requirements. In a letter dated 13 November 2008, Mr McConnell provided further comments on the:

- Proponent's *Response to EPA Questions;*
- Relevant Performance Requirements;
- Statutory provisions for amendment of a Works Approval; and
- EPA's advice on the classification of waste.

The Inquiry provided an opportunity for the Proponent to respond to this further information by the following week, however no response was received.

(ii) Issues Relating to the WAA

The EPA's submission to the Inquiry identified a number of areas in which verification of the environmental performance of the final design will be required. Where these matters are not addressed in the Performance Requirements, EPA stated that they it may require "*such verification as a condition of the works approval or licence*".

The EPA submission states the Inquiry and EPA may need the following:

- Further information on the frequency, dilution, duration, severity and extent of low dilution events and their ecological significance to inform its decision-making;
- Further information on whether the diffuser can be designed and configured to improve plume dilution by minimising re-entrainment and reducing diffuser plume merging;
- A comparative assessment of the plume behaviour and ecological impact associated with the marine structure variations to provide them with confidence that the project variations could meet 30:1 dilution beyond the near-field;
- Additional information on the potential for large-scale gyre formation, its frequency of occurrence and its ecological significance to inform its decision-making; and
- A more comprehensive evaluation of the options to avoid or minimise waste generation, particularly in relation to the practicality of membrane pre-treatment, to inform its decision-making on waste management in relation to the VDP.

Low dilution events

The EPA noted that the modelling presented in the EES has been completed for a series of scenarios. The EPA commented that "*the frequency and occurrence for each of these scenarios and an understanding of their representativeness*" would assist the Inquiry

place the modelled results in context.

The Proponent noted in its response that the further mid and far field modelling which had been presented to the Inquiry had refined information on the frequency, duration and salinity range.

Diffuser design

As part of the near-field modelling, the EES compares several alternative diffuser designs and configurations. The EPA noted that modelling presented in the EES indicates that improved dilution could be achieved in the mid-field using alternate diffuser designs and spacing.

In its response, the Proponent commented that the private sector is expected to respond to the performance requirements for dilution with a range of different approaches.

Plume behaviour and ecological impact

The EPA was concerned that the EES make clear reference to performance criteria relevant to discharge structure design and performance, however, the Project does not indicate under what conditions these performance criteria can not be met.

Gyre formation

The EES has considered various modelling scenarios, some of which indicate the potential for large-scale gyre formation in periods of prolonged low current. Whilst the EES does not examine the likelihood of potential gyre formation, the EPA made the observation that its possible occurrence has the potential to disrupt the prevailing alongshore flows, acting as a barrier to the natural passage of plankton along this part of the coastline and have potential consequences to the benthic ecology of the area.

Waste

The EES identifies some wastes that are likely to be categorised as Prescribed Industrial Waste (PIW). The EPA stated that the Performance Requirements relating to waste management could benefit from reference to compliance with Industrial Waste Management Policy (Prescribed Industrial Waste). The EPA also noted that the principle of the waste hierarchy, and in particular the preference to minimise or avoid the generation of waste to the extent practicable, is reflected in the

performance criteria.

The WAA has not sought approval for the Options associated with the Desalination Plant nor the marine structures. Accordingly, as ocean disposal of pre-treatment wastes from the Desalination Plant is an Option which has not been fully assessed under the EES or considered under the WAA, then either an amended or new WAA will be required to consider this option as an inclusion in the VDP.

(iii) Other Issues

The EPA identified matters that the EPA will be considering at a later stage when detailed design is further developed, including:

- Energy use and greenhouse gas emissions;
- Environment and resource efficiency plans;
- Air quality;
- Noise impact; and
- Environment management.

In its submission, the EPA expressed concern over an apparent discrepancy in the expected Specific Energy Consumption (SEC) presented between the EES and the WAA. The statutory requirements in relation to energy efficiency reflect the need to demonstrate that the proposed works are consistent with best practice. The EPA stated that further information would be required to "*establish whether the performance requirement of an SEC of less than 4.6 kwh/kl is consistent with best practice*".

Department of Human Services

DHS stated that it had no objection based on public health grounds provided that the application complies with the statutory framework established under the *Environment Protection Act*. In relation to air quality, DHS recommend that if a concrete batching plant is required to be established on site, all emissions from it should comply with Environmental Guidelines for the Concrete Batching Industry (1995). DHS recommend that once the Desalination Plant has been commissioned, monitoring should be conducted to inform the need for abatement measures for emissions to air including odour and dust be undertaken if required.

In relation to noise, DHS recommend that once the Desalination Plant has been commissioned, noise assessment should be conducted to inform the need for any additional noise abatement measures.

The Inquiry considers that these are matters that would normally be covered by way of conditions of approval. The Inquiry considers that Performance Requirements 21.1 and 21.2 will be adequate to deal with dust issues while Performance Requirements 21.3 to 21.5 (with amendments suggested in this report) will be adequate to address issues associated with odour emissions.

WorkSafe Victoria

WorkSafe Victoria advised that it has not identified any concerns regarding the management of dangerous goods and has no objection to the grant of a WAA subject to conditions relating to:

- Compliance with Dangerous Goods legislation;
- Further opportunities to reduce risks associated with the holding and management of chlorine being assessed such as through the use of air scrubber technology; and
- Development of an emergency plan prepared in conjunction with emergency services and in relation to those incidents that have a potential for offsite consequences, the relevant local council.

The Inquiry considers that the above matters can either be assessed at the detailed design phase of the VDP or are adequately covered by Performance Requirements 4 in relation to Public Safety and 18 Hazardous Materials and Dangerous Goods.

With respect to the matter of parties involved in emergency plans, the Inquiry considers that there is some merit in seeking to involve local emergency services and the Bass Coast Shire Council and accordingly, considers that Performance Requirement 4.3 should be amended to include reference in preparing a Safety Management System in conjunction with emergency services and the Bass Coast Shire Council.

Bass Coast Shire Council

Bass Coast Shire Council indicated that they oppose the VDP. Council submitted to the Inquiry a detailed list of minimum requirements that in part have some relevance to matters under the WAA. However, the Inquiry has considered these matters as part of its considerations concerning the individual components of the VDP in this report.

West Gippsland Catchment Management Authority

The WGCMA indicated it's in principle support for the WAA and advised that it was satisfied that the performance criteria and requirements are appropriate to mitigate and manage risks associated with the VDP. The WGCMA outlined some specific comments in relation to the performance requirements with respect to surface water and groundwater which are addressed in Chapter 4 of this report.

(iv) Inquiry Findings

The Inquiry believes that the issues raised by the EPA can be accommodated in the Works Approval WA64404, and the detailed conclusions and recommendations made throughout this report should be taken into consideration by EPA when reviewing the final form of the WAA.

With regards to areas where the EPA believes further information is needed, it identified issues with regards to the marine environment and the operation of the outlet structure and waste management and the options for different waste treatments.

The Inquiry therefore considers that the contents of this report will assist to inform the EPA in its assessment of the WAA.

8.2 Greenhouse Gas Emissions

Technical Appendix 7 assesses greenhouse gas (GHG) emissions for construction and operation over 30 years for each component of the project using a grid-connected power supply. GHG from the construction of the project are estimated at 1,403,140 t CO_2-e.

Annual GHG emissions associated with the operation of the Project are estimated at 1,117,950 t CO_2-e equivalent (t CO_2-e). Of the annual emissions from operation, approximately 1,047,700 t CO_2-e arise from the electricity required to power the Desalination Plant and Transfer Pipeline.

The remaining 70,250 t CO_2-e not associated with the electricity supply is attributable to estimates of waste decomposition in landfill, transport, chemical deliveries and embodied emissions.

Emissions arising from the construction of the Desalination Project constitute approximately 4% of total emissions over a 30 year project life. The main sources of

construction emissions are from emissions embodied in the construction materials followed by power supply required for the operation of construction equipment, notably tunnel boring machines.

The Government has made the following commitment on Page 13 of Volume 1 of the EES:

> *… the State has made a commitment that 100 per cent of the electricity used in operating both the Desalination Plant and the Transfer Pipeline is to be offset by the purchase of renewable energy credits (*Inquiry note: this should be 'certificates'*) from generation sources, commissioned after 1 January 2007. This is in addition to current renewable energy targets in the Victorian Renewable Energy Act 2006.*

This will mean that the amount of new renewable energy that is transferred to the grid will be effectively the same as the amount of electricity that is taken from the grid for the operation of the Plant and the Transfer Pipeline.

Mr Wakeham from Environment Victoria, amongst other submittors criticised this approach. He suggested that buying Renewable Energy Certificates (RECs) to offset the Desalination Plant energy use was flawed for the following reasons:

- It will be difficult to track exactly how the offset is being achieved;
- There is concern about 'double dipping', for example buying RECs interstate that are already contributing to that States renewable energy targets; and
- Whether the RECs are additional (as per the Government commitment) to the Victorian VRET scheme or Commonwealth MRET scheme.

To avoid these risks, Environment Victoria suggested that the Desalination Plant should be required to purchase 100% accredited green power directly from the grid and then surrender the RECs for this energy.

The Inquiry considers that in principle, the State commitment is a significant one that goes beyond the normal requirements for a major new industrial plant. Whilst the Inquiry notes the suggestion of Environment Victoria that green power should be purchased directly to power the plant, it does not feel it appropriate to 'extend' the commitment made by the State, although this is an outcome that has considerable merit and may be pursued if market conditions dictate.

There is benefit perhaps in the State clarifying its existing commitment to avoid confusion and the possibility of "*double dipping*" with Renewable Energy Certificates.

8.3 Solid and Liquid Waste Management

Technical Appendix 8 identifies waste streams that will be generated from construction and operation of the Project. It further assesses options of waste management against the EPA's hierarchy of waste management.

Construction wastes will be generated through bulk earth works and infrastructure development.

The construction of the Transfer Pipeline and Power Supply grid connection will generate construction spoil from excavations. The options available for managing this spoil will vary depending on the characteristics of the spoil. Specific volumes will not be known until the exact location of works has been identified.

Construction of the Treatment Plant and intake structure will generate construction spoil which is generally proposed to be used to construct screening bunds around the treatment plant.

Plant operation will generate wastes specific to the desalination process, including seawater screenings, pre-treatment back wash sludge, membrane cleaning waste, lime sludge and discarded equipment (filter media, cartridge filter elements and RO membranes). Some wastes will be produced continuously while others will be intermittent. Waste will also be generated from the general operation and maintenance of the plant, office, workshops, laboratories, chemical stores, gardening and landscaping.

The construction of the Plant is subject to an EPA Works approval and the operation will require an EPA licence. Issues related to the offsite disposal of wastes from the plant will be addressed in the various EPA requirements.

Performance Requirements call for a long term waste minimisation plan for the construction and operation phases of the project consistent with the EPA waste hierarchy, including proper assessment of reuse and recycling. A strategy for dealing with waste streams is likely to involve a combination of the identified options. Specific legislation and guidelines govern disposal of many wastes, such as acid sulfate soils and contaminated soils.

This strategy should also address plant and/or pipeline upset conditions during emergency shutdown and start-up. Large quantities of water would potentially discharge to the marine and land environments.

Following a review of the waste streams in accordance with the EPA waste hierarchy

the Reference Project has identified the following options for waste management during the Desalination Plant operation phase.

Table 5: Options for Waste Management

Waste identified	Reference Project Management option
Seawater screenings	Landfill
Pre-treatment back wash sludge	Licensed landfill
Membrane cleaning waste	Discharge to ocean
Lime sludge	Landfill
Discarded filters, membranes, etc	Landfill
Filter Media	Landfill
General operation and maintenance wastes	Recycle and landfill as appropriate

While the Proponent has investigated alternative treatment for the wastes from the Plant it has identified that the most likely initial handling method will be by disposal to landfill. However the Proponent has identified opportunities for improved waste management which could be investigated by the Project Company as part of detailed design and during the operational phase.

Submittors were concerned that pre-treatment wastes from the plant may be discharged to ocean. Mr Koller for the Proponent and Mr McConnell for the EPA referred to other plants in Australia as current best practice examples which all dispose of dewatered wastes to landfill. The IEG advised that they *"…would not support sludge disposal to sea as this is not world's best practice for desalination plant operation"* Document 182).

There was some discussion by Mr Koller whether the wastes from the pre-treatment process would be classified as a prescribed industrial waste. Mr McConnell confirmed that the EPA is currently reviewing the regulatory framework for industrial wastes, however he advised that as the final characteristics of the various wastes streams were not finalised it was not possible for the EPA to determine the classification. Furthermore, Mr McConnell did note that *"Based on the limited information available from DSE's testing of waste from the Kwinana Desalination Plant, EPA concurs with the DSE's assessment that this is a low risk waste i.e. based on the information currently available the waste is likely to be classified as a commercial/industrial waste or as a Category C (ie. low hazard) prescribed industrial waste (under the existing regulatory framework for prescribed wastes)".*

In relation to spoil wastes from the Transfer Pipeline and Power Supply, submittors raised the issue of off site disposal of spoil from regions affected by various soil diseases such as the Potato Cyst Nematode. Under the regulations soil from declared areas is not allowed to be removed from site. Mr Morris advised that soil which is cleaned from potatoes taken from affected areas is currently disposed to landfill and identified that *"The most likely solution is to remove the spoil to a registered landfill site. Involvement of the Plant Standards Group within the DPI is required to interpret the regulation"*.

In general, the Inquiry considers that waste management is adequately addressed by the Performance Requirements and the EPA waste management regulations and guidelines. The Inquiry supports the Reference Project practice for the disposal of pre treatment wastes to landfill rather than to ocean. This is reflected in the approach taken by other Desalination Plants elsewhere in Australia and overseas.

The Inquiry notes that the final characteristics and volumes of wastes from the operation of the Plant cannot be accurately predicted until the Project Company finalises the process design. However the Inquiry notes that the volumes of some streams will be large and will require daily removal to landfill. It will therefore be important for the Project Company to develop waste handling and disposal methods that minimise the impact on the environment and minimise greenhouse gas production.

Most, if not all of the spoil from the construction of the intake tunnels can be reused for the construction of visual screening bunds at the Plant. However reuse/disposal options for the large volume (up to 600,000m^3) of clean spoil from the Transfer Pipeline has not been clearly identified. It will be necessary for the Project Company to establish a number of suitable disposal sites in the general region along the pipeline route prior to the commencement of construction.

The safe handling and disposal of spoil from disease affected areas along the pipe route should be safely managed using existing protocols required in the Performance Requirements and with assistance and advice from the Department of Primary Industries.

The Inquiry is concerned that the Proponents analysis of potential landfills for the various waste streams did not clearly identify which landfills have suitable capacity for the Reference Project proposals. It will be necessary for the Project Company to characterise the various waste streams with the EPA and to identify and set in place long term contracts with appropriate landfills licensed to take each stream.

The Inquiry considers that Project Company focus on pre-treatment processes which minimise the production of large quantities of greenhouse gases from the treatment and disposal of the waste streams. This is supported in part by Performance Requirements 11.3 and 25.3.

8.4 Surface Water and Groundwaters

Surface water and ground water have been separately reported in the EES for the Plant, Transfer Pipeline and Northern Power Route.

The Plant site is situated behind a ridge of sand dunes at the back of Williamsons Beach with the site draining away from the dunes to an unnamed tributary of the Powlett River. This tributary drains the site, the adjacent windfarm and parts of Wonthaggi and comprises mostly grassed waterway. The tributary enters the Powlett River in an estuarine reach that is generally subject to level control by a sandbar across the mouth of the river. The sand bar is naturally breached in periods of high flows (generally late autumn and early spring) and artificially breached by the West Gippsland CMA to maintain water quality in the estuary. The Proponent has undertaken modelling to confirm the minimum site height required to avoid a 1:100 year flood and to avoid the impacts of climate change.

The Transfer Pipeline corridor crosses seven main catchments, all except the Powlett River draining into Western Port. The pipeline will cross 100 waterways, which have been significantly altered as a result of land clearance and reclamation. Technical Appendix 63 assessed the impacts associated with erosion/sedimentation and flooding for each waterway. The Northern Power Route is further inland from the Transfer Pipeline and will have negligible impact on surface water due to the construction of pylons.

Ground water investigations for the EES were primarily desktop reviews to identify approximate ground water depths and nearby uses. The Proponent is currently undertaking additional investigation into ground water at the Plant site that was identified in the EES. It is understood that this information will be provided to the Project Company. The key potential impacts on ground water from the Transfer Pipeline relate to interruption of ground water supplies during construction. The ground water uses near the pipeline are primarily for stock and domestic purposes, however there is considerable irrigation from ground water in the northern section of the pipeline.

Both corridors and the site are included in DSE declared Water Supply Protection Areas. This will require the Project Company to seek approval for the extraction of

any ground water during construction, including dewatering activities.

(i) Groundwater Impacts

Appendix 40 identifies that the existing groundwater table at the Plant site is approximately 6m below ground level and marginally above sea level. The Proponent has advised that dewatering will be required throughout the construction phase of the intake structure and the Plant. Further the Proponent has advised that detailed ground water investigations are required to enable the development of appropriate mitigation measures and improve design certainty. The Inquiry noted that these investigations are currently being undertaken.

Submittors raised two concerns in relation to groundwater issues at the Plant site. The potential presence of Potential Acid Sulfate Soils in old river courses under the site, and the resultant impacts on water quality in the Powlett River if dewatering causes Acid Sulfate Soil conditions, was raised by Ms Walker and is discussed further in the Transfer Pipeline Chapter. Submittors also raised concerns in relation to potential saline water intrusion into the ground water and resulting long term impacts on the water quality.

The Inquiry notes that ground water is currently utilised by nearby properties for stock and domestic purposes.

The West Gippsland CMA identified issues regarding groundwater and sought to make minor amendments to Performance Requirements 13 and 14 to ensure that interactions between groundwater and any connected surface waterways are properly managed. Accordingly, the Inquiry considers that:

- Performance Criteria 13 should be amended to include minimising the impacts on the interaction between groundwater and connected surface waterways and that Performance Requirement 13.2 (d) should be amended to complement this intent.
- Performance Requirement 13.4 should be amended to monitor not only groundwater quality but levels as well.
- Performance Requirement 14.3 should be amended to also include "*consultation with the West Gippsland CMA*."

The Inquiry is satisfied that as detailed ground water investigations are currently being undertaken, and the Project Company will be required to obtain authority approval prior to undertaking any ground water extraction or dewatering, the impacts of construction of the Plant on the local ground water will be adequately

addressed. Groundwater is widely used throughout the Transfer Pipeline and Power supply corridors for stock and domestic use. Irrigation use is widespread in the Koo Wee Rup Special Use Zone.

Groundwater levels are generally less than 5m below the natural surface, but marginally above sea level and are described in Appendix 62 (Section 3.4), as: "*Unconfined aquifers are expected along much of the Transfer Pipeline route. Varying confinement conditions could also be expected at river crossings where pipeline construction may extend to greater depths, and thus intersect deeper aquifers.*"

The impacts of construction of both the Transfer Pipeline and Northern Power line on groundwater quality and availability were assessed by GHD in Appendices 62 and 74. These studies identified the impacts on groundwater as Low and concluded that mitigation measures are available to reduce and significant impacts during construction and operation of the pipeline and noted that the foundations of the pylons are comparatively shallow and therefore unlikely to impact on groundwater.

Shallow ground water quality, flow direction and interaction are poorly understood and has been noted by the Proponent as requiring sampling and testing. Tidal impacts on ground water are also noted as requiring investigation in coastal sections.

The Proponent assessed issues associated with dewatering for the Transfer Pipeline as Medium for impacts on flora and fauna, other ground water users and dislocation of ground water flows.

(ii) Surface Water Impacts

Technical Appendix 43 identified that the main potential impact from the Plant site runoff related to sediment during the construction phase. However if appropriate mitigation measures were in place, such as sediment basins and artificial wetlands prior to discharge into the downstream environment. The Inquiry agrees with the Proponents' conclusion that the Plant should have negligible impact on the pollutant loads in the Powlett River system.

The EES notes that the waterways affected by the Transfer Pipeline are generally ranked as Poor or Moderate in terms of river health and most of the major waterways have nutrient levels above the SEPP guidelines. The exception is the Bass River which is in Moderate to Good condition. It is noted that the Bunyip River exceeds SEPP guidelines for suspended solids and contributes significant amounts of sediment to Western Port. The Powlett River downstream of Wonthaggi has high readings of nutrients, turbidity and suspended solids.

The Inquiry notes that due to the already degraded condition of the majority of waterways and the fact that they generally discharge into the Western Port Ramsar site or locally valuable waterways, the Project Company will have to undertake careful management of drainage and storm water during construction for the Plant site, the whole of the Transfer Pipeline route and the areas around the bases of the pylons along the Power Transmission route.

Further, additional site specific assessment will need to be undertaken for each waterway crossing, once the exact alignment of the pipeline is known. Permits for works on waterways will need to be obtained, from the relevant Catchment Management Authorities and Melbourne Water. The same issues and impacts will apply to any alignments along the corridors for gas pipelines in respect to the onsite gas fired power station option.

(iii) Flooding

Risk of inundation due to flooding at the Plant site was raised as a potential issue. Technical Appendix 43 analysed existing conditions and considered climate change scenarios in the assessment of potential impacts from flooding. It concluded that with an appropriate set back from waterways, well designed storm water management systems and a suitable elevation of the above ground works, the proposed plant would have little impact on flood behaviour and water quality of the Powlett River and would not be affected by predicted climate change sea levels.

Issues raised at the hearings related primarily to potential impacts on the flora and fauna in and around the mouth of the Powlett River. The Inquiry accepts that with appropriate design and construction management the impact of the Plant on flooding in the lower reaches of the Powlett River will be negligible.

The Inquiry supports the Proponent's identification of the requirement to undertake investigations into the environmental impacts of dewatering during construction. Further, it supports the Proponent's requirement for the following additional field investigations to be undertaken for both the Transfer Pipeline and the Northern Power Route (as discussed in Chapter 6 of this report).

In response to the issues raised above in relation to surface water and groundwater, the Inquiry makes the following recommendations:

(i) Amend the Performance Requirements as follows:

- Add a new Objective in 12 (Flooding Control): "*Maintain ecological processes dependent on periodic flooding during project design, construction and operation".*
- Add a new point in Performance Requirement 12.4 as follows: *"(c) Maintain flood dependent ecosystems".*
- Amend the second Performance Criteria 13 to read: *"Minimise impacts on the interaction between groundwater and flora and fauna habitats, including connected surface waterways, wetlands and dune vegetation".*
- Amend Performance Requirement 13.2 (d) to read: *"Limiting any impact or diminution on the existing flow regime in nearby connected waterways, wetlands or on the use of groundwater as a resource arising out of any interception and/or drainage of groundwater".*
- Amend Performance Requirement 13.4 to read: *"Monitor groundwater quality and levels during the Project Term in accordance with the requirements of the EPA and/or relevant Authorities".*
- Amend Performance Requirement 14.3 to read: *"Establish a surface water quality monitoring (including reporting) program for the Powlett River, in the vicinity of the Desalination Plant Site in consultation with the EPA and West Gippsland CMA".*

8.5 Traffic and Access

While traffic issues are discussed in Chapter 4 as they relate to the Desalination Plant, Technical Appendix 53 outlines the potential traffic impacts during the construction phase and operational life of the Reference Project.

During the construction phases, the Project will result in noticeable impacts on traffic, not only in the vicinity of the Plant, but also along both the Transfer Pipeline and the northern power route. Traffic numbers have been estimated by the Proponent as 150 vehicle movements per day for the Plant (plus up to 900 light vehicle movement for workers and contractors), similar numbers at each of the Transfer Pipeline sites and 300 movements per day for the length of the Northern Power Route. As construction levels will rise to a peak and then fall away over a two year period, the length of time when amenity is reduced may be short and hence not considered onerous.

The Lower Powlett River Road provides the primary access to the Plant site and hence will experience a high proportion of the construction traffic. Improvements to optimise intersection amenity and safety have been identified.

During the operational phase the Plant will continue to impact on traffic but at a

reduced rate and in a more confined area near the Plant.

The impact of the Desalination Plant and the Transfer Pipeline on existing services is described in Technical Appendix 57. There are no significant constructability or operational issues that would impact on existing services, but clearances to existing services must comply with requirements of the service providers.

The Proponent has undertaken detailed analysis of current traffic volumes and road capacities for the Plant and more generally along the Transfer Pipeline and the Northern Power Route (also for the gas plant site). These included crash analyses, road capacity analysis, bicycle path usage and identified additional roadwork requirements. The Proponent has provided an estimate of the parking requirements at the Plant site.

Technical Appendix 53 Section 11 addresses mitigation measures for each of the elements of the Project. The Inquiry notes that the Project Company will be required to undertake a more detailed analysis as part of the Traffic Management Strategy development. The Inquiry further notes that a number of recommendations and observations included in this section have not been reflected in the Performance Requirements.

The Inquiry heard from many submittors in relation to road safety concerns during construction. These relate to issues of the increased number of heavy and light vehicle movements and the lack of local knowledge of the road networks resulting in increased safety risks for school buses, milk tankers, children walking, riding and on horses and for the movement of farm machinery. Bass Coast Shire provided a number of documents and submissions that included comments in relation to traffic concerns and it recommended additional Performance Requirements. In particular Bass Coast Shire raised concerns in relation to potential road pavement damage due to the increased heavy traffic.

The Inquiry makes the following recommendation in relation to traffic and access:

- Add a new Performance Requirement 24.8: "*Undertake pre and post road condition surveys on identified construction routes (from the Traffic Management Strategy) and undertake restitution measures as necessary in consultation with VicRoads or the Local Government Authority (as appropriate)*".

PART 3: RESPONSE TO TERMS OF REFERENCE AND RECOMMENDATIONS

9. ENVIRONMENTAL EFFECTS AND ALIGNMENTS

Section 3 of the Terms of Reference states that:

> ***The principal objectives of the Inquiry are to establish a sound understanding of the environmental effects of the project and to advise on the best approach to reduce or otherwise manage these effects.***

Under these objectives the Terms of Reference require the Inquiry to address six matters (tasks) only. The first three tasks are addressed in this chapter and the final three in subsequent chapters.

In responding to these tasks, the Inquiry relies on the detail presented in the main Project component chapters of this report and these are referenced where appropriate.

9.1 Construction and Operation Effects of VDP

The first matter the Inquiry is required to report on is:

> ***The likely environmental effects of the construction and operation of the components of the project, including the Desalination Plant at the site west of Wonthaggi, the associated marine structures, the water Transfer Pipeline and the power supply infrastructure, as well as relevant variations identified in the EES. To the extent practicable, the likely environmental effects of project options identified in the EES should also be addressed.***

The Inquiry responds to this task based on the four main project components. This section lists the likely effects. The Inquiry's response to management of these effects is addressed in Section 9.3 in response to Task 3.

(i) Desalination Plant

Chapter 4 of this report addresses the range of likely environmental effects of the Desalination Plant itself in some detail. The key likely effects are listed below for construction and operation.

Construction

- Traffic;
- Noise, dust and vibration;
- Social and economic impacts;
- Waste management;
- Powlett River floodplain and acid sulfate soils;
- Flora and fauna; and
- Lighting.

Operation

- Visual and landscape effects;
- Noise;
- Social and economic impacts;
- Waste management; and
- Greenhouse gas emissions.

Variations and Options

Variations to the Desalination Plant Reference Project included two possible modifications to the water treatment process. These are dissolved air flotation to further pre-treat intake water prior to filtration; and the use of membrane filtration pre-treatment rather than conventional media filtration. These variations would have some effect on the waste stream generated from the plant and may have beneficial effects in reducing chemical pre-treatment.

(ii) Marine Structures

Chapter 5 of this report addresses the likely environmental effects of the Marine Structures. The key likely effects are listed below for construction and operation.

Construction

- Physical disturbance of seabed from tunnel risers and SEPs;
- Underwater noise;
- Airborne noise;
- Marine pests introduction; and
- Lighting

Operation

- Marine life impingement and entrainment;
- Ecological effects of brine discharge and process chemicals.

Variations and Options

Variations for the Marine Structures include different tunnel arrangements (multiple smaller tunnels) for intake and outlets; finer screens at intakes to prevent entrainment of marine organisms; alternative diffuser arrangements; and different diffuser locations. The likely environmental effects of variations were not specifically assessed but subject to further detailed design and EPA requirements may be suitable project variations.

Options for the Marine Structures included indirect seabed intake; combination of tunnelled/trenched intake/outlet seabed conduits; and ocean disposal of pre-treatment wastes. The likely effects of these options would include greater seabed disturbance.

Ocean disposal of pre-treatment waste was considered as an option in the EES. The likely effects of this are discussed in Chapters 5 and may include water discoloration at the discharge point.

(iii) Water Transfer Pipeline

Chapter 6 of this report considers the likely environmental effects from the Water Transfer Pipeline. The key likely effects are listed below for construction and operation.

Construction

- Potential acid sulfate soils;
- Groundwater depletion and flow disruption and groundwater dependent ecosystems;
- Alteration to surface water flow and sedimentation;
- Soil and spoil management and rehabilitation;
- Flora and fauna;
- Traffic;
- Noise and vibration
- Socio-economic and impact on agriculture; and
- Western Port Ramsar site.

Operation

- Noise (Booster Pump Station); and
- Scour valves and release management.

Variations and Options

The Transfer Pipeline may be varied within the investigation corridor to avoid environmental assets or take account of landholder requests. The likely effects of these will be determined by the specific alignment chosen but should be similar to those chosen for the reference project route in the EES.

Three options were shown in the EES including a different pipeline corridor alignment; a different location for the Booster Pump Station; and incorporating a dosing facility at the Booster Pump Station. Whilst the likely effects of these options were not considered in the EES in any detail, the Inquiry discusses the merits of moving the Booster Pump Station in Chapter 6.

(iv) Power Supply Infrastructure

Chapter 7 of this report addresses the range of likely environmental effects of the Power Supply. The main likely environmental effects are listed below for construction and operation of the underground Plant to Woolamai link and above ground 220 kV powerline.

Construction

- Alteration to surface water flow and sedimentation (underground component);
- Soil and spoil management and rehabilitation (underground component and tower footings);
- Cultural heritage (underground component and tower footings);
- Flora and fauna;
- Traffic;
- Noise and vibration; and
- Socio-economic and impact on agriculture.

Operation

- Socio-economic and impact on agriculture; and
- Visual amenity and landscape.

Variations and Options

The Power Supply variations included varying the easement within the wider investigation corridor to protect environmental assets or respond to particular landholder issues. The likely environmental effect of these variations will be similar as for the Reference Project.

A number of options were considered in the EES being a Northerly 220 kV AC Underground option; a Northerly 220 kV DC Underground option; a Northerly Alternative Alignment towards Longwarry; a Gas Fired Power Station Option; and two Hybrid Options. All of the options may be technically feasible but some may have limitations related to cost, timing or commercial issues and would require further assessment of likely environmental effects if selected by the Project Company.

(v) Inquiry Response to Task

The Inquiry considers that from the EES, submissions, expert reports and the public hearing that it has identified the likely environmental effects of the Victorian Desalination Project Reference Project. Likely environmental effects of variations and options, to the extent possible, have also been identified in the relevant chapters.

9.2 Transfer Pipeline and Power Supply Alignment

The second matter the Inquiry is to provide information and advice on is:

> ***Whether the proposed alignments of the water Transfer Pipeline and the power supply infrastructure are generally suitable or should be adjusted, in light of their likely environmental effects.***

(i) Water Transfer Pipeline

The Water Transfer Pipeline is discussed in Chapter 6 and the likely environmental effects of the Reference Project alignment considered in detail there. The Inquiry considers that, subject to detailed design and appropriate construction management the proposed Transfer Pipeline alignment is generally suitable.

Within this broad conclusion the Inquiry considers there may be opportunities during detailed design to work with landholders to minimise impacts on agricultural operations and to determine the least intrusive alignment at the 'micro' level (for example along property boundaries rather than across paddocks).

One area where the Inquiry considers further attention should be given is the Koo Wee Rup Horticulture Special Use Zone (SUZ). The alignment through this area should be modified to avoid the SUZ where possible. Where avoidance is not possible, particular attention should be paid to protocols to protect the high value agricultural land present.

(ii) Power Supply Infrastructure

The Power Supply Infrastructure is discussed in Chapter 7 of this report. The Reference Project includes the underground 66 kV link from the Desalination Plant to the proposed Woolamai Terminal Station. This alignment of the underground section shadows the Water Transfer Pipeline and the Inquiry considers that subject to detailed design and appropriate environmental management measures, this is a suitable alignment.

The 220 kV overhead component of the Power Supply Reference Project runs from the Woolamai Terminal Station to the Tynong Terminal Station via the Bass Valley, Loch, Heath Hill and the intensive agricultural area from Lang Lang East north to Tynong.

The Inquiry notes that efforts have been made to place the overhead line in the bottom of the Bass Valley and otherwise low in the landscape where possible. The Inquiry has recommended that where possible the power supply alignment avoid the Significant Landscape Overlay areas and the horticultural Special Use Zone.

9.3 Management of Environmental Effects

The third matter the Inquiry is required to provide advice on is:

> ***Whether the environmental effects of the project are capable of being effectively managed, without significant adverse consequences - particularly in the long-term – either on the basis of the proposed Performance Requirements (subject to necessary refinement) or other environmental management measures.***

With an emphasis on long term impacts and in addressing this Terms of Reference, the Proponent identified four relevant matters for consideration as follows:

- Larval entrainment;
- Impacts of the saline concentrate discharge;
- Visual impact of the Desalination Plant in the coastal landscape; and
- Visual impact of the overhead powerline in the rural landscape.

The Inquiry agrees that these issues may have long term impacts and has also added for consideration below the impact on agriculture.

(i) Larval Entrainment

The Reference Project contains a number of mitigating features to minimise the entrainment of larvae of marine species (location of the intake in the water column, location of the intake off high relief reef). The impact on local short duration larval stage species is one area of remaining uncertainty that requires further investigation. Whilst the overall level of impact is likely to be low, and localised, further investigation and monitoring of this aspect of the project is recommended in modified performance criteria.

(ii) Saline Concentrate Discharge

The final mixing zone for the saline concentrate discharge will be set by the EPA via the works approval and licence for the Desalination Plant. Further toxicity testing and water quality assessments will be undertaken during project development.

The Inquiry is satisfied that, subject to ongoing assessment and monitoring, the long term impact of the saline concentrate discharge on the local marine environment will not be significant. There may be local community composition changes from increases in salinity within the mixing zone but the long term impacts should be within a relatively small spatial area, and as advised by the Proponent "*will not be a dead zone*." There will be no material impairment of recreational values in the area.

(iii) Visual Impacts

The visual impact of the Desalination Plant will be significant in this coastal environment. There are however, opportunities for land shaping, plant design and plant colouring to reduce visual impact and over time landscaping should reduce this even further.

The overhead power line component of the Power Supply Reference Project will be a significant visual effect on the residents and landscapes of the Bass Valley and further north. Some mitigation may be possible by careful micro-siting of the alignment, landscaping in some cases and the use of poles rather than lattice towers where appropriate.

It is likely that the landscape and visual impacts of the overhead power line on some residents will not be able to be mitigated.

(iv) Impact on Agriculture

Long term environmental effects may occur on agricultural production if the Transfer Pipeline and underground Power Supply components are not effectively rehabilitated to replace soil horizons and natural drainage.

If the overhead power line component of the Power Supply causes a shift in production from irrigation to dryland farming, then this may also be a long term impact from the project.

The Inquiry considers that these issues can be minimised during the detailed design and construction process for the Victorian Desalination Project, but will require

careful management and the application of strict environmental management measures.

(v) Overall Inquiry Comment

The Inquiry considers that in general the environmental effects of the Project can be managed through application of the Performance Requirements, the proposed Environmental Management Framework (discussed in the next Chapter) and the normal statutory approvals required (for example the Works Approval).

The Inquiry has made a number of recommendations to strengthen the Performance Requirements and these are mostly contained in Chapters 4 - 7 and consolidated in Chapter 13.

10. ENVIRONMENTAL MANAGEMENT FRAMEWORK

The fourth task of the Terms of Reference is to report on:

> ***Recommendations regarding the approach of the environmental management framework presented in the EES, including any appropriate strengthening of this framework, to provide a high level of confidence that implementation of the project will achieve acceptable environmental outcomes.***

The fifth task of the Terms of Reference is to report on:

> ***In light of the preceding matter, any specific recommendations regarding the proposed Performance Requirements, including for aspects relating to siting, design, construction techniques, waste production, energy efficiency and environmental mitigation, that would be appropriate to ensure acceptable environmental outcomes consistent with applicable legislation, policy and industry best practice.***

These two tasks of the Terms of Reference have been considered together in this chapter.

The Environmental Management Framework (EMF) set out in the EES Volume 1 Chapter presents the broad approach and accountabilities for the management of the environmental aspects of the VDP for the design, construction and operation phase of the Project. The VDP will the first seawater desalination project in Victoria. Due to the procurement process being adopted for its construction and operation, a robust and transparent EMF will be important in providing the level of quality assurance expected by many major stakeholders.

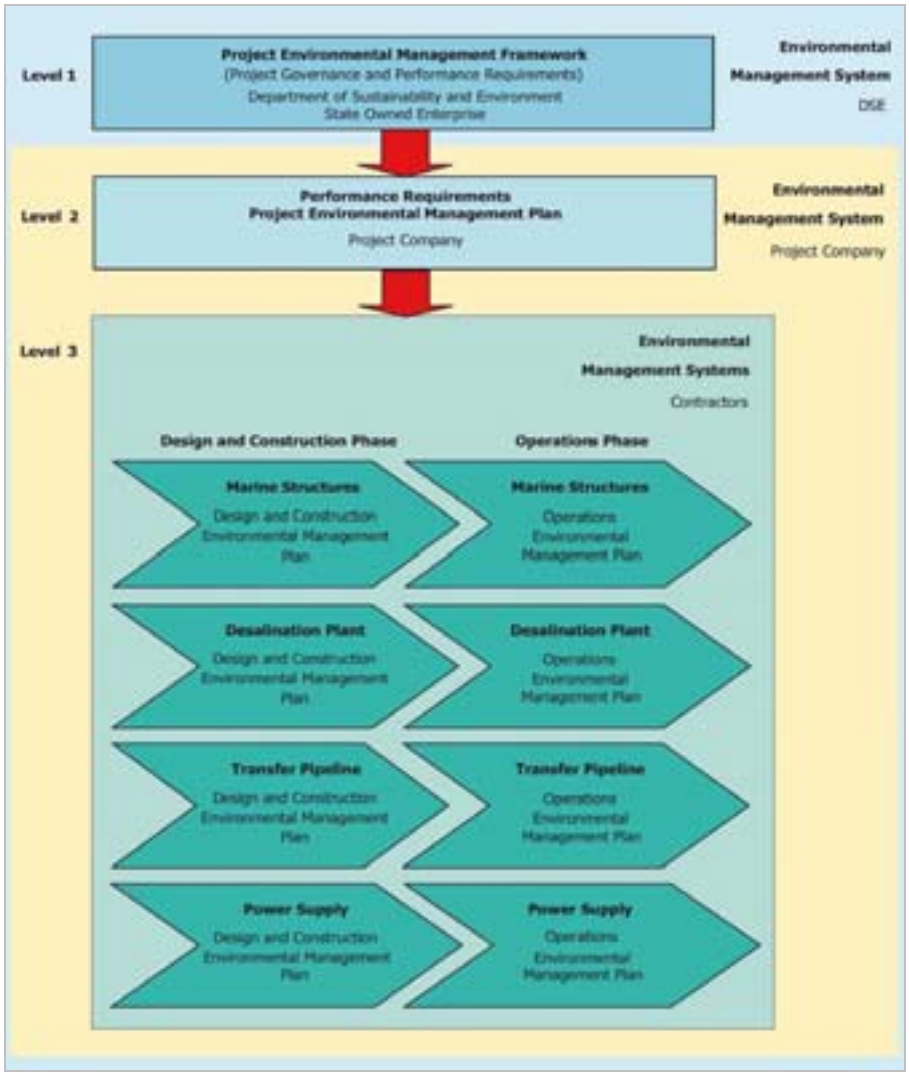
In addition, to the information presented in the EES, the Proponent tabled a number of documents which (i) outlined additional information on the proposed EMF; (ii) addressed, in particular, the role of Performance Requirements in the overall EMF; and (iii) provided more detail on the approach and requirements associated with the delivery of the VDP as a Public Private Partnership (PPP). The main documents were:

- Document 146 - response to Question on Notice concerning Performance Requirements; and
- Document 180 - closing submission and attachments.

10.1 Overall Environmental Management Framework

The EES outlines that the Environmental Management Framework proposed is consistent with DSE's environmental management policies and the AS/NZS/ISO 14000 series of standards for environmental management systems. The proposed EMF will contain three levels as set out in EES Volume 1 Chapter 10 and reproduced below:

Figure 12: Proposed Environmental Management Framework



Reflecting this hierarchy, the EES indicates that each environmental management plan will be prepared in the context of the environmental management systems of the organisation responsible for the activities and all plans will be required to be consistent with the international environmental management standard ISO 14001 and relevant legislation, policy and approvals.

Further details of the proposed roles and accountabilities of DSE, the Project Company and its contractors are set out in the table below, also reproduced from EES Volume 1 (Chapter 10).

Table 6: Proposed Roles and Accountabilities of DSE

DSE/State Owned Enterprise	Develop the Desalination Project	• Establish the Environmental Management Framework • Develop and administer the Performance Requirements • Ensure that prior to commencement of work, the Project Company has complied with relevant Performance Requirements such as preparing and implementing a Project Environmental Management Plan, conducting monitoring and notifying the community • Review the Project Company's performance against the Performance Requirements and take corrective action as necessary • Carry out environmental audits against compliance
Project Company	Implement Desalination Project	• Establish, implement, maintain and improve the Project Environmental Management Plan • Implement the Performance Requirements for the Project • Engage an independent environmental representative • Carry out environmental audits against compliance • Liaise with and coordinate relevant agencies for the smooth and efficient delivery of the Project • Obtain relevant approvals, licences and permits before starting site works • Ensure that prior to commencement of work; contractors have complied with relevant Performance Requirements such as preparing and implementing an environmental management plan • Review contractors' performances against the Performance Requirements and take corrective action as necessary • Establish and maintain open and effective communications with stakeholders

The proposed EMF is viewed as providing the structure for:

- Managing the Project in a way that achieves compliance with environmental legislation and encourages continual improvement in environmental performance;
- Establishing and assessing performance against the Project's environmental commitments;
- Developing and implementing appropriate plans and procedures for all phases of the Project; and
- Monitoring, auditing, reviewing and reporting performance.

10.2 Procurement Process and Project Agreement

As reflected in the EMF, the State intends to select a Project Company to finance, design, construct, operate and maintain the VDP. The bidding process (which is currently underway) requires the bidders to respond to an outline proposal for the VDP with a detailed scope of works (Project Scope) that must comply with the Performance Requirements. The detailed scope of works will contain many of the individual plans required by the Performance Requirements. The bidders are required to respond with an Environmental Management Framework to address the wider environmental governance of the Project.

As outlined by the Proponent in Document 146, both the Performance Requirements and the Project Scope will form the basis of the Project Company's contractual obligations to the State. Document 146 further outlined that the Project Deed between the State and the Project Company will include the following list of obligations and accountabilities:

- An obligation on the Project Company to avoid, and if not practical, to minimise all impacts on the environment, and to comply with all the environmental laws, approvals and other requirements. These other requirements refer to all environmental safeguards and measures necessary to mitigate the impacts of project activities (including, but not limited to the Performance Requirements);
- A requirement that the Project Company develop and implement an Environmental Management System including a Project Environmental Management Plan with separate Environmental Management Plans for each design, construction, operation and maintenance phase of each of the Project components;
- An acknowledgement that the Native Vegetation Framework applies to the Project. A requirement to follow the hierarchy of avoidance, then minimisation, of any clearance of native vegetation and achievement of Net Gain in relation to any necessary clearance;
- A separate regime in relation to site rehabilitation. This includes the appointment of a Rehabilitation Consultant to verify that rehabilitation has occurred to an appropriate standard and to manage complaints;
- A separate regime in relation to land contamination;
- Provision for an Independent Reviewer to verify that works are being undertaken in accordance with the Environmental Management Plan and other relevant environment requirements; and
- Provision for appointment of an independent auditor to audit on-going

compliance with the Performance Requirements and Project Environmental Management Plan.

Further to this outline of the Project Deed, Document 146 went on to outline that the Environmental Management Framework will include the following elements:

- Environment Management Systems and Plans. The environmental management plans must include an outline of the relevant regulatory framework; identification of the environment risks to be managed and the measures to be taken to meet the environmental requirements (including the Performance Requirements); management strategies and methodologies that address the environmental requirements; the means by which the environmental management requirements will be incorporated into day-to-day work activities; auditing, monitoring and reporting programmes to ensure compliance with the environmental requirements; and emergency, incident management and communication procedures;
- An Environmental Management Representative to be nominated by the Project Company. The Representative will be responsible for a range of environmental matters including monitoring, auditing and reporting environmental performance;
- Emergency/Environment Incident Procedures. These include an assessment of the types of incidents and emergencies that might impact on the environment and their potential causes and consequences;
- Environmental Training. A requirement to provide environment training to all project personnel;
- Control of associates. This requires the Project Company ensures its associates, including contractors, are aware of and comply with the environmental requirements and receive training; and
- Reporting and Auditing Requirements. These require the Project Company to (i) prepare a reporting and auditing schedule that is consistent with the monitoring program in the environmental management plans and (ii) appoint an independent qualified environment auditor to carry out quarterly audits on each component of the environmental plans, the implementation of the environmental management plans on site and the operation of the environment management system. Copies of the audit are to be provided to the State.

While the Inquiry notes the information tabled was in line with the information presented in the EES, in a number of areas a greater level of detail on the environmental requirements to be placed or processes to be required of the Project Company were provided. Further, the information provided outlined the

interconnections between the EMF, the Performance Requirements and the Project Deed or Agreement including the environmental requirements that will be contained in the Project Deed over and above the Performance Requirements. Given these interconnections, the Inquiry sought access to the draft Project Deed but given the nature of the procurement process, the Proponent declined the request.

As a consequence, the Inquiry's consideration of the EMF is largely informed by the material outlined in the EES, and the additional information summarised above, and is largely focussed on the nature and extent of the Performance Requirements and the monitoring and reporting arrangements.

10.3 Performance Requirements

The Performance Requirements proposed are set out under 35 separate headings, each with an overall objective, a set of performance criteria and then the individual Performance Requirements. In total there are some 170 Performance Requirements with a number having sub-elements within the individual Performance Requirements.

In its closing submissions, the Proponent advised that it "*relies on the Environment Management Framework described in the EES supplemented by the Performance Requirements and the further matters required by the Project Agreement*".

These Performance Requirements form a critical element of the EMF and the overall objective of mitigating, managing and monitoring the environmental effects of the Project during the construction and operations phases of the VDP. The EES continually emphasises, given the adoption of the PPP process to the delivery of the VDP, that the approach adopted has been to describe the Performance Requirements in the language of 'outputs', that is, the performance that the VDP must achieve rather than the process used to achieve it.

This output or performance based approach to environmental management is intended to deliver the appropriate balance between:

- Achieving acceptable outcomes for the community and environmental values; and
- A delivery mode with sufficient flexibility to accommodate specific challenges and that optimises potential efficiencies in construction and operation.

As outlined, the final Performance Requirements will be incorporated in the contractual Project Agreement to achieve the highest commitment by the Project

Company to mitigation and avoidance strategies and to the delivery of the acceptable and required environmental outcomes. The Performance Requirements are guided by the relevant policy, legislation and regulations and any approvals that the Project Company is required to obtain under law. They will be subject to the requirements of the relevant approving authority, and to enforcement actions under the relevant Act. The EPA will be a significant authority in relation to major aspects of the VDP.

At the Inquiry, a number of parties were invited to or provided comments on the Performance Requirements. These parties included Cardinia Council, Bass Coast Shire Council and the Environmental Protection Authority. A number of individual submittors also drew attention to the lack of specificity in individual areas and, in some cases, the variations between the suggested Performance Requirements and associated mitigation measures set out in the Technical Appendices and the Performance Requirements set out in the EES.

The Inquiry's specific consideration of the individual Performance Requirements is contained within the individual chapters on the major components of the VDP and the section on the whole of project issues such as waste management and greenhouse gas emissions. As a general rule, the Inquiry has adopted the view that the Performance Requirements comprehensively cover the critical areas and, where recommendations are made; they are deliberatively selective and designed to respond to major matters or concerns identified during the Inquiry. In particular, the Inquiry has not sought to significantly expand the number of Performance Requirements by including a range of pre-conditions or process requirements which were evident in a number of the proposals put forward by Cardinia Council and the Bass Coast Shire Council.

10.4 Performance Requirements and Monitoring and Reporting

Having reached that view, the Inquiry notes that a number of the Performance Requirements themselves set out the requirement for strategies or plans to be developed including:

- Communications strategy;
- Industry participation strategy;
- Construction workforce accommodation strategy;
- Safety management system compliant with Major Hazard Facility legislation;
- Rehabilitation plan;
- Monitoring and reporting water quality;
- Vegetation management plan;

- Construction management and monitoring plans for waterways;
- Water and energy efficiency plans;
- Ground water monitoring program;
- Surface water monitoring program;
- Long term waste management and minimisation program;
- Marine conditions baseline and monitoring program; and
- Marine pest risk managements and monitoring process.

From the Inquiry's perspective, Performance Requirements of this nature, along with the body of the Performance Requirements generally, serve to emphasise the need for a robust monitoring, auditing and reporting approach including a commitment to public reporting.

As outlined above, the EES and the documents tabled overall indicate:

- The Project Company will be required to nominate a suitably qualified person to serve as an Environmental Management Representative. The principal role of the representative will be to report on the performance of the Project Environmental Management Plan and system;
- Provision for an Independent Reviewer to verify design and construction activities and outcomes are in accordance with the Environmental Management Plan and other environmental requirements; and
- Provision for appointment of an Independent Auditor to audit on-going compliance with the Performance Requirements and the Project Environmental Management Plan with the quarterly reports to be provided to the State.

The EES and other documents refer generally to the preparation of monitoring, auditing and other reports including the Project Company being required to prepare environmental reports on various issues, including environmental reports on a monthly basis, and to provide a copy of the reports to the State. EES Volume 1 refers to:

- An annual management review of the EMF and Project Environment Management Plan during construction and operations being conducted to ensure they continue to be effective, suitable and adequate over the life cycle of the Project;
- Incorporation of all contractual and other legal requirements arising from monitoring, auditing, changing construction and operations circumstances; and
- Giving effect to the commitment to continual improvement.

The broad outline of the proposed monitoring, reviewing and auditing regime suggest that the essential ingredients for an appropriate quality assurance framework are envisaged. However, given the seminal nature and significance of the VDP, the Inquiry considers public perception of this overall approach would be improved by:

- The Independent Reviewer and Independent Auditor being joint appointments by the Project Company and the State;
- A commitment, prior to the commencement of the VDP, to the public release of regular information during the construction and operation phases based on the verifications of the Independent Reviewer and a summary of the quarterly reports of the independent auditor; and
- A commitment to periodic public release of significant pre and post construction monitoring surveys and longer term research on major areas such as the impact of structures and plant discharge to the marine environment.

10.5 Findings and Recommendations

With respect to the Environmental Management Framework, the Inquiry makes the following findings and recommendations.

The broad information provided to the Inquiry on the overall Environmental Management Framework suggests appropriate governance, accountability and monitoring approach has been developed, given the PPP approach adopted to the delivery of the VDP. However, the Inquiry notes in this regard that information tabled at the public hearings indicates the Project Agreement with the successful Project Company will contain key environmental requirements and processes, (notwithstanding that the Inquiry has not been able to examine the Project Agreement).

The proposed Performance Requirements cover the key areas and, with the additions outlined in the relevant chapters, provide a solid basis for mitigating, monitoring and managing the environmental effects during the construction and operations phase of the Project.

However, given the size, scope and significance of the VDP, the Inquiry considers the monitoring, auditing and reporting arrangements could be strengthened by the proposed Independent Reviewer for the design and construction phase and the Independent Auditor for the operations phase being joint appointments of the State

and Project Company and a commitment made to the public release of regular public information based on the verifications of the Independent Reviewer for the design and construction phase and the quarterly reports of the Independent Auditor.

The Inquiry makes the following recommendations in relation to Environmental Management:

(i) Provide for the Independent Reviewer (design and construction) and the Independent Auditor (operations and management) roles for the Victorian Desalination Project being a joint State and Project Company appointment.

(ii) Provide for the public release of regular information based on verifications of the Independent Reviewer for the design and construction phase of the Victorian Desalination Project, and for the quarterly reports of the Independent Auditor.

(iii) Commit to periodic public release of significant pre and post construction monitoring surveys, and longer term research on major areas such as the impact of structures and plant discharge to the marine environment.

11. LEGISLATIVE CONSIDERATIONS

The sixth task of the Terms of Reference is to report on:

> ***The considerations relevant to the Assessment that will inform decisions on the project under the Planning and Environment Act 1987, Coastal Management Act 1995 and Environment Protection Act 1970, as well as under the Environment Protection and Biodiversity Conservation Act 1999 (Cth), having regard to relevant regulations and guidelines including the Ministerial Guidelines.***

(This Term of Reference includes matters of Commonwealth interest with regard to the EPBC Act, however these issues are dealt with separately in the following Chapter 14.).

Specifically, the Inquiry addresses matters relevant to the *Planning and Environment Act* 1987 and the *Coastal Management Act* 1995 and the *Environment Protection Act* 1970. In addressing this Term of Reference, the Inquiry examines the relevant provisions of those Acts in a broad context, as they pertain to the Project. The Proponent was concerned about some of the submissions made in the context of these Acts and expressed its view that:

> *The phrase 'considerations relevant to the Assessment' in sub-task (6) is significant. That is, the Inquiry is not placed in the shoes of later decision-makers under the various Acts and is not required, as a matter of administrative law, to have regard to all matters of relevance to those decisions. Rather, its recommendations, within the framework of its own Assessment for the purposes of the Environment Effects Act 1978 and Environment Protection and Biodiversity Conservation Act 1999, will "inform" only those aspects of the decisions to be taken under those Acts to which its recommendations are relevant.*

Further, Mr Morris argued that: "*This interpretation avoids opening issues which are specifically excluded from the Terms of Reference*". In this context, he made specific reference to considerations of compatibility of the provisions of planning schemes and net community benefit as discussed further below.

11.1 *Planning and Environment Act* 1987

This Project does not involve consideration of a Planning Scheme amendment nor a planning permit application. Indeed, the Proponent stated "*the fact that there is no planning scheme amendment proposed in conjunction with the EES can be explained by the uncertainty of the final form of the Project*". While there may be consequential

amendments to Planning Schemes to facilitate this Project, the Inquiry has not reviewed the Planning Schemes in this context, nor has it considered any options to facilitate development and approval of the Project. It has however, been cognisant of the provisions of the relevant Planning Scheme as they relate to applicable zones and overlays, particularly for the Desalination Plant, the preferred route of the pipeline and the power supply lines. In this regard, the Inquiry requested the Proponent provide an assessment of the merits of the project components against the relevant provisions and policies contained in the respective Planning Schemes (Question 10 of its Directions). The Proponent addressed this issue and submitted its response as Document No 105 on 30 October. An overview of the key provisions of the relevant Planning Schemes is provided in Chapter 3.4 of this report.

The Inquiry pursued the concept of net community benefit with the Councils (particularly Bass Coast and Cardinia) and the Proponent, as it considered it to be an important principle to address. The Proponent however did not accept that net community benefit should be considered, and argued that:

> *In the context of amendments to planning schemes, it is now well established that one test is to assess whether the amendment will deliver a net community. …. But, although the Inquiry will inform subsequent decisions under the Planning and Environment Act 1987, it does not have the task of assessing all matters that will be relevant to such decisions. Obviously, a net community benefit analysis can only be conducted if one can have regard to all matters that bear on community benefit.*
>
> *Because water is a basic necessity, providing water security for the Melbourne metropolis will deliver immeasurable community benefit. This is so regardless of the means of power supply or the visual impact of the Desalination Plant or the method of waste disposal. However it is not the task of the Inquiry to carry out such an analysis.*

While the Inquiry is clear that it is not undertaking an analysis of the scheme provisions and an assessment of net community benefit in the same manner as it might for a site specific amendment, for example, it does consider that an understanding of the planning issues and the benefits that might accrue from the Project in the context of the proposal is warranted.

The Social objectives referred to in Chapter 1.2 of this report note that one of these objectives is "*To maximise benefits to the local community and wider economy within relevant Victorian Government policy frameworks*".

The social impact assessment was set out in Technical Appendices 55 and 56. It provided information on the existing social conditions, and the social policy context

in the area with a focus on social variables that may be affected during construction and operation of the project.

The Terms of Reference are direct and targeted to achieve specific advice to assist with a broader decision making process. The ultimate question is in the hands of Government mindful of its obligations to ensure the health and social wellbeing of the State including the orderly supply of services. The Terms of Reference are introduced by an explanation of the Government's water strategies and the imperative that delivery of the Project occurs by end 2011.

Mr Biacsi urged the Inquiry to adopt a net community benefit analysis approach to the Project, while at the same time he accepted the importance of the Project for water security to the State.

In questioning Mr Milner, the Proponent referred to Sections 1, 4 and 20(4) of the *Planning and Environment Act* 1987 to provide the rationale for Government to make decisions in the interests of the community without third party processes.

The Proponent argued that: "*as a matter of law, it cannot be said that a decision made in the interests of Victoria by the Minister under the Planning and Environment Act 1987 does not implement the objectives of planning in Victoria, or deliver net community benefit, on the grounds that the decision making process excluded third party notice, or limited advice to particular questions*".

Mr Morris contended that item (6) of Task 3 of the Terms of Reference must be qualified by the balance of the Terms of Reference and the specific exclusion of key issues influencing the ultimate question of net community benefit. However, the Inquiry considers it appropriate to consider the Project from a net community benefit perspective as it enables assessment from a local and state perspective.

For the reasons outlined in this report, the Inquiry concludes there will be both positive and negative social impacts on the various communities affected by the Project, with the key positive impacts including:

- Increased employment opportunities for a range of workers including trades and construction workers;
- Increased demand for accommodation and flow on effects to the local community, especially Wonthaggi; and
- Increased use and possible flow on impacts for a range of local services and business.

Impacts on the permanent and seasonal resident populations from the assimilation of the project workforce within the existing community were noted, and included:

- An increased demand for accommodation. This may have benefit for rental property owners. However there is a potential for increased housing stress and inability to access affordable accommodation for the local community.
- Extra demand for community health and social services. The short time frame of the Project means that planning for adequate social servicing for the potential influx of construction workers may not occur. The Inquiry would be surprised if a full occupational and health strategy was not pursued for the workers on site at the commencement of the Project.
- It is acknowledged that some of the social impacts may require management and mitigation. This includes the short term demands on health services, the temporary increase in a small range of Council services. In this regard, the recommendations of the Inquiry to assist Bass Coast Council with additional funds could mitigate impacts.
- Social opportunities of the Project included secondary employment, increased visitation to community activities and events, greater social interaction and diversity, and increased investment in social and commercial services.

The social impact assessment identified a range of additional impacts relating to the Transfer Pipeline and Power Supply, including such impacts as:

- Construction traffic disrupting access to public recreation and community hubs and facilities;
- Managing the interface between school and construction traffic;
- Severance and dislocation impacts relating to people's enjoyment of their property;
- Temporary disruption to farming and other activities on properties during construction;
- Some constraints on primary production in irrigation areas post construction;
- Minor constraints to development and residential activities post construction;
- Affect on visual amenity and landscapes;
- Effect on property values; and
- Dislocation and psychological impacts.

A number of submissions to the Inquiry highlighted the impact of the perception that the area will be industrialised and will lose values that have attracted residents to the area, in particular restorative qualities that are important for health and well being.

The Project will be associated with a number of regional and local economic influences including sourcing of labour, provision of project support services and availability of accommodation for the project workforce.

Construction of the Desalination Project is estimated to generate direct employment of 1,825 Full Time Equivalent (FTE) jobs and indirect (multiplier) employment of 2,920 FTE jobs over two years. Operation of the Project is estimated at direct employment of 50 FTE jobs and indirect (multiplier) employment of 100 FTE jobs in a typical operating year.

The regional occupation structure has a high proportion of labourers, technicians and tradespeople suggesting that the local labour force may be well positioned to contribute to the Project. However as there are identified skill shortages in these sectors regionally, it may mean that there is little surplus labour available and that upward pressure on wage rates will occur in some sectors of the regional economy.

There are opportunities for local businesses to contribute to the Project, particularly those businesses associated with construction related activities, manufacturing transport and storage and business support services. Significant new expenditure will be generated in the local economy by Project and worker spending. This is expected to create new opportunities for retailers, cafes, trade suppliers and other service providers.

Short term supply constraints exist in the region's residential market. Short term workers relocating to the area will be competing with existing residents for limited supply of housing stock. As there is a paucity of rental accommodation in the area there is a threat that rental inflation could force some local residents out of the rental market. However, as mentioned at the hearing, there are some 10,000 properties registered for holiday accommodation, and it is likely much of this can be used for short term accommodation requirements. While this may have an effect on potential rentals for holiday periods, this impact is only likely to occur over the peak 2010 period.

Three areas of industry specific economic impact were analysed as part of the EES. These were the effects on agricultural productivity, marine based commercial activities and eco-tourism activities in the area.

The economic effects of the project on agricultural production are explored in detail in Technical Appendix 17 to the EES. The major impacts on agricultural production are from the pipeline and power supply components of the Project, and these include:

- Loss of productive farmland and disruption to agricultural practices;
- Interference with subdivision or development potential;
- Loss of future generational commitment through loss of farm value; and
- Devaluation of land by pipeline/powerlines (particularly those agricultural enterprises in the view shed of powerlines).

Underground pipelines have minor impacts on agriculture. Most of these impacts occur through the construction and rehabilitation phases. Many of the impacts can be controlled and the resulting costs to the landholder can be reflected in the compensation process. The operational phase has a very minor impact, usually only when access is required for maintenance. A potential cost not covered in the assessment is the implementation of the Potato Cyst Nematode Protocol. Estimates of the economic impacts of not adhering to the protocol have not been considered either.

In contrast the impacts of above ground transmission lines could be considered less in the construction phase, (less earth moving and quicker rehabilitation times) but significant in the long term. The restrictions placed on land within the transmission easement place constraints on some forms of farming activity, in particular intensive horticulture and grazing. This is particularly relevant to the high productivity agricultural land in the Koo Wee Rup district. The loss of productivity of Koo Wee Rup district land within the northerly grid alignment easement was assessed as 75% loss in capital value as irrigation becomes dryland (Technical Appendix 17).

The likely impact on marine-based commercial activities in and around the Wonthaggi area will be limited, with abalone, rock lobster and reef fish expected to be tolerant to the impacts of the Desalination Plant (Technical Appendix 11).

Effects on eco-tourism relating to wildlife activities are likely to be minor, particularly in the longer term as most eco tourist activity is located on Phillip Island. There is some concern that the sense of industrialisation could alter tourist interest in the area in the long term. The lack of rental properties in the market may see a shorter term impact on tourist accommodation being used for the construction workforce and drive tourist to holiday elsewhere. The Inquiry is not able to draw a parallel about the loss of tourism opportunities because of the Plant. It should have no impact on Phillip Island and travellers to Wonthaggi, Inverloch and beyond may have glimpse of the Plant (and associated infrastructure, particularly when it is being constructed), but it is questionable that it will deter visitors to the region.

Overall, the Inquiry concludes that the provision of a Desalination Plant for Victoria

is a matter of State interest and it accrues a net community benefit at this highest level. Additionally, it results in a net community benefit at the local level in terms of economic impacts, including business and employment opportunities, and provision of housing opportunities. While some might argue that there will be some disbenefits for these very matters, it is clear that enhanced economic activity will occur as a result of this Project.

11.2 *Coastal Management Act* 1995

The Inquiry notes that the consent of the Minister for the Environment under section 37 of the *Coastal Management Act* 1995 will be required for the use and development of the intake and outlet structures on coastal Crown land beneath and seaward of the plant site. Section 40(2) of the Act states that when deciding whether to provide a consent to develop coastal Crown land, the Victorian Minister for the Environment must have regard to the Victorian Coastal Strategy, as well as:

- Any approved Coastal Action Plan applying to the land;
- Any recommendation of the Victorian Environment Assessment Council; and
- The purposes for which the land is reserved under the *Crown Land (Reserves) Act* 1978.

The Proponent discussed the application of the Victorian Coastal Strategy 2002 to the Project in Document 105. The Desalination Plant site is partly within an area listed in the Victorian Coastal Strategy 2002 as being within the "*Coastal Protection Zone*" which applies to "*areas in relatively natural condition or which are significant for botanical, zoological geological or geomorphological, archaeological or historical reasons*". Areas located within the Coastal Protection Zone should be managed to protect natural values of the zone. Section 40(2) of the Act notes that 'regard' is paid to the Strategy and there is no actual requirement of consistency.

The Inquiry concludes there should be minimal disturbance to this zone because the Desalination Plant will be established behind the coastal dune system on flat, cleared agricultural land. Proposed drilling under the dunes and beach area should allow these systems to remain untouched with minimal disturbance to the sea bed through the location of the inlet and outlet structures beyond the high relief reef area of marine sensitivity. The Inquiry notes the Performance Requirements contain a wide range of conditions and processes to respond to coastal landscape issues.

As mentioned in Chapter 3.4, the Victorian Coastal Draft Strategy has been exhibited and its approval is understood to be imminent. The Draft Strategy provides updated policies and actions relating to future challenges including climate change and

population growth. As indicated by the Proponent, the Draft Strategy notes "*that water availability is an increasing concern for growing coastal settlements and that seawater desalination and recycling wastewater could provide new supplies of water".* This Strategy specifically states that: *"A Desalination Plant will be built on the coast by the end of 2011 to supplement Melbourne's water supply*".

The Inquiry notes the new action (4.5.1) of State/regional importance that requires the Department of Sustainability and Environment, Environment Protection Authority and Victorian Coastal Council to "*Give expert advice during the assessment of environmental impacts, and siting and design of a Desalination Plant*". While Mr Morris contended that all were submittors to the Inquiry and *"none has objected to the development of the Desalination Plant at its proposed coastal location near Wonthaggi*", the Inquiry makes the point that all presented submissions on a range of issues and raised concerns about various aspects of the Project, including in relation to matters relevant to its location and impact on the coast. Issues relating to sea level rises from climate change are dealt with in Chapter 3.4 of this report.

Ms Dripps from DSE submitted on the expectations of DSE as a regulator. In particular, a wide range of approvals are required in order to carry out works pre, during and post construction and during operation. She strongly argued that the Proponent (Capital Projects Division of DSE) must meet the same standards as other parties when seeking, and complying with, approvals.

The Victorian Coastal Council submitted that such a large scale coastal – dependent use and development should subject to a comprehensive planning assessment that considers environmental social and economic effects.

The Central Coastal Board raised concerns about the need to maintain the coastal character of the Kilcunda to Cape Patterson coastline. The Board also stressed the importance of preserving the coastal integrity of the dune system adjacent to the construction site as a natural buffer from high energy coastal processes. It was also highlighted that with heavy rainfall events predicted due to climate change, the need to protect infrastructure from severe flooding in the hinterland. They expressed concerns about the marine discharge in particular the need for ongoing onsite modelling of the discharge, for early detection of diffuser failure.

The Environment Protection Authority in their submission raised issues surrounding the information provided in relation to marine discharge, and options to avoid or minimise waste discharge. The EPA highlighted the need to provide post design verification and demonstration of environmental performance in relation to the marine environment, waste management, energy usage and greenhouse gas

emissions, Environment and Resource Efficiency plans, air quality and noise. Pending approvals a licence will be required to operate the Plant.

As noted by Mr Morris, the Gippsland Estuaries Coastal Action Plan, which applies to the coastal area between San Remo and Inverloch, and specifically the Powlett River, includes key actions relating to revegetation with indigenous vegetation, reduction of catchment-sourced nutrients and sediments entering estuarine waters and visitor safety. The Inquiry is satisfied these matters are addressed by the Performance Requirements in a manner consistent with the Action Plan.

Similarly, while the purpose of the Crown reservations and the Land Conservation Council recommendation covering the coastal area adjacent to the Plant site is to protect the coast, the Inquiry is satisfied there will be no visible disturbance of this coastal area or its terrestrial or marine environments. The only Project works in this area will be deep within the sub-strata.

The Inquiry concludes that subject to specific additional recommendations in relation to the Performance Requirements relating to marine structures and the Desalination Plant, the Project is generally consistent with the 2002 Coastal Strategy (and the Draft Strategy).

11.3 *Environment Protection Act* 1970

As advised by the Proponent, water Desalination Plants that have a design capacity of more than one megalitre per day of feed water are prescribed under the *Environment Protection (Scheduled Premises & Exemptions) Regulations* 1996, and therefore require a works approval and licence under the *Environment Protection Act* 1970. A Works Approval Application (WAA) has been co-exhibited with the EES.

The WAA addresses the requirements of the above Act with respect to compliance with State Environment Protection Policies, waste management policies, the waste hierarchy, best practice outcomes and other relevant principles and policies.

In its submission, the EPA described the regulatory framework and analysed the Project against it. The EPA has sought further information from the Proponent within the Inquiry. Detailed conditions of the works approval and license, beyond the Performance Requirements, can be expected to be resolved by the EPA as the statutory decision-maker.

With regard to concerns raised by the EPA, the Proponent responded to this issue in its closing submission as follows:

In relation to the mixing zone, we submit that, on the evidence, the Inquiry should find that the area modelled by Dr Black as exceeding 1psu, if adopted by the EPA as a basis for the mixing zone, would be conservative in relation to potential effects on beneficial uses of the marine environment, noting that the definition of the mixing zone is appropriately at the discretion of the EPA and will be subject to on-going monitoring and review.

Secondly, while not included in the current WAA, ocean disposal of pre-treatment waste is an Option in the EES and the Inquiry is encouraged to support this waste disposal solution in principle, in line with the IEG's support, so as to bring this Option within the scope of the matters which may be determined as appropriate or otherwise by the EPA.

The Inquiry has addressed issues relating to the *Environment Protection Act* and the Works Approval Application in Chapter 8.1 of this report.

12. MATTERS OF COMMONWEALTH INTEREST

The matters of Commonwealth interest relate to the approvals required under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act). The Minister for the Environment Heritage and the Arts decided on 6 March 2008 that the Victorian Desalination Project is a controlled action under the EPBC Act.

The controlling provisions under the Act relevant to this project, as noted in the Terms of Reference are:

- Sections 16 and 17B (Wetlands of international importance); and
- Sections 18 and 18A (Listed threatened species and communities).

The Australian Government has accredited the Victorian Environment Effects Statement (EES) process as the required assessment process under the EPBC Act to assess matters relevant to that Government's decision to approve the project under that Act. At the conclusion of the EES process the Minister for Planning's assessment will be provided to the Federal Minister for the Environment, Heritage and the Arts.

As stated in the Terms of Reference 3(6) the Inquiry is tasked with providing advice to the Minister for Planning on considerations relevant to the Assessment that will inform decisions on the Project under the EPBC Act.

The Department of Environment, Water, Heritage and the Arts (DEWHA) on behalf of the Minister for the Environment, Heritage and the Arts outline in paragraphs 17 to 55 of the *Statement of Reasons for a Decision on Controlled Action under the Environment Protection and Biodiversity Conservation Act 1999* (the Statement), the wetlands and species likely to be impacted by the Project.

The DEWHA response to the EES was tabled as Document 4 (9 October 2008). This response highlights that "*While the State assessment process has been accredited under the EPBC Act, the approvals process under Part 9 of the EPBC Act remains the responsibility of the Minister for the Environment Heritage and the Arts. In order for the Minister to make an informed decision on whether or not to approve the project, further information is required on how the potential impacts of the action on EPBC listed species will be avoided mitigated or otherwise managed.*" The letter makes comment on the adequacy of information provided in the EES and notes:

While the EES (by reference to the supporting technical reports) identifies possible

management measures, it does not, through Performance Requirements, commit to the implementation of specific measures for "avoiding, minimising, managing and monitoring effects and hazards as well as offsetting measures (section 5.1 Scoping requirements) As currently presented the Performance Requirements do not appear to satisfy the above scoping requirements and assessment expectations and do not provide the level of certainty normally required to support an approval decision under the EPBC Act.

The Inquiry's response to the matters of National Environmental Significance is outlined as a response to the Western Port Ramsar Site and Listed Threatened Species.

12.1 Western Port Ramsar Site

The Western Port Ramsar site is identified as a wetland of international importance under the EPBC Act. The proposed plant is located 13 kilometres from the nearest point of the Western Port Ramsar site.

The potential impact of the Project on the wetland is due to construction activities for the pipeline and power line. These activities include the construction of the waterway crossings which have the potential to destabilise and erode stream banks and thereby increase sedimentation and water turbidity within waterways that drain into Western Port. In turn these impacts may extend downstream into the Ramsar site. These may adversely affect the ecological character of the wetland particularly through the impacts of increased turbidity on seagrass and mangrove habitats.

The Performance Criteria and Performance Requirements outline the proposed mitigation and management methods, in particular "*7 – Waterways and wetlands*", which note "*No significant impact on Western Port Ramsar site*". This is then supported by a number of Performance Requirements (7.2 to 7.6).

DEWHA in Document 4 have requested further information on the management measures that will be implemented during construction to ensure protection of matters of National Environmental Significance in potential habitat areas. These include:

- *Identifying potential habitat areas and species presence;*
- *Erosion and sedimentation control;*
- *Minimising the construction foot print at water way crossings;*
- *Limiting construction during breeding times for relevant species and salvage and relocation protocols for individual animals;*

- *Minimising the potential for the accidental spill of chemicals into streams or adjoining habitat areas; and*
- *Monitoring of in stream water quality parameters; and site rehabilitation and weed control.*

Under the Victorian *Water Act* 1989 permission for Works on waterways are granted by Melbourne Water as the waterway manager for the region. The final decision on the construction methodology used for each water way crossing will be decided as a part of this approval process. This decision will be informed by the Inquiry's report.

Document No 47 details the Proponent's justification of the identified pipeline construction techniques at sensitive locations. The major waterways that flow into Western Port are identified, as is the risk of sedimentation from construction techniques (trenching and pipe jacking) impacting the Ramsar wetland. Pipe jacking technology is generally assessed as having less impact. However the cost of this construction technique is considerably higher than trenching (ranging from $2M to $4.5M per crossing). Because of this, the Proponent's position is that pipe jacking should only be used where the environmental risks at a location are high enough to warrant this construction technique as a precautionary measure.

This document concludes that pipe jacking technology is likely to be necessary for the Powlett River, Bass River and Lang Lang River. This is because of water volumes, environmental sensitivities and the need to create a stable post construction environment to mitigate flood risk and potential impacts of flood-borne sedimentation on the Western Port Ramsar wetland.

Technical Appendix 15 gives some detailed recommendations in order to minimise construction impacts and to protect the integrity of the Western Port Ramsar site, and include:

- Trenchless excavation methods should be used where feasible for perennial and mildly ephemeral waterways and other waterways with significant riparian zones that cannot be avoided;
- Construction of the pipeline at all stream intersections should be undertaken in accordance with *Environment Protection Act* 1970: State Environmental Protection Policy (Waters of Victoria) 2003, and guidance should be sought from EPA Victoria with regard to establishing appropriate water quality objectives and monitoring requirements such that significant impacts on the Western Port Ramsar site do not occur; and
- Trenched construction across waterways should be undertaken during periods of zero stream-flow wherever feasible in order to further reduce

potential effects. Thorough preparation should be implemented to ensure that where trenching is undertaken, interruption to natural stream flows is either avoided or kept to a minimum possible period.

With respect to matters relevant to the marine structures the Inquiry notes and agrees with the response from Mr Morris that:

In relation to wetlands of international importance, the only wetland of relevance to the Project is the Western Port Ramsar site, which is more than 20km distant from the Plant site and other Project works.

Dr Black's modelling confirms that the discharge is unlikely to have any discernible effect on the Western Port Ramsar Wetland. The area of influence of the discharge around the intake is confined to the immediate vicinity of the intake. Similarly, Dr Black's evidence in combination with that of Mr Chidgey is to the effect that there will be no significant impacts arising from entrainment of larvae in the intake or consequential foodchain impacts. Accordingly, no indirect effects on the ecology of the Ramsar wetland are anticipated.

The Inquiry concludes that the Performance Criteria and Requirements provide the framework to ensure that impacts from construction of the Project are managed in such away that there is no significant impact of the Western Port Ramsar site.

12.2 Listed Threatened Species and Communities

The EPBC Act listed threatened species likely to be impacted by the Project are included in Table 6 below:

Table 7: Listed Threatened Species and Communities

EPBC listed Flora and Fauna recorded in EES surveys.	EPBC listed Flora and Fauna likely to occur in project area.
Flora • River Swamp Wallaby-grass Fauna • Growling Grass Frog • Dwarf galaxias • Giant Gippsland Earthworm • Hooded Plover	Flora • Green Striped Greenhood • Matted Flax Lily • Maroon Leek-orchid Fauna • Orange-bellied Parrot • Southern Brown Bandicoot • Australian Grayling • Southern Right Whale • Humpback Whale

Impacts on most of the above species are addressed in the EES and are summarised from the EES and Technical Appendices 12, 13, 14, 15, 16, as well as the Proponent's closing submission (Document 180) and Documents 6, 19, 21 and 47.

The EES has not made mention in any detail of some flora species listed by DEWHA in its Statement of 6 March 2008 as potentially being present. These are the endangered Cream Spider Orchid, the endangered Metallic Sun Orchid and the vulnerable Swamp Everlasting. DEWHA noted that the presence of one or more of these species in suitable habitat along the pipeline corridor cannot be ruled out.

Fauna species mentioned in the Statement of 6 March include the Spotted-tailed Quoll and Swift Parrot. The statement went on to assess that the general lack of suitable habitat for the Spotted-tailed Quoll at a local level suggests that a significant impact from the proposal is unlikely. The preferred habitat of the Swift Parrot is not found in the study area, and the widespread range of the species means that the limited removal of native vegetation for construction of the pipeline and power line is unlikely to have a significant effect on habitat critical to the species. These two species were not covered in the EES.

It is noted that for a large number of the EPBC listed species further survey work is required, which makes it difficult to assess real impacts until these surveys are complete. The Inquiry is not categorically stating that matters of National Environmental Significance will not be impacted. However for most species, the Inquiry does consider a range of avoidance of management options are available to minimise impacts on matters of National Environmental Significance.

Nevertheless the Inquiry considers that until the absence of a species is categorically confirmed, it should be considered to exist in likely habitats and construction proceeds in accordance with the *'precautionary principle'*.

(i) Recorded Flora Listed under the EPBC Act

The following flora was recorded at one or more locations associated with the Project, as shown below:

Table 8: Recorded Flora Listed under the EPBC Act

River Swamp Wallaby-grass		
EPBC Status	**Presence**	**Potential Impacts**
Vulnerable	Identified within the Plant site. Four individual plants recorded on property 336. A population recorded on Property 48. It is likely that the species occurs on the margins of shallow wetlands and dams within the vicinity and immediately adjacent to the Transfer Pipeline alignment and the northerly grid connection corridor.	Possible loss of individual plants. Further populations could be encountered during construction. A reduction in size of populations of this species.

DEWHA in Document 4 (9 October 2008) requested further detail on how impacts on River Swamp Wallaby-grass recorded on the site will be avoided or mitigated, including proposed salvage and translocation of plants or propagation of seedlings from the parent material. They further pose the question that if this species or other EPBC listed flora species are encountered, what measure will be implemented to avoid/mitigate adverse impacts?

Mitigation Measures through Performance Requirement 6, 6.3 and 6.4 deal with recorded listed flora. Technical Appendix 14 highlights that the major population of Swamp Wallaby-grass is located in Property 48, a parcel of the Plant site. It is suggested that construction or operational impacts of the Plant on Property 48 should be avoided and the property managed to minimise threats to the species. That is, no clearing of indigenous vegetation, maintain current hydrology of the site, appropriate grazing regimes. The sensitivity mapping in Technical Appendix 5 has identified the Property 48 is an area of sensitivity because of the presence of River Swamp Wallaby-grass, and is reflected in the Performance Criteria.

Both the pipeline corridor and the Northerly Grid connection have been chosen to avoid areas of significant native vegetation habitat. No populations of the above species have been found in the corridors at this stage. The Performance Criteria 6, has where practicable, to avoid areas of flora and fauna sensitivity identified through the EES. This would include suitable habitat for the above species. The Inquiry can find no Performance Criteria which directly deals with the need to develop or implement measures to avoid/mitigate impacts if EPBC Act Flora species are encountered. A Performance Requirement more specifically outlining the need to develop such contingency plans should be included, and has been so recommended.

Further, it is noted that in Performance Requirement 6.4 (c), reference is made to the Australia Mudfish, and it is understood that it should be the Australia Grayling. This has been modified by a further recommendation.

(ii) Recorded Fauna Listed under the EPBC Act

The following fauna was recorded at one or more locations associated with the Project, as shown below:

Table 9: Recorded Fauna Listed under the EPBC Act

Growling Grass Frog		
EPBC Status	***Presence***	***Potential Impacts***
Vulnerable	Breeding populations were found inhabiting six drains at the intersecting alignment of the Transfer Pipeline corridor. Suitable habitat is also found in water body crossings of the Northerly Grid Connection alignment.	Habitat loss, habitat degradation, disturbance and mortality. Construction works may interfere with the breeding or dispersal of frog populations.
Dwarf Galaxias		
EPBC Status	***Presence***	***Potential Impacts***
Vulnerable	Recorded on two sites in Yallock Creek, and could potentially inhabit a number of waterways intersected by the Transfer Pipeline and Northerly Grid Connection. Suitable habitat in the Powlett River and the unnamed tributary on Plant site.	Habitat loss, habitat degradation, disturbance and mortality. Construction works interfering with migration of the species.
Giant Gippsland Earthworm		
EPBC Status	***Presence***	***Potential Impacts***
Vulnerable	Three active Giant Gippsland Earthworm populations were identified in the Northerly Grid Connection corridor and three other sites with suitable habitat. Potential habitat was identified along the Almerta to Woolamai section of the pipeline. There is potential for further populations to be uncovered during construction.	Habitat loss, habitat degradation, disturbance and mortality. Physical disturbance of soil habitat. Local Hydrological disturbance. It is very likely that further populations of this species will be detected during construction of the Northerly Grid

		Connection and pipeline.

General Performance Requirements addressing *Minimising impacts on Terrestrial Flora and Fauna (6)* and *Protecting Waterways and Wetlands (7)* will mitigate many of the potential impacts on the above species.

The only Performance Requirement to specifically address these species is 6.4(c), which says "*Where disturbance is to occur, the agreement of the state is to be obtained for the processes to apply to: (c) conservation of significant fauna species.* Performance Criteria 7.5 relates to the re-establishment of wetland (unnamed tributary of the Powlett River) on the Desalination Plant Site. This wetland is identified as potential habitat for the Dwarf Galaxia.

DEWHA in Document 4 have requested further information on what measures are proposed to avoid/mitigate adverse impacts on these species, particularly if encountered during construction works. This included information on salvage and translocation protocols and an outline of further monitoring and management for these species.

Technical Appendix 14 identifies that impacts to Dwarf Galaxias and Growling Grass Frog can be largely avoided by employing trenchless excavation methods (e.g. pipe jacking) where feasible, on waterway crossings where these species are known or have potential to occur.

In the closing submission, the Proponent comments that "*where practicable, low-impact construction techniques will be adopted for these waterways (potential habitat for the species). However, Biosis has confirmed that trenching would be likely to affect only small areas of Growling Grass Frog habitat and impacts would be temporary".*

Document 47 outlined the Proponents justification of the identified pipeline construction at the various sensitive locations. This included a table addressing impacts on fish species including the Dwarf Galaxias, as shown below:

Table 10: Potential Impacts on Fish Species

Waterway	Species	Trenching	Pipe-jacking
Cardinia Creek	Australian Grayling Dwarf Galaxias	Short-term localized impact on habitat. The habitat is not likely to provide important or limiting resources for an ecologically	Substantially reduced impacts

		significant portion of the species' populations.	
Bunyip River	Australian Grayling	As above	As above
Lang Lang River	Australian Grayling Also flows into Westernport Ramsar wetland	As above Risk of sedimentation impacting Ramsar wetland	As above
Eumemmerring Creek	Dwarf Galaxias	As above	As above
Yallock Creek	Dwarf Galaxias	As above	As above
Bunyip River Main Drain	Flows into Westernport Ramsar wetland	Risk of sedimentation impacting Ramsar wetland	Lesser risk
Bass River	Flows into Westernport Ramsar wetland	Risk of sedimentation impacting Ramsar wetland	As above

DEWHA in Document 4 requested specific details on "*any sediment, pollution and erosion controls and monitoring to be implemented to ensure protection of the ecological values of the unnamed tributary of the Powlett River, which provides potential habitat for the Dwarf Galaxias?"*

Technical Appendix 14 provides the following recommendations in relation to avoiding and/or minimising impacts on Dwarf Galaxias at or near the Plant site:

- Exclude the unnamed tributary and associated low lying areas (on the north eastern perimeter of the eastern property boundary) from the construction footprint;
- Design and construct drainage works to avoid or minimise discharge of potentially contaminated surface water runoff to the unnamed tributary and the Powlett River itself; and
- Ensure existing road crossings of the unnamed tributary are upgraded in a sensitive manner, and new road crossings of the tributary are avoided or kept to a minimum and do not pose a barrier to fish passage.

In its closing statement, the Proponent summarised the effects on the Dwarf Galaxias as "*The Reference Project enhances this habitat as the landscape concept includes the reinstatement of wetlands and protection of this waterway (unnamed tributary of the Powlett on Plant site. Biosis has confirmed that any disturbance from construction is unlikely to have a long term effect on habitat and Dwarf Galaxias are unlikely to be significantly*

impacted by the Project".

These recommendations are reflected in Performance Requirement 7.5. Included in Performance Criteria 6 is the application of EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) to limit impacts during construction. These guidelines deal with sediment, runoff and pollution controls.

(iii) Giant Gippsland Earthworm

Although no Giant Gippsland Earthworm populations were found during the flora and fauna surveys of the Pipeline Corridor, Technical Appendix 15 outlined a number of recommendations to avoid and/or mitigate impacts in the event that Giant Gippsland Earthworms are encountered during construction. These are:

- Relocating the Transfer Pipeline alignment within the Transfer Pipeline corridor. This may be feasible given the generally patchy distribution of the species;
- Tunnelling the pipe underground in instances where Giant Gippsland Earthworms are found near creek banks or drainage lines. Pipes can be tunnelled below populations (minimum depth 3.0 metres). Buffer zones from creek banks of 30-50 metres for benching and shaft (insertion points) are required to protect populations. Buffer zones can be determined by localised surveys; and
- Translocation of Giant Gippsland Earthworm population. This method is time consuming and expensive with some population loss during the translocation process. In-situ conservation is recommended under most circumstances. However translocation may be considered when other forms of mitigation are not possible. Provided that the mitigation measures outlined are implemented, it is unlikely that construction of the Transfer Pipeline will impact on any Giant Gippsland Earthworm populations identified. The implementation of 30 metre buffer zones on all creeks and major drainage lines within the known range of the Giant Gippsland Earthworm would reduce the risk of any adverse impacts on undetected Giant Gippsland Earthworm populations.

Three populations of the Giant Gippsland Earthworm were identified in the Northerly Grid Corridor. Impacts from construction on this species were identified and a number of specific recommendations made in Technical Appendix 16 to avoid and/or minimise impacts in the event that Giant Gippsland Earthworms are encountered during construction. These include:

- Survey current alignment prior to construction, targeting potential Giant Gippsland Earthworm habitat. If populations of the species are found, localised realignment of the placement of transmission towers and/or poles is recommended. This is feasible given the patchy distribution of the Earthworm and the average transmission line span length of 380 metres.
- Ensure all Giant Gippsland Earthworm sites identified are protected by buffer zones. These sites need to be protected from all earthworks associated with the installation of the transmission towers and/or poles, and associated infrastructures such as access roads and storage of equipment. Recommended buffer zones are:
  (i) A minimum of 50 metres for sites where active Giant Gippsland Earthworms were identified;
  (ii) A minimum of 30 metres for sites where old Giant Gippsland Earthworm burrows were identified; and
  (iii) A minimum of 30 metres for all watercourses within the known range of the species.
- Ensure that local hydrological regimes around Giant Gippsland Earthworm sites are not altered.
- Ensure that a contingency plan, agreed upon and accepted by the relevant authorities, is developed in the event that previously undetected populations of Giant Gippsland Earthworms are accidentally exposed during the construction of the northerly grid connection.

The Technical Appendix recommends that provided that the mitigation measures outlined are implemented, it is unlikely that the construction of the transmission line will impact on any Giant Gippsland Earthworm populations identified. The implementation of 30m buffer zones on all creeks and major drainage lines within the known range of the Giant Gippsland Earthworm (Figure 3 Map Sheets 5 - 9) would reduce the risk of any adverse impacts on undetected Giant Gippsland Earthworm populations.

In their closing submission, the Proponent summarised that along the Northerly Grid Connection "*As poles and towers can be located to avoid these areas (Giant Gippsland earthworm populations), these sites will not be affected".*

The Inquiry concludes that as Giant Gippsland Earthworms are known to inhabit areas of both the Northerly Grid Connection and the Transfer Pipeline corridor it is likely they will be encountered during the construction phase of the Project. The Inquiry recommends that Performance Requirements are strengthened to include recommendations specific to this species as identified above from Technical

Appendix 14 and 15. In particular strengthening the definition of buffer zones and contingency planning for as yet undetected populations of the species These more detailed Performance Requirements will not only strengthen the management and mitigation of impacts to the species, but should assist in satisfying considerations under the EPBC Act. It therefore recommends a new Performance Requirement 6.3(e) to read as follows:

> *Undertake pre-construction survey for Giant Gippsland Earthworm along the pipeline and power supply alignments. Ensure all identified locations of the species are protected by appropriate buffer zones. Develop contingency plans for management of yet undetected populations of the Giant Gippsland Earthworm.*

(iv) Hooded Plover

As with the other recorded fauna species general Performance Requirements addressing *Minimising impacts on Terrestrial Flora and Fauna (6)* and *Protecting Waterways and Wetlands (7)* will mitigate many of the potential impacts on the Hooded Plover. The Hooded Plover is specifically addressed as part of Performance Requirement 6.4(c). The potential impacts on this species is shown below:

Table 11: Potential Impact on Hooded Plover

Hooded Plover		
EPBC Status	***Presence***	***Potential Impacts***
Marine	Resident along Williamson's Beach. At least three breeding pairs recorded. (Technical Appendix 13.	Habitat loss, habitat degradation, disturbance and mortality. Noise and light from the plant. Trampling of nest. Predation from foxes and unrestrained dogs.

More detailed Performance Requirements (for example 28.1) outline specific requirements identified to manage and mitigate impacts on this species. In relation to the listed threatened species and communities, the Inquiry notes and agrees with the comments of Mr Morris with respect to the Hooded Plover that:

> *A small but significant population of Hooded Plovers nest from August to February above the high tide line or in the fore-dunes of the beach adjacent to the Plant. The Hooded Plovers' well-camouflaged eggs and chicks are prone to being trampled inadvertently by walkers, fishermen, stock and horses ridden along beaches. They are also subject to predation by introduced foxes and unrestrained dogs. The Performance Requirements provide extensive measures specifically for the protection of the Hooded*

Plover and require the Project Company to develop and implement methods and management systems to ensure no adverse effect from construction or the presence of construction workers on the dune system, beach and intertidal zone. Contrary to concerns raised in some submissions, modelling of impacts of the intake on larvae suggests that there will be no indirect effects on Hooded Plovers via the food chain.

The impacts of the Project on the Hooded Plover were assessed in Technical Appendix 13 and the Inquiry is satisfied that specific recommendations from the Technical Appendix have been incorporated into Performance Criteria 28.1.

(v) EPBC Act Listed Flora Likely to Occur in Project Area

The flora species with potential to occur in the Project area are shown below:

Table 12: EPBC Act Listed Flora Likely to Occur in Project Area

Green Striped Greenhood		
EPBC Status	***Presence***	***Potential Impacts***
Vulnerable	Two past records within the pipeline corridor. Likely to occur in healthy woodland habitat within or adjacent to pipeline corridor.	Populations could be encountered during pipeline construction. Loss of plants during construction works. A reduction in size of populations of this species.
Matted Flax Lily		
EPBC Status	***Presence***	***Potential Impacts***
Endangered	Has been recorded within the Transfer Pipeline alignment corridor. Likely to occur in lowland grassland and grassy wood land habitat along the pipeline alignment.	Populations could be encountered during pipeline construction. Loss of plants during construction works. A reduction in size of populations of this species.
Maroon Leek-orchid		
EPBC Status	***Presence***	***Potential Impacts***
Endangered	Records of the species within the Transfer Pipeline and northerly grid connection corridors. Likely to occur in suitable grassland and grassy wood land habitat along the pipeline alignment. Not recorded on plant site – unlikely to be present due to habitat loss/modification.	Populations could be encountered during pipeline construction. Loss of plants during construction works. A reduction in size of populations of this species.

Mitigation Measures (as proposed in EES Performance Requirements) include Performance Requirements 6 and 6.3.

DEWHA has asked for the following details in letter of 9 October 2008: "*The timing of further seasonal ecological surveys of the pipeline corridor and how detail of how the surveys will relate to species listed under the EPBC Act. If EPBC listed Flora species are recorded along the power line or pipeline corridors, what measures will be implemented to avoid/mitigate adverse impacts?*"

Both the pipeline corridor and the Northerly Grid Connection have been chosen to avoid areas of significant native vegetation habitat. No populations of the above species have been found in the corridors at this stage. Performance Criteria 6 has where practicable to avoid areas of flora and fauna sensitivity identified through the EES. This would include suitable habitat for the above species.

The Inquiry can find no Performance Criteria which directly deals with the need to develop or implement measures to avoid/mitigate impacts if EPBC Act Flora species are encountered. The Inquiry has recommended that a new Performance Requirement 6.3(d) specifically outlining the need for such contingency plans be included.

(vi) EPBC Act Listed Fauna Likely to occur in Project Area

The potential impacts on the Orange-bellied Parrot, Southern Brown Bandicoot, Australian Grayling and the EPBC Act Listed Whales are shown in the following four tables:

Table 13: Potential Impacts on Orange-bellied Parrot

Orange-bellied Parrot		
EPBC Status	***Presence***	***Potential Impacts***
Critically Endangered	Could occur in plant reference area on odd occasions. Suitable habitat is found in salt marsh and farmlands surrounding the Powlett River.	Loss of potential food resources for the species. Disturbance of species by increased people accessing the mouth of the Powlett River.

As with the other fauna species general Performance Requirements addressing Minimising impacts on Terrestrial Flora and Fauna (6) and Protecting Waterways and Wetlands (7) will mitigate many of the potential impacts on the Orange-bellied Parrot. Performance Requirements specific to the species are found at 6.4 and 28.3.

No Orange-bellied Parrots were recorded in the surveys undertaken for the EES. Although as identified in Performance Requirement 28.3 a program of monitoring is proposed for the construction and operation of the Project. It is recorded in Technical Appendix 14 that the plant site offers no resources to the parrot that are not abundant and widespread in the local area and across similar agricultural landscapes along the much of the coastal zone of Victoria. Any such loss is therefore not considered likely to have a measurable impact on the species.

DEWHA (Document 4) requested further details of the proposed monitoring programme and measures that will be implemented to minimise potential impacts should the Orange-bellied Parrot be observed during the construction phase. Performance Requirements 28.3 specifically refers to a future monitoring program for the Orange-bellied Parrot.

Table 14: Potential Impacts on Southern Brown Bandicoot

Southern Brown Bandicoot		
EPBC Status	***Presence***	***Potential Impacts***
Endangered	May occur within the strip of coastal dune vegetation and may forage in adjacent pasture in areas close to the plant site. It may occur within strips of suitable structurally dense remnant and introduced vegetation along the pipeline corridor and the northern section of the grid connection alignment.	Habitat loss, habitat degradation, disturbance and mortality.

As with the other recorded fauna species general Performance Requirements addressing Minimising impacts on Terrestrial Flora and Fauna (6) and Protecting Waterways and Wetlands (7) will mitigate many of the potential impacts on the Southern Brown Bandicoot. Of particular note in relation to this species are Performance Requirements 6, 6.3, 6.4, 28 and 28.2.

In its closing submission (Document 180), the Proponent referred specifically to measures proposed for mitigation of the Southern Brown Bandicoot.

> *The Southern Brown Bandicoot may occur in strips of remnant vegetation with a dense ground layer along the Transfer Pipeline alignment. Wherever possible the alignment of*

the Transfer Pipeline has been located to avoid potential habitat of the Southern Brown Bandicoot and as a result construction works should affect only a small area of available habitat. While there is also potential for the Southern Brown Bandicoot to occur in strips of remnant vegetation in the northern section of the grid connection alignment, disturbance would be localised to pole or tower locations. Also, as vegetation under 3 metres in height will be retained under powerlines, there is unlikely to be a significant impact on this species.

DEWHA (Document 4) expressed concern about management of the potential habitat for the Southern brown bandicoot that existed in the coastal dune vegetation adjoining the plant. It is the Inquiry's opinion that the Performance Criteria and Requirements under 28 Coastal Flora and Fauna, in regards to protecting ecological values of coastal habitat, will work to not only mitigate impacts on Hood Plovers but also on any potential Southern Brown Bandicoot utilising the habitat.

Table 15: Potential Impacts on Australian Grayling

Australian Grayling		
EPBC Status	***Presence***	***Potential Impacts***
Vulnerable	May inhabit areas along the pipeline and northerly grid connection. Typically found in rivers and large creeks. Previously recorded in the Bunyip and Lang Lang River and could potentially occur in other large waterways crossed by the pipeline or northerly grid connection.	Habitat loss, habitat degradation, disturbance and mortality.

As with the other recorded fauna species general Performance Requirements addressing Minimising impacts on Terrestrial Flora and Fauna (6) and Protecting Waterways and Wetlands (7) will mitigate many of the potential impacts on the Australian Grayling. Performance Requirements specific to the species are found at 6.4 and 7.1 to 7.4.

Table 16: Potential Impacts on EPBC Act Listed Whales

Southern Right Whale		
EPBC Status	***Presence***	***Potential Impacts***
Endangered Cetacean Marine	May pass through or near the marine section of the Project during the May – December migrations of the species.	Pre construction seismic investigations could have an impact on whales and other cetaceans. Construction activities that cause repulsive and or repetitive noise ie pile driving and vessel, helicopter movements during construction may also have impacts. Noise may cause disturbance and avoidance by the species.
Humpback Whale		
EPBC Status	***Presence***	***Potential Impacts***
Vulnerable Cetacean Marine	May pass through or near the marine section of the Project during the May – December migrations of the species.	Pre construction seismic investigations could have an impact on whales and other cetaceans. Construction activities that cause repulsive and or repetitive noise ie pile driving and vessel, helicopter movements during construction may also have impacts. Noise may cause disturbance and avoidance by the species.

Mitigation Measures (as proposed in EES Performance Requirements) include 29, 29.1-4, 35 and 35.2.

DEWHA asked in its letter of 9 October 2008 whether surveys are proposed to be undertaken to detect and monitor the presence of any EPBC listed marine mammals during construction of the marine structures. Surveys are a requirement of implementation of the EPBC Policy Statement 2.1 and this requirement was identified by the Proponent in their closing submission.

In its closing submission, the Proponent concluded that the Desalination Project area was not important habitat for the Hump Back and Southern Right Whale (i.e. it is not a defined breeding, calving, feeding or resting area, or a confined migratory route). The primarily risk to these species was the potential impact of noise during the construction phase. The Inquiry notes and agrees with the comments of Mr Morris with respect to the Great White Shark and whales that:

Great White Shark are sometimes sighted in the waters off Williamson's Beach, but this species is highly mobile with vast individual geographic ranges and individuals are only likely to remain resident in one locality for periods of days or rarely weeks. As the hearing sensitivity of sharks is considered to be low, underwater noise and vibration that may result from the construction and operation of the Project is not likely to have a significant adverse effect on the Great White Shark. Also, it is not expected that the salinity of the plume itself could have a direct impact on the Great White Shark and it is considered unlikely that there would be any impact on the Shark's food chain.

A few individuals of the Southern Right Whale and the Humpback Whale may pass through or near the marine environment of the Desalination Project area during their annual migrations (between May and December), but the Desalination Project area does not provide important habitat for these species (i.e. it is not a defined breeding, calving, feeding or resting area, or a confined migratory route). The primarily risk to whales associated with the Project is the potential impact of noise during the construction phase. The risk of noise from geophysical (or seismic) survey was assessed as low as any geophysical surveys will be conducted in accordance with the EPBC Act Policy Statement 2.1, including whale-watching and cessation of activities if an individual is detected. Also drilling and piling noise was considered to be a low risk as these activities will be short-term and whales are only likely to visit the Project Area sporadically.

The risk of noise from geophysical (or seismic) survey was assessed as low as any geophysical surveys will be conducted in accordance with the EPBC Act Policy Statement 2.1, including whale-watching and cessation of activities if an individual is detected. Also drilling and piling noise was considered to be a low risk as these activities will be short-term and whales are only likely to visit the Project Area sporadically.

The Inquiry makes the following recommendations in relation to Matters of Commonwealth Interest:

(i) Add a new Performance Requirement 6.3 (d) to read:

"Development of contingency plans (including surveys) in the event that undetected populations of significant Flora species (River Swamp Wallaby-grass, Green Striped Greenhood, Matted Flax Lily, Maroon Leek-orchid, Cream Spider Orchid, Metallic Sun Orchid and Swamp Everlasting) are encountered during construction".

(ii) Add a new Performance Requirement 6.3 (e) to read:

"Undertake pre-construction survey for Giant Gippsland Earthworm along the

pipeline and power supply alignments. Ensure all identified locations of the species are protected by appropriate buffer zones. Develop contingency plans for management of yet undetected populations of the Giant Gippsland Earthworm".

(iii) Amend the Performance Requirement 6.4 (c) to refer to the *"Australian Grayling"* not *"Australian Mudfish".*

13. INQUIRY RECOMMENDATIONS

In finalising its recommendations for the Victorian Desalination Project, the Inquiry is cognisant that the EES make numerous findings and recommendations about the management of the environmental effects of the Project. It is assumed by the Inquiry that the Government and the Project Company will ensure that the issues raised throughout the EES and the recommendations made in response, will be undertaken in good faith. Many of these recommendations are about adhering to various state standards (eg SEPPs, EPA requirements and the like), while others are specific recommendations from specific consultants. Not all of these are represented in the Performance Requirements. However, the Inquiry expects that as far as practicable, the EES and the recommendations contained within it will provide the foundation for the successful design, construction, delivery and management of the Victorian Desalination Project.

The further detailed recommendations of the Inquiry are as follows:

13.1 Legislation and Policy Framework

(i) Amend the Performance Requirements as follows:

- Amend the first Objective in 8 (Aboriginal Heritage) to delete the word: *…"known"…*

- Delete the first four Performance Criteria in 8 (Aboriginal Heritage) and replace with: *"No Works to be undertaken prior to the approval of project Cultural Heritage Management Plan(s) in accordance with the Aboriginal Heritage Act 2006"* and *"Comply with the approved Cultural Heritage Management Plan(s)".*

13.2 Desalination Plant

(i) Amend the Performance Requirements as follows:

- Add the following to Performance Requirement 1.4: "T*he results of the modelling to be provided to the community and relevant property owners as part of the proposed communications strategy prior to construction*".

- Add the following to Performance Requirement 1.7: "*… having particular regard to the potential visual amenity and noise impacts on the northern and western boundaries*".

- Amend Performance Requirement 4.3 to read: *"Develop a Safety Management System for the facility in conjunction with emergency services and the Bass Coast Shire Council that complies with Major Hazard Facility legislation, if it is determined that the Project Company will be operating a Major Hazard Facility".*

- Add the following to Performance Requirement 6.4 (c): "; *conservation of significant flora species (River Swamp Wallaby-grass, Green Striped Greenhood, Matted Flax Lily, Maroon Leek-orchid)".*

- Include reference to the involvement and consultation with the Bass Coast Shire Council in the following Performance Requirements 3.2, 3.3, 3.4, 3.5, 24.2, 24.5, 24.6 and 24.7.

- Add the following to Performance Criteria 21.4: "… *and ensure no offensive odours beyond the boundary of the premises*".

- Update the Performance Criteria 22 and Performance Requirements for Airborne Noise to refer to EPA Publication 1254.

(ii) The Government establish arrangements that will facilitate earlier and speedier consideration of a number of the potential economic and social impacts on the local area during the construction of the Plant including the impacts arising from the accommodation requirements of construction workers and potential short and longer-term tourism impacts. These arrangements could include provision of financial assistance to the Bass Coast Shire Council to assist the Council's important role in these considerations. Consideration could be given to financial assistance to be used for employment of a full time Project Liaison Officer for the duration of the Project and for up to six months post commencement of operation, provision to upgrade Lower Powlett Road, and funding for a socio-economic strategy to deal with issues relating to an accommodation strategy and potential impacts on tourism.

13.3 Marine Structures

(i) Amend the Performance Requirements as follows:

- Add a new Performance Requirement 28.2 (f) to read: "*Manage helicopter use to avoid low level flyovers of Williamsons Beach to minimise impacts on Hooded Plovers".*

- Amend the second Performance Criteria in 29 to read: "*Avoid impacts on ecology of high relief reef*".

- Amend Performance Requirement 29.2 to read: "*No construction and impacts from construction in the designated areas presented in Figure PR Sensitivity Area – Marine Area, in Technical Appendix 5*".

- Add a new Performance Requirement 30.3 (d) to read: "*Minimise impact on moderate relief reef*".

- Add a new Performance Requirement 30.3 (e) to read: *"To inform final site selection and hydrodynamic modelling, undertake a pre-construction survey to identify species composition and community structure to determine larval supply and behaviour to demonstrate compliance with the relevant Performance criteria".*

- Amend Performance Requirement 30.5 to read: *"Monitor and report on possible effects of entrainment on marine biota including changes to recruitment and marine community structure and demonstrate compliance with the relevant Performance Criteria".*

- Amend Performance Requirement 31.6 header to read: "*Develop and implement a pre-construction and post-commencement survey and monitoring program to demonstrate performance ….".*

- Amend Performance Requirement 31.6 (d) to read: "*Document condition of high and moderate relief reef ecosystems".*

- Add a new Performance Requirement 31.10 to read: "*Prior to construction the Project Company must demonstrate to EPA that the diffuser has been designed, and will be operated, in a manner that minimises the size of the mixing zone to the extent practicable and does not result in environmental risks to beneficial uses outside the mixing zone".*

13.4 Transfer Pipeline

(i) Amend the Performance Requirements as follows:

- Amend Performance Requirement 1.11 to read: *"The Transfer Pipeline must be underground unless superior environmental outcomes at waterway crossings can be achieved with an above ground solution*".

- Amend Performance Requirement 5.2 to read: "*In design, minimise impact on agricultural productivity including following road reserves and/or property boundaries where practical".*

- Add a new Performance Requirement 5.6 to read: "*Detail the methodology for any soil removal, assessment, reuse and management to manage biohazard risk including Potato Cyst Nematode and Phytophthora cinnamomi".*

- Add a new Performance Requirement 16.4: "*Ensure that the environmental management plan for the Powlett River crossing addresses the location of all Potential Acid Sulfate Soils in the vicinity of the Powlett River and the Project Site, and interaction with groundwater dewatering, floods, flora and fauna and construction technique".*

(ii) Ensure that construction of the Transfer Pipeline in the vicinity of the Berwick South Primary School and St Catherine's' Catholic Primary School/St Francis Xavier College Junior Campus are undertaken to coincide with school holiday periods.

(iii) Consider alternative locations for the Booster Pump Station to reduce noise and visual impacts on the township of Cardinia.

13.5 Power Supply

(i) Undertake further investigations on the Power Supply Reference Project, Variations and Options as part of the ongoing procurement process.

(ii) Development of the alignment for the Power Supply Reference Project (and any Options and Variations) should, where possible:

- Follow property and/or road reserve boundaries;
- Avoid areas of the Significant Landscape Overlay as designated in the Bass Coast and Cardinia Planning Schemes;
- Avoid the Special Use Zone 1 in the Cardinia Planning Scheme to protect its horticultural values;
- Avoid the Potato Cyst Nematode control area; and
- Investigate the use of different forms of Powerline construction to minimise impacts (eg Poles if an overhead Option is pursued).

(iii) Consider additional mitigation measures to address visual, agricultural

productivity, and social impacts for those affected by the power line alignment.

(iv) Amend the Performance Requirements as follows:

- Amend the second Performance Criteria in 5 (Agriculture) to read: "*Prepare appropriate rehabilitation plans with individual landholder input in order to restore land to similar existing conditions".*

13.6 Other Issues

(i) Amend the Performance Requirements as follows:

- Add a new Objective in 12 (Flooding Control): "*Maintain ecological processes dependent on periodic flooding during project design, construction and operation".*

- Add a new point in Performance Requirement 12.4 as follows: "(c) *Maintain flood dependent ecosystems".*

- Amend the second Performance Criteria 13 to read: *"Minimise impacts on the interaction between groundwater and flora and fauna habitats, including connected surface waterways, wetlands and dune vegetation".*

- Amend Performance Requirement 13.2 (d) to read: *"Limiting any impact or diminution on the existing flow regime in nearby connected waterways, wetlands or on the use of groundwater as a resource arising out of any interception and/or drainage of groundwater".*

- Amend Performance Requirement 13.4 to read: *"Monitor groundwater quality and levels during the Project Term in accordance with the requirements of the EPA and/or relevant Authorities".*

- Amend Performance Requirement 14.3 to read: *"Establish a surface water quality monitoring (including reporting) program for the Powlett River, in the vicinity of the Desalination Plant Site in consultation with the EPA and West Gippsland CMA".*

- Add a new Performance Requirement 24.8: "*Undertake pre and post road condition surveys on identified construction routes (from the Traffic Management*

Strategy) and undertake restitution measures as necessary in consultation with VicRoads or the Local Government Authority (as appropriate)".

13.7 Environmental Management

(i) Provide for the Independent Reviewer (design and construction) and the Independent Auditor (operations and management) roles for the Victorian Desalination Project being a joint State and Project Company appointment.

(ii) Provide for the public release of regular information based on verifications of the Independent Reviewer for the design and construction phase of the Victorian Desalination Project, and for the quarterly reports of the Independent Auditor.

(iii) Commit to periodic public release of significant pre and post construction monitoring surveys, and longer term research on major areas such as the impact of structures and plant discharge to the marine environment.

13.8 Matters of Commonwealth Interest

(i) Add a new Performance Requirement 6.3 (d) to read:

"Development of contingency plans (including surveys) in the event that undetected populations of significant Flora species (River Swamp Wallaby-grass, Green Striped Greenhood, Matted Flax Lily, Maroon Leek-orchid, Cream Spider Orchid, Metallic Sun Orchid and Swamp Everlasting) are encountered during construction".

(ii) Add a new Performance Requirement 6.3 (e) to read:

"Undertake pre-construction survey for Giant Gippsland Earthworm along the pipeline and power supply alignments. Ensure all identified locations of the species are protected by appropriate buffer zones. Develop contingency plans for management of yet undetected populations of the Giant Gippsland Earthworm".

(iii) Amend the Performance Requirement 6.4 (c) to refer to the *"Australian Grayling"* not *"Australian Mudfish".*

Kathryn Mitchell Chris Harty Garth Lampe Greg Sharpley Nick Wimbush
4 December 2008

APPENDIX 1: TERMS OF REFERENCE

TERMS OF REFERENCE FOR INQUIRY

UNDER SECTION 9(1) OF THE *ENVIRONMENT EFFECTS ACT 1978*

VICTORIAN DESALINATION PROJECT

1. PURPOSE

The Inquiry is to inquire into the environmental effects of the works known as the Victorian Desalination Project (the "Project"), as contemplated by section 9(1) of the *Environment Effects Act 1978* (EE Act), in order to assist the Minister for Planning to make an assessment of the environmental effects of those works under that Act.

2. BACKGROUND

The Proposal

As part of the *Our Water Our Future: The Next Stage of the Government's Water Plan,* the Victorian Government announced on 19 June 2007 its intention to develop a reverse osmosis Desalination Plant near Wonthaggi to augment Melbourne's water supply as well as other regional supply systems. The Government intends that the plant will be operational by the end of 2011.

The Government's decision was informed by the *Seawater Desalination Feasibility Study* (2007) conducted by Melbourne Water, which investigated the feasibility of desalination as an option to augment Melbourne's water supply. The objective of the project is to provide water security for Victoria's growing population and economy by introducing supply from a rainfall-independent source.

The proposed works comprise a Desalination Plant with the capacity to produce 150 to 200 gigalitres per annum, marine structures for the seawater intake and the saline concentrate outlet associated with the plant, a pipeline to transfer water from the plant to Melbourne's water supply network, and a power supply infrastructure to supply electricity for the plant and associated infrastructure (see Attachment 1). The proposed site for the plant adjoins Williamsons Beach, west of Wonthaggi. A more complete description of the proposal is provided in the Environment Effects Statement (EES) prepared by DSE.

The Secretary of the Department of Sustainability and Environment (DSE) is the project's proponent, on behalf of the Minister for Water, as the 'facilitating agency' nominated by an Order in Council on 18 December 2007 under the *Project Development and Construction Management Act 1994*.

Relationship to the EES process

The Minister for Planning decided on 28 December 2007 that an EES was required under the EE Act to document the environmental effects[1] of the Victorian Desalination Project. The EES has been

[1] Under the seventh edition of the *Ministerial guidelines for assessment of environmental effects* (June 2006) (i.e. the "Ministerial Guidelines"), environment for the purposes of assessment includes the physical, biological, heritage, cultural, social, health, safety and economic aspects of human surroundings, including the wider ecological and physical systems within which

prepared by DSE in response to Scoping Requirements issued by the Minister for Planning on 4 May 2008.

The Government has adopted a Public Private Partnership (PPP) as the procurement method for the project. The PPP tender process is being conducted concurrently with the EES process. Consequently, the EES is based on concept proposals for the works that comprise the project. The final designs for the project works will not be available until mid 2009 when the successful bidder is chosen.

The assessment of and response to environmental effects in the EES is based on a combination of: a "reference project" (which is a generalised version of the "public sector comparator" reference design being used to benchmark the private sector proposals); variations of the reference project that might be considered by a PPP bidder; and environmental Performance Requirements which provide a generic framework (subject to refinement) that the project would need to comply with.

The EES will be exhibited for public comment, together with the Works Approval Application (WAA) No WA64404 to the EPA, from 20 August 2008 until 30 September 2008.

The Minister for Planning will appoint an Inquiry under the EE Act. After receiving the report of this Inquiry, the Minister for Planning will prepare an Assessment of the project's environmental effects under the EE Act to inform relevant decisions whether or not to approve the project, as well as the setting of associated conditions.

Required approvals

Under Victorian law, the project requires the following approvals:

- Authorisations under the *Planning and Environment Act 1987* to provide for the use and development of the Desalination Plant, water pipeline and power supply infrastructure, i.e. under the Bass Coast[2], Casey, Cardinia and South Gippsland Planning Schemes;
- Works Approval under the *Environment Protection* Act *1970* from the Environment Protection Authority to construct the Desalination Plant;
- Consent for use and development of coastal Crown land under *Coastal Management Act 1995* for the marine structures;
- Approval of cultural heritage management plans[3] under the *Aboriginal Heritage Act 2006*; and
- Consent for waterways crossings under the *Water Act 1989* for the water pipeline.

While other approvals may also be required, the decisions necessary for the above approvals will be substantially informed by the outcomes of the assessment process.

The project also needs approval under the Commonwealth's *Environment Protection and Biodiversity*

humans live.

[2] In January 2008, the Minister for Planning approved Amendment C80 to the Bass Coast Planning Scheme to provide approval to: authorise the use and development of land for preparatory works, including pre-construction or pilot works necessary for technical investigations to inform the design of the Desalination Plant. The Amendment also applied a Public Acquisition Overlay over land required for the project.

[3] Note that while Aboriginal cultural heritage is a relevant matter for the Inquiry, it will not consider in any detail the draft cultural heritage management plans that have been prepared in conjunction with the EES. Decisions on the final plans will follow the Minister for Planning's Assessment.

Conservation Act 1999 (EPBC Act). The controlling provisions under that Act to which the project is subject are:

- sections 16 and 17B (Wetlands of international importance)
- sections 18 and 18A (Listed threatened species and communities)

The Australian Government has accredited the EES process as the required assessment process under the EPBC Act to assess the matters relevant to that Government's decision whether to approve the project under this Act. The conclusion of the accredited process will be the provision of the Minister for Planning's Assessment to the Federal Minister for the Environment, Heritage and the Arts.

3. TASK

The principal objectives of the Inquiry are to establish a sound understanding of the environmental effects of the project and to advise on the best approach to reduce or otherwise manage these effects.[4]

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

(1) The likely environmental effects[5] of the construction and operation of the components of the project, including the Desalination Plant at the site west of Wonthaggi, the associated marine structures, the water Transfer Pipeline and the power supply infrastructure, as well as relevant variations identified in the EES. To the extent practicable, the likely environmental effects of project options identified in the EES should also be addressed.

(2) Whether the proposed alignments of the water Transfer Pipeline and the power supply infrastructure are generally suitable or should be adjusted, in light of their likely environmental effects.

(3) Whether the environmental effects of the project are capable of being effectively managed, without significant adverse consequences - particularly in the long-term – either on the basis of the proposed Performance Requirements (subject to necessary refinement) or other environmental management measures.

(4) Recommendations regarding the approach of the environmental management framework presented in the EES, including any appropriate strengthening of this framework, to provide a high level of confidence that implementation of the project will achieve acceptable environmental outcomes.

(5) In light of the preceding matter, any specific recommendations regarding the proposed Performance Requirements, including for aspects relating to siting, design, construction techniques, waste production, energy efficiency and environmental mitigation, that would be appropriate to ensure acceptable environmental outcomes consistent with applicable legislation, policy and industry best practice.

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[4] The following strategic alternatives are outside the scope of the EES and are matters that this Inquiry is not required to examine:

- strategic options for augmenting water supplies to Melbourne;
- different technologies for the Desalination Plant (i.e. thermal); and
- potential locations for a Desalination Plant outside the Wonthaggi-Kilcunda area.

[5] Relevant effects include impacts in relation to those matters protected by each provision of Part 3 of the EPBC Act that is a controlling provision for the action (i.e. 'relevant impacts')

(6) The considerations relevant to the Assessment that will inform decisions on the project under the *Planning and Environment Act 1987, Coastal Management Act 1995* and *Environment Protection Act 1970,* as well as under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th), having regard to relevant regulations and guidelines including the Ministerial Guidelines.

4. PROCEDURE

Written submissions that specifically respond to the Task of the Terms of Reference will be the principal means of providing input to the Inquiry process. At its discretion the Inquiry shall invite those submitters who raise substantive issues to present at the Public Hearing, but shall, as necessary, place time limits on the length of all presentations. Further to this, the Inquiry is to adopt the following procedure.

(1) Commence its investigations during the period of EES exhibition.

(2) Consider the exhibited EES, the exhibited WAA No WA64404, issues and information put forward in submissions on the EES and/or WAA in so far as they pertain to the Task of the Inquiry, the proponent's written response to submissions on the EES and WAA, and other relevant information either provided to or obtained by the Inquiry.

(3) Conduct an early public session, preferably during the exhibition of the EES and WAA, at which the proponent and its specialists will outline the content of the EES and WAA.

(4) Conduct a Directions Hearing on as near as possible to 8 October 2008 to:

- (a) identify key issues that it intends to examine;
- (b) identify submitters, agencies and associated experts that it intends to invite to participate in a discussion session and/or Public Hearing;
- (c) provide appropriate directions to submitters and for the conduct of the hearing;
- (d) finalise a timetable for its proceedings including a schedule for presentations by submitters and agencies (including any experts).

(5) If considered of assistance by the Inquiry, to conduct discussion sessions involving submitters and/or experts to clarify issues of contention, discuss particular topics identified by the Inquiry, and if practicable, to identify the level of agreement amongst participating submitters and/or experts.

(6) Conduct a Public Hearing, commencing the week of 13 October 2008, to obtain information from submitters and relevant agencies, including expert witnesses, regarding matters relevant to the Task of the Inquiry. The combined duration of the Public Hearing and any discussion sessions preceding the Hearing is to be up to 18 sitting days or is otherwise to conclude by 7 November.

(7) Request further information, if necessary, from relevant submitters or agencies in relation to either issues previously identified or additional matters. This may occur post-hearing, however any information obtained must be publicly disclosed.

(8) Seek written or verbal information or advice, as required, from the Independent Expert Group or its individual members or from such other experts or specialists as the Inquiry may consider

would be of assistance. Any such information or advice must be publicly disclosed (unless it is of a confidential nature).

(9) Have regard to relevant provisions of Victorian legislation, policies, strategies and guidelines, as well as the EPBC Act and associated regulations and guidelines.

(10) At the discretion of the Inquiry, to retain legal counsel to assist the Inquiry from time to time.

(11) Access and maintain a website where all expert evidence, major presentations, the Hearing timetable and other information can be hosted.

(12) Planning Panels Victoria to provide administrative support to the Inquiry. The Inquiry may also engage additional support, subject to the agreement of the Department of Planning and Community Development.

Note that the term 'submitters' is used throughout these Terms of Reference to refer to the proponent and any other persons who make any submission to the Inquiry.

5. CONDUCT OF HEARINGS

As stated under section 4 above, written submissions are to be the principal means of providing input to the inquiry process, but the Inquiry is to further inform itself in relation to substantive issues through a Public Hearing, as well as discussion sessions, as deemed necessary by it.

The Inquiry should conduct its hearings in accordance with the following protocols.

(1) The conduct of the Public Hearing and any discussion session will be managed by the Inquiry Chair. The Chair may regulate proceedings in a manner that he/she considers appropriate to best allow the Inquiry to inform itself.

(2) The Inquiry may meet and conduct hearings and discussion sessions at its discretion when there is a quorum of at least three of the Inquiry members.

(3) If any submitter intends to rely on expert evidence that evidence must be included in the original submission.

(4) The Public Hearing is intended to provide an opportunity for the Inquiry to invite submitters to clarify information or views as presented by them in their written submissions and to raise issues with respect to the information, approaches and views presented by other submitters or publicly disclosed by the Inquiry. The Inquiry will not seek to hear views or comments from submitters where their submission does not respond to the Task set out in section 3 above.

(5) In light of the preceding protocol, the Inquiry is to exercise its discretion in determining whether to invite particular submitters to appear before it to clarify their submissions and contribute to the hearing process. The Inquiry should take into account whether perspectives in particular submissions have been or will be effectively represented by other submitters.

(6) The proponent will have an opportunity to respond to submissions, including input from other submitters during the Inquiry process, at the discretion of the Chair.

(7) Unless requested by the Inquiry, there will be no need for additional expert evidence to be produced for the Public Hearing or subsequently.

(8) The Public Hearing and any discussion sessions are intended to be exploratory and constructive, and adversarial or excessively legalistic behaviour will therefore be discouraged by the Inquiry Chair.

(9) The Public Hearing and any discussion sessions will be conducted in an open, orderly and timely manner, with a minimum of formality and without the necessity for legal representation. Parties without legal representation will not be disadvantaged.

(10) Questioning is to be controlled by and conducted primarily by the Inquiry. However, at its discretion the Inquiry may accept questions received either verbally or in writing from participants at the Hearing.

(11) The Inquiry may of its own initiative call any expert or specialist to present a report or give evidence at a Public Hearing.

(12) The Inquiry Chair is to nominate a Deputy Chair to act with full authority as Chair at any time.

6. OUTCOMES

The Inquiry is to prepare a written report for the Minister for Planning by 4 December 2008, unless an extension is agreed to by the Minister. The report is to present:

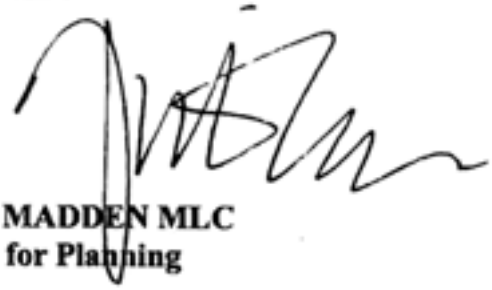
(1) The Inquiry's response to the Task detailed in Section 3, including its findings and recommendations; and

(2) A description of the proceedings conducted by the Inquiry and a list of those consulted or heard by the Inquiry.

7. FEES

The members of the Inquiry will receive the same fees and allowances as a panel chair appointed under Division 1 of Part 8 of the *Planning and Environment Act 1987*.

APPROVED:



JUSTIN MADDEN MLC
Minister for Planning

DATE: 19.8.08

ATTACHMENT 1

Proposed locations of Desalination Plant, transfer water pipeline and power supply infrastructure

(Included as Figure 2 in Chapter 2)

APPENDIX 2: LIST OF SUBMITTORS

- Russ Williams, Bass Valley Real Estate
- Michael & Antoinetta Marson
- Florence Crawford
- Sean Morgan, Kilcunda Residents and Visitors
- Frank Mascadri, Masuno Pty Ltd
- Siri Hayes
- Mary Bramall
- Norm Crichton
- J R Thomas
- Janet Inglis
- Damien Costello
- Nan Gleeson, Killary Estate
- Carolyn & John Lancaster
- Elizabeth Hill
- J Sturge
- Taz Kozaris
- David Bramall
- Scott & Tracy Buijs, Langford Park Farm
- Andrea Kemp
- Alan Mort, Mortloch Limousin Stud
- Noelene Downie
- B M Jourdian
- Elissa McNamara, Southern Rural Water
- Brenton Wildes
- Russ Wildes
- Mal Wildes
- Geoff & Pam Ferrier
- Angie Priestly
- Geoffrey Glover
- Garry Knox
- Janet Morphett
- Vincent Costanzo
- Ailsa Drent
- Pauline Andresen
- P L Cook
- Ian McMullan
- Kimberley Dripps, Department of Sustainability and Environment
- West Gippsland Catchment Management Authority
- Rosemary Knox
- B J & S A Smith
- Jacqueline Seskis
- Juliet Le Feuvre, Environment Victoria
- Liam Hodgetts, City of Casey
- Ourania Emmanouli
- Julie Webstar
- Max Hall
- Amy Knox
- Ian Shand

- Robin McCauley
- B & J Evans
- Lorna Budgen
- P & M Chapman
- Mavis Martin
- Kerryn Wangman
- Michelle Burgess
- Patricia Hunt
- Jan Fleming
- L Homer
- The Egan Family
- Andrew Kellaway
- Beverly & Colin Hobson
- The Cox Family
- Freya Goodall
- Graeme Huon
- Lynne Carter
- Jeff Reilly
- Mark & Karen Quigley
- George & Olivia Lineham
- Nigel & Jennifer Atkins
- Andrew Pollitt
- D Barter
- George & Ivy Haysom
- Rudy Youssef
- Anthony Hackett
- S Kirwin
- Malcolm Townley
- Kevin Kitchin
- Valarie Juddery
- Stephen Wilbourne
- S Fairchild
- Craig Kelly
- Carolyn Coster
- J Smith
- Veronica Quigley
- Susan Nelson
- Robert & Laurel Purvis
- B & M McCarthy
- R & A Purvis
- Debbie Jackson
- Olive Smith
- Judy & Darren Campbell
- Patrick Dunn
- R & P O'Hara
- Anthony & Kerral McFarlane
- Darren & Sinead Hickmont
- Andrew Nicholls
- Rosalind Niproski

- Wayne & Joan Weller, OanWayJe Farms Pty Ltd
- Fred & Bronwyn Isarin
- Pam & John Hobson
- Michelle & David Fulwell
- Rebecca Dauer
- The Levey Family
- Walter Grahame
- Gary & Sarah Blackney
- Bernadette Miles
- Ralph Townley
- Steve & Janis Nisbet
- Harold & Margaret Lineham
- Murray Giles
- Lorraine Campbell
- Kent & Shirley Eden
- M & C Boxshall
- Michael & Susanne Kendall
- Gordon Peck, Lynbrae Farms
- W Lorimer
- The Campbell Family
- Murray & Lisa Huitson
- Russell & Denise Knights
- Mark Hayes
- C Forwood
- David Young
- Desmond Russell
- Andrew Haugh
- Vicki Mercier
- Malcolm & Virginia Manks
- Ray Astbury
- Roderick Smith
- Jill Gay
- Susan McQueston & Judith Hogan
- Alan Holmes
- Matthew Holz & Tristan Starr
- Rick Pinsent
- Jenny Tame, Victorian Farmers Federation
- Arnis & Una Heislers
- Mark Bridgeman
- Lyn Whitlam
- Ross & Rosemary Cummings
- John Duscher
- Gayle Gilbert
- Neil Rankine
- David & Marie Trigg
- Ian Anderson, Victorian Farmers Federation - Cardinia Branch
- Helen Searle
- Richard Kentwell
- Spyros & Ismini Karamesinis

- John & Wilma Coleman
- R & R Peacock
- L Edmonds & G Schutt
- Helen & Shaughan Fox
- Shirley Higman, Longwarry & District Progress Association
- J & K Sabine
- Trish Teesdale, Bird Observation & Conservation Australia
- Cam Walker, Friends of the Earth Melbourne
- Brett Light, Environment Protection Authority
- Jill McCulloch
- Jane Jobe
- Genine Uden
- Vicki & Michael Lewis
- Kimberley Neave
- George Brocklesby
- J Pettenuzzo
- Lesley O'Donohue
- Catherine Manning
- Anna McCallum, Australian Marine Conservation Society
- M & R Cohen
- Barnaby McIlrath, Cardinia Shire Council
- Elizabeth McKinnon, Watershed Victoria
- Jessica Harrison
- Chris & Suzanne Heislers
- Pat Gordon
- Sally Migloranza
- John Gemmill, The Bass Coast Boardriders Club and Surfing Victoria
- Gloria O'Connor, Cardinia Ratepayers & Residents Association (CRRA)
- John Simcocks
- David Wingfield
- John & Maxine Wright
- Linda Moore
- Alan Provis
- Peter Lee
- Susan & Jason Twite
- Gray & Tracey Gardiner
- Alex Hayward
- The Gleeson Family
- Margaret Hancock, Phillip Island Conservation Society
- Kevin Glover
- Deline Skinner
- Maria Riedl
- Stuart Hayes
- Bass Coast Shire Council
- Giancarlo Di Stefano & Elizabeth Crock
- Vicki Hain
- Chelsea Taylor
- Alex & Claudine Andreata
- Roy & Elaine Berryman

- Eric & Rhonda Smith
- Malcolm & Suzanna Reedy
- Geoff Janssen
- Andrew & Glenda McMillan
- Helen Hollole
- John Sonnet
- Gary & Karen Cooper
- Peter Kavanagh
- Penny Morris
- Majorie Reith
- David Blythe
- Tim & Jodie Layton
- K & K Vistarini
- G & M Jobling
- Yvonne Tamburo
- Norm Henwood
- Mark Robertson
- Deborah Tuck
- John Cumming, Infotech Research
- Garry Jenner
- Ray & Ellie Arthur
- Neil & Debbie Ryburn
- Susan Davies, Westernport Swamp Landcare Network
- L & L Milner
- Tracey Moran/Cumming
- John Solohub
- T Thomas
- C & K Hobson
- Andre & Marion Chapman
- Margaret Rowe
- Bernhard Resenberger, iPlex Water
- J Myhill
- Tony & Allen McGuire, AGT Developments Pty Ltd
- R & A Jones
- N & D Blamey
- Will & Nancy Paterson
- Bruce Dunn
- Kevin Bernard
- Lea Pope, Bass Coast Regional Health
- Lindsay Knights
- Loris & Kevin Stephens
- Dorothy Warren
- Robin Middleton
- Wayne & Lisa Tymensen
- Frank Rovers, Horticultural Peat Farmers Group
- Andrew Ristrom, Elandra Park Stud
- Barb Stewart, Elandra Park Stud
- Charlotte Laemmle
- Martin Purslow, National Trust

- John Cumming
- Stephanie Andreata
- Winston & Lorraine Prue
- Gary Martin, Central Coastal Board
- Ron Barnacle, Rosebank Farm
- L & L Gravey
- Tom & Lin Butcher
- W & K Marriner
- Bill Pearson, Cardinia Shire Council
- Lisa Greenway
- Dick Leeuwen, Baw Baw Shire Council
- Barry Clark, Astronomical Society of Victoria
- Vonda & Terry Smith
- Warren Raabe
- Phillip Reedy
- Sue Saliba
- Maurice Schinkel
- Greg Scullin
- Anwyn Martin
- Nola Maxfield
- Lynne & David Moore
- Nagaire Murray
- Joseph Murray
- Kellie Nichols, Bass Coast Landcare Network Coordinator
- Ian Noble
- Sue Packham
- Stephen Koci
- Rosemary Kirwin
- Chris Lancey
- Tim Le Roy
- Margaret Lineham
- Heather Livingston
- Joseph Murray, Longview Horticulture
- Jeanette Lukies
- Peter & Virginia McEntee
- Susan McVeigh
- John Eddy
- Thomas & Janette Tuck
- Ros Eason, Harmers Haven Residents & Ratepayers Group
- Stephen Miles
- Geoff & Cheryl Rose
- Joanne Edwards
- Peter & Jodie Townley
- Neville & Peggy Stone, Colrando Park Stud
- Veronica Quigley
- Sophie Cuttris
- Sue & John Purser
- P J Allen
- S & M Hayes

- Peter & Toni Cunningham
- Tom Sugars
- Lisa Greenway
- Sandra Denham
- Gary Henwood
- C & C Burns
- William & Andrew Hunter
- Tony & Allen McGuire
- N & R Pullen
- Graham & Faye Wood
- Catherine Watson
- Geoff Glare, Friends of Wonthaggi Heatherland and Coastal Reserve Inc.
- John Carson
- Janet Lyle
- Pauline Preston, Tynong Progress Association Committee
- Jan Hillyard
- Mary Cannon
- Pam Kokke
- Jos Vander Geest, Victorian Farmers Federation
- Stephen & Elizabeth Hickery, Raewood Stud, Square Meater Cattle
- James & Clare Casson, Baylyn Park
- Mark & Karen Quigley
- John-Paul Bielecki
- Marion Kavanagh
- Jane Rawson Brocklesby
- Beryl & Ron Banbury
- Curt & Kylie Trewavis
- Denis Donohue
- Mischa Barr
- Michael Beasley
- Celia Bickerstaff
- Paul Bickerstaff
- Roman Bieleckie, Tynong General Store
- Brett & Michelle
- Thomas Jordan
- Andrea Bolch
- Heather Stacey, Bonlac Supply Company and Murray Goulburn
- Louise Brooks
- Graham Browne
- Julie Calsaferri
- Noel Campbell
- John Cantwell
- E & R Jones
- Carolyn Charles
- Vilya Congreave
- Samantha Cooper
- Kevin Corcoran, Corcoran Bros. P/L
- E & E Dowen
- Neil Duncan

- Stephen Fenwick
- Jeff Brown
- Theresa Walker-Hassett
- David Harper, Victorian Coastal Council
- Megan Clinton, Victorian National Parks Association
- Paul Bawden, South Gippsland Shire Council
- Kryzstof Bielecki
- Chris Smyth, Australian Conservation Foundation
- S & J Oliver
- Dominic Gilligan
- Gerald & Anne Busch
- Andrea Bolch, Your Water Your Say
- Amy Walker-Hassett
- Jeremy Loftus-Hill
- Peter & Christine Green
- Ruth Sonley & Don Ostler
- Kim Anderson
- Susannah Stewart
- Meryl & Hartley Tobin
- Malcolm & Dianne Towt
- Marie Trigg
- Aileen Vening
- Wilma Western
- Wendy Williams
- Brian Sutton
- Vern Burchett
- Helen & Jeff Cole
- Sandra Baher
- D & J Montesanti, c/o Complete Concrete Services
- Helen Dennis, Western Port Bird Observation and Conservation
- Patsy Hunt, Friends of the Koalas Inc
- Juanita & Michael Graves
- Jason & Tarli Kelly
- Barry Kendall
- Ross Lloyd
- Hamilton Doug, Cardinia Shire Council
- Peter Brown
- David & Carole Bourke
- Paula Horton
- L & A Evans
- Mary Crowley
- Linda & Rex Sanders
- Bob & Eileen Maguire
- Alan Fraser, Power Grid Option Group & Graceburn Park
- Terri Konstantinou, Sandcrash
- Beverley Walker, Victorian Coastal Alliance
- Mark Donaldson
- Bruce & Anne Gill
- Spyros Karamesinis

- Shirley Burchett
- Pauline Preston
- Lesley Holt
- Tom Whitfeld
- Martin Southwood
- Michael Hodge, Pakenham Racing Club
- Graeme Harrison, Environment and Natural Resources Committee

APPENDIX 3 DOCUMENT LIST

Document Number	Date	Description	Presented by
1	8/10/08	Request for DSE power supply information	Cardinia Shire
2	8/10/08	VCAT Dalyston decision Part A & Extract from GHD Desalination Plant Waste Management Report Part B	Mr Schinkel
3	8/10/08	Update powerline and pipeline maps	Proponent
4	14/10/08	Commonwealth Government response letter dated 9/10/08 on EES	Commonwealth Gov't
5	14/10/08	ASR Mid-Field & Far-Field Modelling Report	Proponent
6	14/10/08	Addendum report on Flora & Fauna Biosis Research	Proponent
7	14/10/08	Summary of submission issues	Proponent
8	14/10/08	EPA overview presentation	EPA
9	14/10/08	Bass Coast Shire overview submission	Bass Coast Shire
10	14/10/08	Baw Baw Shire overview submission	Baw Baw Shire
11	14/10/08	Watershed Inc. overview submission	Watershed Inc. c/o EDO
12	14/10/08	Power Grip Option Group overview submission	Power Grid Option Group
13	15/10/08	Mr Finlayson – GHD witness statement	Proponent
14	15/10/08	Mr Finlayson – GHD overhead presentation	Proponent
15	15/10/08	Dr Black – ASR witness statement	Proponent
16	15/10/08	Dr Black – ASR overhead presentation	Proponent
17	16/10/08	Independent Expert Group (IEG) report	DPCD – IEG
18	16/10/08	Mr Chidgey – CEE witness statement	Proponent
19	16/10/08	Mr Chidgey – CEE overhead presentation	Proponent
20	16/10/08	Mr Smales – Biosis Research witness statement	Proponent
21	16/10/08	Mr Smales – Biosis Research overhead presentation	Proponent
22	16/10/08	Dr Warne – CSIRO witness statement	Proponent
23	16/10/08	Dr Warne – CSIRO overhead presentation	Proponent
24	21/10/08	Central Coastal Board letter withdrawal from appearance	Central Coastal Board
25	21/10/08	Commonwealth referral response – controlled action	Commonwealth Government
26	21/10/08	Proponent response to information on power	Proponent
27	21/10/08	Steve Schutt witness statement	Cardinia Shire Council
28	21/10/08	Mr Henderson witness statement	Proponent
29	21/10/08	Mr Henderson overhead presentation	Proponent
30	21/10/08	Mr Phillips witness statement	Proponent
31	21/10/08	Mr Phillips overhead presentation	Proponent
32	21/10/08	Mr Wyatt witness statement	Proponent
33	21/10/08	Mr Wyatt overhead presentation	Proponent
34	22/10/08	Mr Boyle witness statement	Proponent
35	22/10/08	Mr Boyle overhead presentation	Proponent

36	22/10/08	Legal submission for EMF	Proponent
37	22/10/08	Gibbs report	Proponent
38	22/10/08	Mr Noronha witness statement	Proponent
39	22/10/08	Mr Noronha overhead presentation	Proponent
40	22/10/08	Ms Davies witness statement	Proponent
41	22/10/08	Ms Davies overhead presentation	Proponent
42	22/10/08	Mr Koller witness statement	Proponent
43	22/10/08	Mr Koller overhead presentation	Proponent
44	23/10/08	Table of responses to issues	Proponent
45	23/10/08	Attachment 1 to Table of Issues	Proponent
46	23/10/08	Attachment 2	Proponent
47	23/10/08	Proponents response to Inquiry Questions 1 to 5 & 8	Proponent
48	23/10/08	Mr Schinkel questions	Mr Schinkel
49	23/10/08	Mr Finlayson response to questions	Proponent
50	23/10/08	Longwarry & District Progress Association overhead presentation	Longwarry & District Progress Association
51	23/10/08	EPA overhead presentation	EPA
52	23/10/08	DSE Biodiversity 7 Ecosystem Services overhead presentation	DSE Biodiversity & Ecosystem Services division
53	23/10/08	Casey City Council overhead presentation	Casey City Council
54	23/10/08	Tunnel Boring email	Casey City Council
55	23/10/08	Baw Baw Shire Council overhead presentation	Baw Baw Shire Council
56	23/10/08	South Gippsland Shire Council overhead presentation	South Gippsland Shire Council
57	23/10/08	Bass Coast Landcare Network presentation	Bass Coast Landcare Network
58	24/10/08	VFF Presentation	VFF
59	24/10/08	Cardinia Ratepayers & Residents Association presentation	Cardinia Ratepayers & Residents Association
60	24/10/08	Petition	Cardinia Ratepayers & Residents Association
61	24/10/08	Further submission – Gloria O'Connor	Cardinia Ratepayers & Residents Association
62	24/10/08	National Trust overhead presentation	National Trust
63	24/10/08	Westernport Swamp Landcare Network presentation	Westernport Swamp Landcare Network
64	24/10/08	Friends of the Koalas presentation	Friends of the Koalas
65	24/10/08	Extract National Koala Conservation Strategy	Friends of the Koalas
66	24/10/08	Extract Biodiversity Action Plan – Strzelecki West Biodiversity Landscape Plan – Strzelecki Ranges Bioregion	Friends of the Koalas
67	24/10/08	Photo images x 4	Friends of the Koalas
68	24/10/08	Astronomical Society of Victoria presentation	Astronomical Society of Victoria
69	24/10/08	Astronomical Society of Victoria overhead presentation	Astronomical Society of Victoria

70	24/10/08	Report – a Rationale for the Mandatory Limitation of Outdoor Lighting Ver. 2.5 dated 20/10/08	Astronomical Society of Victoria
71	24/10/08	Phillip Island Conservation Society presentation	Phillip Island conservation Society
72	24/10/08	Friends of the Wonthaggi Heathland & Coastal Reserve presentation	Friends of the Wonthaggi Heathland & Coastal Reserve Inc.
73	24/10/08	Friends of the Wonthaggi Heathland & Coastal Reserve overhead presentation	Friends of the Wonthaggi Heathland & Coastal Reserve Inc.
74	24/10/08	CV of Mr Geoff Glare	Friends of the Wonthaggi Heathland & Coastal Reserve
75	24/10/08	Horticultural Peat Farmers Group presentation	Horticultural Peat Farmers Group
76	24/10/08	Western Port Bird Observation & Conservation presentation	Western Port Bird Observation & Conservation
77	24/10/08	Bass Coast Regional Health overhead presentation	Bass Coast Regional Health
78	27/10/08	Power Grid Option Group overhead presentation	Power Grid Option Group
79	27/10/08	Extract of Hydro-Tasmania Technical Report	Power Grid Option Group
80	27/10/08	Costings – overhead v. underground power supply	Power Grid Option Group
81	27/10/08	Photos x 2 – Mr Reilly	Jeff Reilly
82	27/10/08	Power Grid Option Group submission – greater detail	Power Grid Option Group
83	27/10/08	Sandcrash overhead presentation	Sandcrash
84	27/10/08	Jan Fleming presentation	Jan Fleming
85	27/10/08	Attachment to Ms Fleming's presentation	Jan Fleming
86	27/10/08	Beverley Walker presentation	Beverley Walker
87	27/10/08	Mr Gallienne overhead presentation	Cardinia Shire Council
88	27/10/08	Cardinia Shire Maps	Cardinia Shire Council
89	27/10/08	DPI Potato Cyst Nematode information sheet	Cardinia Shire Council
90	27/10/08	On farm hygiene Potato Cyst Nematode management sheet	Cardinia Shire Council
91	27/10/08	Cardinia Shire presentation	Cardinia Shire Council
92	28/10/08	Power Grid option Group cost comparisons	Power Grid Option Group
93	28/10/08	Mr Schutt overhead presentation	Cardinia Shire Council
94	28/10/08	Dr Simes overhead presentation & Addendum	Cardinia Shire Council
95	28/10/08	Indicative power supply costings	Cardinia Shire Council
96	28/10/08	Amended Performance Requirements	Cardinia Shire Council
97	28/10/08	Map of proposed Lang Lang bypass	Cardinia Shire Council
98	28/10/08	Sandcrash response to Table of Issues	Sandcrash
99	29/10/08	Dr Kaempf overhead presentation	Watershed Inc.
100	29/10/08	Watershed presentation	Watershed Inc.
101	29/10/08	List of recommendations	Watershed Inc.

102	29/10/08	Dr Maxfield presentation	Watershed Inc.
103	29/10/08	Dr Heislers presentation	Watershed Inc.
104	29/10/08	Mr Wingfield presentation	Watershed Inc.
105	30.10/08	Response to Inquiry question No. 10	Proponent
106	30.10/08	Mr Koller response to questions	Proponent
107	30.10/08	Bass Coast presentation	Bass Coast Shire Council
108	30.10/08	Bass Coast overhead presentation	Bass Coast Shire Council
109	30.10/08	Bass Coast Planning Scheme matrix	Bass Coast Shire Council
110	30.10/08	Bass Coast Minimum Requirements Attachment 3	Bass Coast Shire Council
111	31/10/08	Bass Coast presentation – Net community Benefit, Social, Economic & Governance issues	Bass Coast Shire Council
112	31/10/08	Bass Coast overhead presentation – Net Community Benefit, Social, Economic & Governance issues	Bass Coast Shire Council
113	31/10/08	Environmental Management Plan for Preliminary Site Works	Bass Coast Shire Council
114	31/10/08	Bass Coast & Surrounds Brochure	Bass Coast Shire Council
115	31/10/08	Governance Model	Bass Coast Shire Council
116	31/10/08	Bass Coast Research Requirements	Bass Coast Shire Council
117	31/10/08	Carolyn Charles plankton document & postcards	Carolyn Charles
118	31/10/08	David Wingfield overhead presentation	David Wingfield
119	31/10/08	Jane Jobe presentation	Jane Jobe
120	31/10/08	Pat Gordon presentation	Pat Gordon
121	31/10/08	Neil Duncan presentation	Neil Duncan
122	31/10/08	John Wright presentation	John Wright
123	31/10/08	Maria Riedl presentation	Maria Riedl
124	31/10/08	Cartoon	Viki Hain
125	31/10/08	CD – Tim & Jodie Layton presentation	Tim & Jodie Layton
126	31/10/08	Response from Stephen Boyle to questions	Proponent
127	5/11/08	Letter to Mr Kozaris from NASAA (16)	Taz Kozaris
128	5/11/08	Photos from Mr and Mrs Ferrier (27)	Geoff & Pam Ferrier
129	5/11/08	EES Extract Volume 5, Photos of Ms Priestley's House, extract from Mr Boyles Expert Witness Statement - documents from Ms Priestly (28)	Angie Priesley
130	5/11/08	Photographs from Ms Morphett (36)	Jan Morphett
131	5/11/08	Psychology and the Natural Environment Paper from Ms Dent (38)	Alisa Dent
132	5/11/08	Supplement to oral submissions – Bass Coast Boardriders Club from Mr John Gemmill (179)	John Gemmill
133	5/11/08	Hand drawn pictures from Ruby and Elijah Gemmill (1 set)	Ruby & Elijah Gemmill
134	5/11/08	Birds of the Powlett (Powerpoint) and Avifauna Consideration Paper, Mr Arnis Heislers (141)	Arnis 7 Una Heislers
135	5/11/08	EPA Response dated 31 October	EPA

136	5/11/08	Statutory Declarations re Whales from Watershed Victoria (Mr Heislers)	Arnis & Una Heislers
137	5/11/08	Additional submissions from Watershed Victoria in response to EPBC (Mr Heislers)	Arnis & Una Heislers
138	5/11/08	Powerpoint from Mr Morgan (4)	Sean Morgan
139	5/11/08	Submission and attachments from Ms Patricia Hunt (62)	Patricia Hunt
140	5/11/08	Submission – Mr and Mrs Hobson (67)	Colin & Beverley Hobson
141	5/11/08	Submission – Ms Juddery (84)	Dawn Juddery
142	5/11/08	Powerpoint presentation, George and Olivia Lineham (74)	George & Olivia Lineham
143	5/11/08	Aerial photograph – Mr and Mrs Atkins (75)	Nigel & Jennifer Atkins
144	5/11/08	Proponent Compliance Document – EE Act 1978, Mr Pollitt (76)	Andrew Pollitt
145	5/11/08	Submission from the Campbell Family (123)	Campbell Family
146	5/11/08	Response to Question on Notice concerning PRs – Tabled by Mr Morris	Proponent
147	5/11/08	PR Table with numbers – Tabled by Mr Morris	Proponent
148	5/11/08	Management and Mitigation Measures and PRs – Tabled by Mr Morris	Proponent
149	6/11/08	Michael Beasley presentation	Michael Beasley
150	6/11/08	Louise Brooks presentation	Louise Brooks
151	6/11/08	Mr Chapman presentation	PM & ME Chapman
152	6/11/08	Lyn Whitlam overhead presentation	Lyn Whitlam
153	6/11/08	Neil Rankine overhead presentation	Neil Rankine
154	6/11/08	Ms Karamesinis presentation	Spyros & Ismini Karamesinis
155	6/11/08	Jeff Brown presentation	Jeff Brown
156	6/11/08	M E & A J Marson presentation	M E & A J Marson
157	6/11/08	Darren & Sinead Hickmont overhead presentation	Darren & Sinead Hickmont
158	6/11/08	Melbourne Water response letter	Melbourne Water
159	6/11/08	Mr & Mrs Paterson presentation	Will & Nancy Paterson
160	6/11/08	Robin Middleton – Sandery Paper	Robin Middleton
161	6/11/08	Ms Stewart presentation	Barbara Stewart
162	6/11/08	Charlotte Laemmle presentation	Charlotte Laemmle
163	6/11/08	Peter Brown presentation	Peter Brown
164	6/11/08	Warren Raabe overhead presentation	Warren Raabe
165	6/11/08	Mr Schinkel presentation & attachments	Maurice Schinkel
166	6/11/08	Ms Martin presentation	Anwyn Martin
167	6/11/08	Mr Murray presentation	Joseph Murray
168	6/11/08	Mr & Mrs Wood presentation	Graham & Faye Wood
169	6/11/08	Mr Pearson presentation	Bill Pearson
170	7/11/08	DSE Biodiversity letter	DSE Biodiversity Section
171	7/11/08	Ms Heislers presentation	Suzanne Heislers
172	7/11/08	Mr Scullin presentation	Mr Scullin
173	7/11/08	Catherine Manning presentation	Catherine Manning
174	7/11/08	Mr Myhill letter	John Myhill

175	7/11/08	Response to EPA questions	Proponent
176	7/11/08	EPA correction letter & attachments	EPA
177	7/11/08	Response to questions taken on notice by proponent	Proponent
178	7/11/08	Response to questions taken on notice by the proponents experts	Proponent
179	7/11/08	Response from Dr Warne to Watershed questions	Proponent
180	7/11/08	Closing submission & attachments	Proponent
181	7/11/08	Spreadsheet – property valuations	Proponent
182	7/11/08	IEG response to Inquiry questions	Independent Expert Group
183	7/11/08	Bass Coast response to Performance Requirements	Bass Coast Shire Council

(Document list as of 8 November 2008)