

VICTORIAN DESALINATION PROJECT

ASSESSMENT

under

ENVIRONMENT EFFECTS ACT 1978

Minister for Planning

January 2009

LIST OF ACRONYMS

AAV	Aboriginal Affairs Victoria
AH Act	Aboriginal Heritage Act 2006
AHD	Australian Height Datum
ASS	Acid sulphate soils
CHMP	Cultural Heritage Management Plan, prepared under <i>Aboriginal Heritage Act 2006</i>
CM Act	<i>Coastal Management Act 1995</i>
CMA	catchment management authority
C&LP Act	<i>Catchment and Land Protection Act 1994</i>
CPRS	Carbon Pollution Reduction Scheme (proposed)
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
DPCD	Department of Planning and Community Development
DSE	Department of Sustainability and Environment
EE Act	<i>Environment Effects Act 1978</i>
EES	Environment Effects Statement
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EP Act	<i>Environment Protection Act 1970</i>
EPA	Victorian Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Comm.)
ESD	ecologically sustainable development
EVC	ecological vegetation class
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
FTE	full time equivalent
GGE	Giant Gippsland Earthworm
GHG	Greenhouse gas emissions
GL	gigalitre
ha	hectares
IEG	Independent Expert Group
IRC	Index of River Condition
IWMP	Industrial Waste Management Policy
km	kilometre
kV	kilovolts
Ministerial Guidelines	Ministerial Guidelines for Assessment of Environmental Effects under the <i>Environment Effects Act 1978</i>
m, m ³	metre, cubic metre
ML	megalitre

MRET	Mandatory Renewable Energy Scheme (proposed)
NVMF	Victoria's Native Vegetation Management Framework
OBP	Orange-bellied Parrot
PCN	potato cyst nematode
P&E Act	<i>Planning and Environment Act 1987</i>
PIW	Prescribed Industrial Waste under the <i>Environment Protection Act 1970</i>
PM₁₀	Particles or "particulate matter" with equivalent aerodynamic diameter of 10 micrometers or less
PPP	Public Private Partnership
ppt	part per thousand
PR	Performance Requirement
PUZ	Public Use Zone
RAP	Registered Aboriginal Party
RO	Reverse osmosis
SEC	Specific Energy Consumption
SEPs	Self Elevating Platforms
SEPP	State Environment Protection Policy
SEPP (WoV)	State Environment Protection Policy (Waters of Victoria)
SEPP N-1	SEPP N-1 (Control of Noise from Commerce, Industry and Trade No.S31 (1989))
SLO	Significant Landscape Overlay
SPPF	State Planning Policy Framework
SIA	Social Impact Assessment
TIA	Traffic Impact Assessment
TRG	Technical Reference Group
VDP	Victorian Desalination Project
WAA	Works Approval application

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Executive Summary

It is my assessment, having regard to the EES prepared by the Proponent, the recommendations of the Inquiry and advice from the Department of Planning and Community Development (DPCD), that the Reference Project assessed in the EES represents a broadly environmentally acceptable approach to the design, construction and operation of a reverse osmosis Desalination Plant located near Wonthaggi, as well as associated water transfer and power supply infrastructure.

While the Project will have unavoidable environmental impacts, these impacts can be substantially minimised through application of performance requirements that will determine how the final project is ultimately delivered by the Project Company. There is also scope to further mitigate and in some cases avoid the impact of certain components of the project through use of alternate construction techniques, adjusting local siting of some works, minimising waste streams, and implementing social offset programs.

Power Supply

Both overhead and underground technologies provide viable means to deliver power to the Desalination Plant. I also note that the visual impact of power supply would be reduced through use of pole technology and/or underground technology in certain locations. In addition, careful siting of lattice towers or poles could reduce operational impact of power infrastructure on farming activities and reduce risks of spreading soil pathogens.

Water Transfer Pipeline

The long-term environmental impacts of the pipeline will be largely negligible, while short-term impacts can be minimised through use of appropriate construction techniques (e.g. pipe-jacking) particularly where the pipeline crosses sensitive and important waterways.

Marine Impacts

The construction of the marine structures for the Reference Project would have limited footprint impacts, which could be minimised by avoiding high biodiversity reefs. Similarly, operation of the marine discharge would have limited ecological impacts if rigorous control of the quality of the discharge is maintained and the siting of the outlet is suitably separated from high biodiversity reefs.

Further surveys and monitoring of marine areas and conditions should commence prior to construction and continue during the construction phase and for at least three years following the commissioning of the plant and its continuous operation, to verify predictions and the minimisation of environmental impacts in the marine environment.

Regional Impacts

A program should be established by DSE to work with Councils and other agencies to facilitate management of the inevitable social effects of hosting a large scale construction workforce within the region, including social infrastructure and services, provision for housing, and community engagement.

Flora and Fauna Impacts

Project impacts on listed flora and fauna are unlikely to be significant, if the project works are implemented in accordance with Performance Requirements modified in response to this Assessment. Pre-construction surveys to confirm any occurrence of listed species as well as the application of appropriate contingency measures will be needed. In particular, careful siting of infrastructure near areas occupied by the Giant Gippsland Earth Worm will be essential to minimise impacts on this significant species.

Cultural Heritage

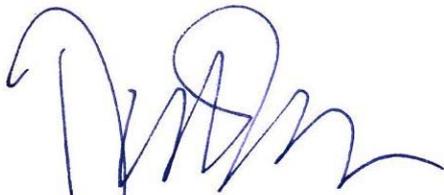
The project proponent will need to finalise Cultural Heritage Management Plans in consultation with relevant indigenous representatives and Aboriginal Affairs Victoria. Current cultural heritage site investigations will inform this.

Next Steps

My Assessment will inform subsequent decisions by Government in relation to the specific approvals that will be required, and also to the final form of the project that is to be implemented following the close of the Private Public Partnership (PPP) bid process. My Assessment indicates that in overall terms the approach to the Reference Project is environmentally acceptable, as it embodies many aspects of current world best practice design and environmental mitigation. My assessment also acknowledges that some variations and alternate approaches could be considered in the PPP process, which may offer overall benefits to the project and its environmental outcomes.

The key enabling statutory decisions that will be required and relevant decision-makers are:

- Planning scheme amendments – Minister for Planning
- Cultural Heritage Management Plan – Aboriginal Affairs Victoria
- Works Approval and Waste Discharge Licence – Environment Protection Authority
- *Coastal Management Act 1995* consent – Minister for Environment and Climate Change.



JUSTIN MADDEN MLC
Minister for Planning

1 Introduction

1.1 Purpose of this document

This document is the assessment of environmental effects ("Assessment") under the *Environment Effects Act 1978* (EE Act) for the proposed Victorian Desalination Project (VDP), including a seawater desalination plant west of Wonthaggi, Bass Coast, Victoria, together with associated water transfer and power supply infrastructure. It represents the final step in the Environment Effects Statement (EES) process under the EE Act by providing advice to decision-makers on the likely environmental effects of the proposal, their acceptability and how they should be addressed through statutory decisions.

This Assessment will inform the statutory decisions required under Victorian law for the Project to proceed; in particular approval of a Works Approval Application (No. WA64404) for the desalination plant under the *Environment Protection Act 1970* (EP Act) and approval for use and development of land under the *Planning and Environment Act 1978* (P&E Act). It will also be provided to the Australian Government Minister for the Environment, Heritage and the Arts, as part of the accredited assessment process under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), to inform his decision whether to approve the VDP under that Act.

1.2 Project description

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 (RO) desalination plant near Wonthaggi to produce drinking water from seawater. This will both augment Melbourne's water supply (as well as other regional water supply systems) and provide additional security by introducing a supply from a rainfall-independent source. It is the Government's intention that the plant and associated infrastructure will be operational by the end of 2011.

The Secretary of the Department of Sustainability and Environment (DSE) is the proponent of the VDP, on behalf of the Minister for Water, as the 'facilitating agency' nominated by an Order under the *Project Development and Construction Management Act 1994*.

The proposed VDP works comprise a desalination plant with the capacity to produce 150 to 200 gigalitres (GL) of drinking water per year, 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 in Berwick, and a power supply infrastructure to supply electricity for the plant and the Booster Pump Station as well as ancillary infrastructure. The VDP's components are presented in Figure 1.

The Government has adopted a Public Private Partnership (PPP) as the procurement method for the project in accordance with the Government's Partnership Victoria policy framework. 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.



LEGEND

- Desalination Plant Site Boundary
- Current Transfer Pipeline Corridor
- Northerly Grid Connection Corridor (500m)
- Municipality Boundary
- Highway
- Major Road
- Town

Figure 1: The Victorian Desalination Project Infrastructure

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), and Variations of the Reference Project as well as Options that might be considered by a PPP bidder. Environmental Performance Requirements (PRs) were put forward in the EES to provide a framework (subject to refinement) that the project would need to comply with.

The key features of the Reference Project elements are outlined in Table 1 below.

Table 1: Key Features of Reference Project

Project Component	Description of Reference Project elements ¹
<p>Desalination Plant</p> <p>Seawater desalination plant using RO technology to produce drinking water</p> <p>(built in modules of 50 GL to achieve design capacity of 150 to 200 GL per year)</p>	<ul style="list-style-type: none"> • Seawater Screens – travelling band screens with small aperture holes used to separate gross solids and entrained marine biota from intake seawater prior to pre-treatment process. • Screening Waste Handling – screening waste would be collected in wire baskets and stored in skips in the Screenings Room until being transported off-site by trucks. • Odour Control – Screenings Room would be ventilated and fitted with Odour Control Plant (an activated carbon filter) to reduce odour to acceptable levels before releasing air to atmosphere. • Seawater Pump Station – once screened, seawater would be pumped from below sea level up to a level at which it could gravitate through the pre-treatment plant. • Pre-treatment Plant – comprising chemical dosing, coagulation, flocculation, clarification and media filtration processes to remove naturally occurring suspended solids and organic material prior to RO desalination. • RO Desalination – The desalination process used to produce drinking water by separating dissolved minerals (i.e. a saline concentrate) out from the filtered seawater. RO technology involves ‘pumping’ water through a membrane under high pressure. The VDP’s desalination process would include two full trains (‘passes’) of the RO membrane to ensure required drinking water quality. • Post-treatment Plant (Potabilisation) – comprising stabilisation with carbon dioxide and lime, chlorination and fluoridation to make desalinated water suitable for drinking and transferring into Melbourne’s water supply system. • Clear Water Storage – large tanks used to store treated water on the plant site. • Transfer Pump Station – a pump station used to pump the treated water to the Transfer Pipeline. • Pre-treatment Waste – pre-treatment waste is a liquid waste stream known as ‘filter backwash’ from periodic cleaning of the pre-treatment filters. The filters need to be cleaned to remove the filtered solids and maintain efficient operation. • Pre-treatment Waste Management – consisting of solid thickening and dewatering of the filter backwash wastewater (a liquid waste stream collected after periodic cleaning of the pre-treatment filters). Clarified water would be recycled to the head of the Plant and the solid sludge disposed to landfill.
<p>Seawater Intake</p> <p>Offshore marine structure to draw seawater to the plant for</p>	<ul style="list-style-type: none"> • Intake Shaft – an onshore shaft, 10 m in diameter and approximately 65 to 70 m deep. • Intake Tunnel – tunnel located under the seabed and coastal dunes, 4 m in diameter and approximately 1.25 km long.

¹ Dimensions of the Reference Project’s elements are provided for the ultimate capacity of the desalination plant of 200 GL/year .

<p>desalination (design capacity 360 – 480 GL per year)</p>	<ul style="list-style-type: none"> • 4 Risers – concrete pipes approximately 1.6 m in diameter grouted to the rock surface then drilled down to the tunnel connecting the Intake Tunnel to the Intake Heads. • 4 Intake Heads – mushroom-shaped heads, 6 m in diameter, located 4-5 m above seabed and at minimum 15 m below surface of seawater. The Intake Heads would be fitted with entrance bar grills to prevent fish, mobile micro-invertebrates and large marine animals (i.e. penguins, seals) from entering the intake tunnel. • Marine growth control – the Heads and Tunnel would be intermittently dosed with chlorine to reduce marine growth.
<p>Saline Concentrate Outlet Offshore marine structure to dispose of saline concentrate, a by- product of reverse osmosis process (design capacity 210 – 280 GL per year)</p>	<ul style="list-style-type: none"> • Outlet Shaft – an onshore shaft, 10 m in diameter and approximately 65-70 m deep. • Outlet Tunnel – tunnel located under the seabed and coastal dunes, 3.2 m in diameter and approximately 1.5 km long. • 6 Risers – concrete pipes approximately 1.1m in diameter grouted to the rock surface then drilled down to the tunnel, connecting the Outlet Tunnel to the Rosette-style Diffusers. • 6 Rosette Diffusers – each rosette with 4 nozzles, located 2 m above seabed and at minimum 10 m below surface of seawater. Rosette Diffusers would be spaced out at 50 m.
<p>Water Transfer Pipeline</p>	<ul style="list-style-type: none"> • Pipeline – a single pipe, 1.8 m in diameter, approximately 85 km long that would connect the Desalination Plant to the existing Melbourne Water supply network near Soldiers Road in Berwick, from where water would be transferred to Cardinia Reservoir. The pipeline would be underground for its entire length. The permanent pipeline easement would be 15-20 m wide, whereas approximately a 30 m wide corridor would be required for construction of the pipeline. • Booster Pump Station – a pump station needed to provide additional pressure in the pipeline to deliver the required flow of treated water to Cardinia Reservoir. It would be located on the area of 1 – 2.5 ha, near the corner of Ballarto and Pound Roads, Cardinia and housed in a building 94 m long and 12 m wide. • Air Valves – located at all high points along the pipeline and approximately every 500 – 1000 m elsewhere. • Tanks – 4 tanks at the Booster Pump Station site and 3 tanks at the Transfer Pump Station located at the Desalination Plant site. • Booster Pump Station Transmission Lines – the pump station would require on average of up to 10 -18 MW of power per annum. • Ancillary infrastructure – common pipeline infrastructure, such as scour valves, access points for testing, divide valves, cathodic protection anode beds, test points, etc. • Sampling Station – A small sampling station located at near to or at the connection point of the pipeline and the Cardinia-Pearcedale main to test water quality.
<p>Power Supply (average power demand 92MW – 133MW)</p>	<p>A Northerly Grid Connection from Tynong North to the Desalination Plant , including:</p> <ul style="list-style-type: none"> • Tynong North Terminal Station – to provide connection to existing 220 kV networks. • Double-circuit 220 kV transmission line – power poles or lattice towers and approximately 61 km long overhead wires spaced at 250 to 450 m intervals. • Woolamai Terminal Station – to transform 220 kV to 66 kV needed to supply the Desalination Plant. • Three 66 kV transmission lines – underground cables to the Desalination Plant.

The following table indicates the Variations and Options to the Reference Project identified in the EES. A detailed description of the project, including the components of the Reference Project, Variations and Options, is provided in volumes 1 to 5 of the main EES document prepared by DSE.

Table 2. Variations and Options to the Reference Project's key elements

Key elements	Reference Project	Variations	Options
<i>Desalination Plant</i>			
Pre-treatment	Media filtration	Additional clarification process such as Dissolved Air Flotation	
		Membrane Filtration	
Pre-treatment Waste Management	Land disposal		Ocean disposal
Saline Concentrate Disposal	Ocean disposal		
<i>Marine Structures</i>			
Location of marine structure	Offshore on low profile reef	Alternative locations	
Intake	Direct intake in deep water		Seabed filtration
Marine conduits	Large tunnels and shafts	Multiple conduits/ pipes on the seabed	Tunnel and then pipes trenched through seabed
Intake head	Mushroom structure		
Intake screening	Grill on Intake Head		
	Mechanical Screens onshore	Passive fine screen at Intake Head	
Outlets	Rosette diffuser	Pipeline diffuser	
<i>Transfer Pipeline</i>			
Corridor/ alignment	Corridor with nominal alignment	Alignment deviations within corridor	Alternative corridor/ alignment
Booster Pump Station	Nominated location on alignment		Alternative location along the alignment or multiple stations
Dosing Facility	Dosing facility at the Plant		Dosing facility at the Booster Pump Station
<i>Power Supply</i>			
Grid connection/ corridor alignment	Northerly grid connection	Alternative alignment within corridor	Alternative corridor/ alignment
			Grid connection underground from Tynong to Woolamai
			Gas-fired power station at the Plant and gas supply lines
			Hybrid - gas-fired power station and wind farm

1.3 Environmental Setting

Desalination Plant and Marine Structures

The proposed site for the Desalination Plant is located approximately 90 km south-east of Melbourne between the townships of Wonthaggi and Kilcunda in the South Gippsland region. The main access to the site from Bass Highway is via Lower Powlett Road, with secondary access available from the Mouth of Powlett River Road.

The site covers the area of 264 ha comprising mainly of cleared farmland elevated above the floodplain of the Powlett River. A disused mineshaft from previous coal mining activities is located in the northern section of

the site. Mining activities stopped in 1968 and the mine remains disused. The site adjoins Kilcunda-Harmers Haven Coastal Reserve, with vegetated high dunes between the site and Williamson's Beach.

Terrestrial Environment

There are a number of small remnant native vegetation patches on the Desalination Plant site containing a low diversity of indigenous plant species which are likely to provide links between habitats for a number of bird and small mammal species. A number of damp depressions on the site and a few farm dams may provide habitat for native species, such as bird and frog species. These latter habitats are unlikely to be ecologically important because they are isolated from other water bodies and lack fringing aquatic vegetation.

The coastal dune and adjacent foreshore are adjacent to the south-west portion of the site. The crests of the dunes reach elevations of up to 20 m. Agricultural grazing has not extended into the dunes and its native vegetation is relatively undisturbed. The vegetation on the dunes comprises mainly native coastal scrub species interspersed with weed species, that provides habitat for a number of native animal species, including small mammals and reptiles. The coastal dunes also have Aboriginal cultural heritage significance with a number of coastal midden sites being recorded. Williamson's Beach is located between the dunes and Bass Strait. The beach provides habitat and breeding area for various bird species, including species protected under the *Flora and Fauna Guarantee Act 1988* (Vic) (FFG Act).

Fossilised remains (bones, teeth and vertebrae) of dinosaurs and marine reptiles have reportedly been found in a rock shelf at the mouth of the Powlett River, to the west of the site, and at other locations on the coast near the site.

The Powlett River flows to Bass Strait less than 1 km to the north-west of the Desalination Plant site. The Powlett River estuary is an intermittently opened and closed barrier estuary with an associated estuarine (saltmarsh) wetland. An unnamed tributary of the Powlett River crosses the north-eastern perimeter of the plant site. This tributary is a small, slow flowing ephemeral creek that flows into the lower reaches of the Powlett River. Upstream of the Plant site there are deeper pools that do not completely dry out. Various migratory and freshwater fish may use these pools for habitat during summer months.

Marine environment

The marine structures are proposed to be located in the marine waters of Bass Strait approximately 3 km from Wonthaggi to the south and 1 km from the Powlett River to the north. Sea depths in this area are initially relatively shallow and extend steeply from the beach before levelling out to around 40 m below sea level at 3,000 m from the shoreline. Flushing times for seawater in this area are approximately 120 days.

Two coastal protected areas and two marine parks, including Bunurong Marine National Park, are located within 20 km of the project area. These areas protect significant marine habitat and species. The Kilcunda-Harmers Haven Coastal Reserve adjoining the Desalination Plant site includes Williamson's Beach.

The coastline 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. Deep ocean swells can be felt on the seafloor at around 40 m depth. Sediments on the seabed would be subjected to wave stirring to at least 40 m depth in large long period swells. Ocean currents in the area are primarily controlled by tides and winds. Typical wind driven current strengths (when averaged through the water column) are about 1 percent of wind speed, while surface currents are about 3 percent. Typical wind-driven current strengths would 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 m per second. Maximum tidal currents rarely exceed 0.2 m per second.

There are a number of marine habitats within the area where the VDP Intake and Outlet structures are likely to be located, including: intertidal (located in the shore between the highest and lowest tides), subtidal (located below the mean low-water mark, almost always submerged) and pelagic (open ocean) habitats.

The majority of intertidal habitats from Kilcunda to Coal Point comprise sandy habitats, with small patches of rocky reef scattered along the coastline. Small seaweeds, snails and limpets dominate the intertidal community. At high tide, when these habitats are submerged, small reef fish also live in these areas.

Subtidal habitats experience variable environmental conditions, including substantial influence from physical factors such as turbulence caused by wave action. Subtidal habitats offshore from the VDP area comprise a mosaic of scattered reef of varying relief interspersed with small patches of soft sediments. The subtidal reefs and sand patches provide habitat for a wide range of seaweeds, invertebrates and fish species.

The pelagic habitat of Bass Strait incorporates an area of shallow continental shelf. The biological community found in the open ocean consists of plankton, fish and larger mammals such as whales, dolphins and sharks.

Water Transfer Pipeline

The investigation corridor for the Transfer Pipeline generally follows the Bass Highway and traverses the ridge to Woolamai, follows the South Gippsland Rail Trail and rejoins the Bass Highway at the Gurdies, continues up to Monomeith and north to Ballarto Road, and then onto the connection point near Soldiers Road, Berwick.

The corridor traverses over 100 waterways including rivers, streams and drains. Many of these waterways are ephemeral and dry for several months of the year and are of limited habitat value to most aquatic fauna. Approximately a quarter of these waterways would provide suitable habitat for fish. Amongst those with more diverse habitat are: Powlett River, Bridge Creek, Woolshed Creek, Tennant Creek, Bass River, Yallock Creek, Bunyip River, Lang Lang River, Toomuc Creek, Deep Creek, Cardinia Creek and Adams Creek.

In addition to these waterways, the pipeline corridor traverses or is located adjacent to a number of private and public land uses including the Bass Highway, agricultural and farm land, the South Gippsland Ranges, utility easements, including the BassGas and other easements and the Koo Wee Rup swamp area.

Power Supply – Northern Grid Connection

The Northerly Grid Connection would cross a range of distinct environments including coastal plain between Kilcunda and Wonthaggi (Bass Coast), Strzelecki foothills and Bass Valley and alluvial plain between Nyora and Tynong.

The coastal landscape between Cape Patterson and San Remo is valued by the community for its scenic qualities and is listed on the Register of the National Estate. Between Kilcunda and Cape Patterson, the coastline features rugged high cliffs, dunes and dramatic rock formations. West of Kilcunda, the steeply sloping Strzelecki foothills join the coast. Views are open and expansive, extending east towards Venus Bay and west to Phillip Island. Inland, the coastal plains present a generally cleared, flat landscape used for agriculture and farming. Some indigenous vegetation is present in road reserves and occasional remnant patches.

The Strzelecki foothills comprise the south-western section of the South Gippsland Ranges and feature steeply sloping hills that are subject to landslides and erosion. This region provides habitat for the EPBC-listed Giant Gippsland Earthworm (*Megascolides australis*). Some of the terrain is undulating with cypress rows and small pockets of native vegetation. The land is largely cleared for pastoral and farming uses. Small and medium farm dams are scattered across the landscape.

The Bass River is one feature of this region. It is lined by remnant vegetation and together with a number of other parks and areas zoned rural conservation, provides significant habitat for native flora and fauna. Numerous Aboriginal sites can be found along the Bass River, including artefact scatters and scar trees.

The alluvial plain is characterised by open, cleared farmland and market gardens, with frequent farm dams. North of the Princes Highway, the landscape changes to feature moderately hilly cleared farmland.

1.4 Structure of this Assessment

Section 2 of this Assessment outlines the assessment (EES) process and statutory approvals required for the VDP. It also introduces a set of evaluation objectives, based key aspects of relevant legislation and policy, which provide the basic structure for this Assessment.

The core part of this Assessment is found in Section 3, which provides findings on the environmental effects of the VDP within the context of the evaluation objectives. The section also makes findings on the Reference Project's acceptability and appropriate refinements, in particular for the PRs in the EES.

2 EES and Statutory Approvals

2.1 *Environment Effects Act 1978*

Preparation of EES

The Minister for Planning decided on 28 December 2007 that an EES was required under the EE Act to document the VDP's environmental effects². The EES was prepared by DSE in response to the Scoping Requirements issued by the Minister for Planning on 4 May 2008. The EES was exhibited for public comment, together with the Works Approval Application (WAA) No. WA64404 under the EP Act, from 20 August 2008 until 30 September 2008. Four hundred and five written submissions were received.

Independent Expert Group

As part of his EES decision, the Minister directed DPCD to:

'Convene a group of independent experts [i.e. Independent Expert Group (IEG)] 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 IEG was appointed in April 2008 to provide technical advice to the Secretary DPCD in relation to the preparation and assessment of the EES. The IEG members and their respective areas of expertise are:

- Prof. Michael Keough, Melbourne University - a specialist in marine ecology;
- Adjunct Prof. Desmond Lord, University of Western Australia - a specialist in oceanography including hydrodynamics;
- Dr Jenny Stauber, CSIRO Land and Water, Centre for Environmental Contaminant Research - a specialist in water and sediment quality, including eco-toxicology; and
- Mr Tom Pankratz, Water Consultants International - a leading specialist in desalination processes.

After reviewing the exhibited EES documentation, the IEG provided written advice to the Secretary DPCD on 16 October 2008 in relation to the hydrodynamic modelling in the EES as well as the marine ecological effects and technology choices for the Desalination Plant. This advice was made publicly available during the Inquiry hearing, as was subsequent IEG advice in response to questions from the Inquiry.

EES Inquiry

On 3 September 2008 the Minister for Planning appointed an Inquiry under section 9(1) of the EE Act to consider the environmental effects of the VDP, to address Terms of Reference previously issued by the Minister. The Inquiry comprised: Kathryn Mitchell (Chair), Nick Wimbush (Deputy Chair), Chris Harty (Member), Garth Lampe (Member) and Greg Sharpley (Member). The Inquiry was to provide a written report to the Minister providing information and advice on the likely environmental effects of the VDP, as well as advice on whether the environmental effects of the project are capable of being effectively managed.

² 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 humans live.

The Inquiry held a Directions Hearing on 8 October 2008 and public hearings over 15 days from 14 October 2008 to 7 November 2008. The Inquiry's report was submitted to the Minister for Planning on 4 December 2008 to inform his Assessment of the environmental effects of the VDP.

2.2 Statutory Approvals

Key Approvals

Under Victorian law, the VDP requires the following approvals:

- Authorisations under the *Planning and Environment Act 1987* (P&E Act) to provide for the use and development of the Desalination Plant, Water Transfer Pipeline and Power Supply infrastructure, i.e. under the Bass Coast, Casey, Cardinia and South Gippsland Planning Schemes.
- Works Approval under the *Environment Protection Act 1970* (EP Act) from the Environment Protection Authority (EPA) to construct the Desalination Plant and Marine Structures, as well as a subsequent Discharge Licence under the EP Act for the operation of the Plant and Marine Structures.
- Consent for use and development of coastal Crown land under *Coastal Management Act 1995* (CM Act), i.e. for the Marine Structures.
- Approval of Cultural Heritage Management Plan(s) (CHMP) under the *Aboriginal Heritage Act 2006* (AH Act) for the different components of the VDP.
- Consent for waterways crossings and groundwater extraction under the *Water Act 1989*, in relation to the Water Transfer Pipeline and Power Supply infrastructure.

Various secondary approvals needed for the VDP under Victorian law 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 also needs approval under the Commonwealth's 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 VDP under this Act. The conclusion of the accredited process will be the provision of the Minister for Planning's Assessment to the Australian Government Minister for the Environment, Heritage and the Arts.

Planning Approvals

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 the project land west of Wonthaggi 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. A further amendment to the Bass Coast Planning Scheme will be needed to enable the use and development of the land for the Desalination Plant, as well as for the Transfer Pipeline and the 220 kV powerline. I note that the 66 kV powerline may also require planning approval. Amendments to the Casey, Cardinia and South Gippsland Planning Schemes will be needed for the Transfer Pipeline, and to the Casey and Cardinia Planning Schemes for a 220 kV powerline.

EP Act Approval

The decisions by the Environment Protection Authority (EPA) with respect to the Works Approval and Discharge License will be substantially guided by EPA's assessment of the VDP's compliance with applicable State Environment Protection Policy (SEPP) and Industrial Waste Management Policy. For example, SEPP (Waters of Victoria) (SEPP (WoV)) sets objectives and attainment measures for maintaining environmental quality sufficient to protect existing and anticipated beneficial uses of aquatic environments (e.g. aquatic ecosystems, passive recreation, and consumption of crustaceans, molluscs and fish).

2.3 Evaluation Framework for Integrated Assessment

In assessing the environmental effects of the VDP, this Assessment takes into account legislation and policy that is either directly relevant to approval decisions or at least warrants consideration as part of the wider policy framework. In combination, the applicable provisions, objectives and standards from this legislative and policy framework guide the identification and evaluation of environmental effects in this Assessment.

To provide a comprehensive and integrated structure for this Assessment of environmental effects, aspects of legislation and policy that are relevant to the potential effects of the VDP have been synthesised into a set of evaluation objectives. These evaluation objectives provide a set of benchmarks for assessing likely environmental outcomes of the Project. A draft set of objectives were included within the EES Scoping Requirements for the VDP. These evaluation objectives have been refined and are now adopted for the purposes of this Assessment. See Table 3. Key statutes underpinning these objectives, in addition to the EE Act, are identified in Table 3. Specific aspects of applicable legislation and related policy underpinning these objectives will be highlighted in the individual sections.

In line with key legislation, including the P&E Act, EP Act and EPBC Act, as well as the EE Act, the Assessment has regard to the consistency of the Project with ecologically sustainable development (ESD). The first three of these Acts incorporate objectives and/or principles of "ESD" or "sustainable development". Further, the 2006 *Ministerial Guidelines for Assessing Environmental Effects under the Environment Effects Act 1978* ('Ministerial Guidelines') made under section 10 of the EE Act specifically require the assessment of the proposal and its effects to be in the context of the principles and objectives of ESD. The various evaluation objectives address different matters relevant to ESD, while the final evaluation objective provides an overall ESD synthesis.

Table 3: Evaluation Objectives

Evaluation Objectives	Key Statutes
<p>Economic Effects</p> <p>1. To avoid or minimise any adverse economic effects and to facilitate beneficial economic outcomes from establishing a desalination plant capable of producing up to 150 to 200 GL of water per year near Wonthaggi.</p>	<ul style="list-style-type: none"> • P&E Act
<p>Waste Management</p> <p>2. To ensure that performance criteria for construction and operation of project infrastructure will optimise avoidance, mitigation and management of waste streams consistent with the waste hierarchy and protecting beneficial uses.</p>	<ul style="list-style-type: none"> • EP Act
<p>Energy Efficiency and Greenhouse Gas Emissions</p> <p>3. To ensure optimal energy efficiency and mitigation of greenhouse gas emissions associated with construction and operation of the project to minimise overall greenhouse gas emissions consistent with applicable policy.</p>	<ul style="list-style-type: none"> • EP Act • <i>Renewable Energy Act 2006</i>
<p>Waterways and Groundwater</p> <p>4. To avoid or minimise to the extent practicable adverse effects of project construction and operational activities on inland waterways, water resources and floodway function.</p>	<ul style="list-style-type: none"> • EP Act • <i>Catchment & Land Protection Act 1994</i> • <i>Water Act 1989</i>
<p>Marine Ecology</p> <p>5. To avoid or minimise to the extent practicable adverse effects on marine (aquatic) ecosystems associated with marine construction or operation of the intake of seawater or discharge of saline concentrate.</p>	<ul style="list-style-type: none"> • EP Act • CM Act • EPBC Act
<p>Terrestrial Ecology</p> <p>6. To avoid or minimise to the extent practicable adverse effects of project construction and operational activities on species and ecological communities listed under the <i>Flora and Fauna Guarantee Act 1988</i> or EPBC Act, minimise impacts on other protected wildlife and indigenous species and communities as well as address requirements of the Native Vegetation Management Framework.</p>	<ul style="list-style-type: none"> • P&E Act • FFG Act • EPBC Act
<p>Cultural Heritage and Scientific Values</p> <p>7. To avoid or minimise to the extent practicable adverse effects of project construction on Aboriginal and post-settlement cultural heritage, as well as palaeontologic and geomorphologic values.</p>	<ul style="list-style-type: none"> • AH Act • <i>Heritage Act 1995</i>
<p>Landscape and Visual</p> <p>8. To avoid to the extent practicable any adverse effects of project construction on the character of significant landscapes as well as minimise adverse effects on visual amenity.</p>	<ul style="list-style-type: none"> • P&E Act • CM Act
<p>Residential and Recreational Amenity</p> <p>9. To avoid or minimise to the extent practicable adverse effects on residents' and coastal users' amenity due to noise, dust and related off-site effects during construction and operation of the project.</p>	<ul style="list-style-type: none"> • P&E Act • EP Act
<p>Other Land-uses, Activities and Infrastructure</p> <p>10. To avoid or minimise to the extent practicable adverse effects of project construction and operational activities on land uses (including agriculture and residential), tourism, marine activities (including commercial and recreational) and physical infrastructure.</p>	<ul style="list-style-type: none"> • P&E Act • CM Act

<p>Social and Community Infrastructure</p> <p>11. To avoid or minimise to the extent practicable adverse effects on social well-being including the local availability of social infrastructure and housing, due to construction and operation of the desalination plant and other project components.</p>	<ul style="list-style-type: none"> • P&E Act
<p>Management of Environmental Effects</p> <p>12. To provide a transparent framework with clear accountability for managing environmental effects and risks associated with the project to achieve acceptable outcomes.</p>	<ul style="list-style-type: none"> • P&E Act • EP Act • EPBC Act
<p>Ecologically Sustainable Development</p> <p>13. To enable outcomes consistent with ecologically sustainable development over the shorter and longer-term, having regard to the likely overall economic, social and environmental effects.</p>	<ul style="list-style-type: none"> • P&E Act • EP Act • EPBC Act

3 Integrated Assessment

This section presents an assessment of the environmental effects of the VDP within the framework of the integrated set of evaluation objectives outlined in section 2.3.

3.1 Economic Effects

Evaluation Objective - To avoid or minimise any adverse economic effects and to facilitate beneficial economic outcomes from establishing a desalination plant capable of producing up to 150 to 200 GL of water per year near Wonthaggi.

Key Statutory and Policy Context

Objectives of planning in Victoria under section 4(1) of the P&E Act that are relevant to the consideration of economic effects are:

- (a) to provide for the fair, orderly, economic and sustainable use, and development of land;
- (b) to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria;
- (e) to protect public utilities and other assets and enable the orderly provision and coordination of public utilities and other facilities for the benefit of the community; and
- (f) to balance the present and future interests of all Victorians.

Further, under section 4(2) of the P&E Act, the objectives of the planning framework established by the Act include:

- (d) to ensure that the effects on the environment are considered and provide for explicit consideration of social and *economic* effects when decisions are made about the use and development of land.

Clause 11.03-5 of the SPPF provides that in relation to "Economic well-being":

Planning is to contribute to the economic well-being of communities and the State as a whole by supporting and fostering economic growth and development by providing land, facilitating decisions, and resolving land use conflicts, so that each district may build on its strengths and achieve its economic potential.

In terms of State Government policy, Growing Victoria Together, 2005 is the 10 year vision for building a better society. Relevant economic goals include more quality jobs and thriving, innovative industries across Victoria and protecting the environment for future generations and efficient use of natural resources.

Discussion

The development of the Desalination Plant at Wonthaggi will provide vital economic and social benefits to Victorians through the augmentation of secure, potable water supplies in greater Metropolitan Melbourne, as well as through the injection of income and employment in the Bass Coast region and beyond. Moreover, the augmentation of high voltage power supplies to the Bass Coast/South Gippsland region (beyond that needed to supply the Desalination Plant) will significantly expand infrastructure capacities for economic growth.

Median household income levels in the main towns in Bass Coast Shire are low relative to the State average. While this may reflect a high proportion of single-income households, median individual income levels are also lower, by a margin of about 20 percent. This latter statistic may reflect a high proportion of retirees, unemployed workers, lower wage levels and/or part-time workers. Whatever the factors involved, the income and employment flowing from the construction of the Desalination Plant will provide a much-needed boost.

The extent of regional economic benefits will depend in large measure on the proportion of the project investment and work that flows to local firms and workers. The benefits will also reflect the increase in demand for goods and services from local businesses, including for project construction and transport services, as well as retail demand from project workers and their families.

The EES estimates that there are 15,000 construction workers and 26,000 manufacturing workers in the regional catchment including the Shires of Bass Coast, South Gippsland and Cardinia. However, the current skills shortage in the construction and manufacturing sectors in the Gippsland region means both that the scope for participation by regional workers is somewhat constrained and that some degree of competition between the project needs and other regional demands for labour is unavoidable. Importantly, the facilitation of local industry participation will be a central factor in determining the economic benefits that are won locally.

The EES acknowledges that a "large portion of the project labour is likely to be recruited from outside the local area, including through transfer of specialist labour from other desalination sites. It estimated that 1,825 full-time equivalent (FTE) jobs would be directly created by the VDP, with a further 2,920 FTE jobs indirectly created by flow-on effects particularly during the construction period. Of these, about 260 direct and 290 indirect FTE jobs are likely to be sourced locally, with similar numbers generated elsewhere in Bass Coast and South Gippsland Shires. The peak total workforce for all project components would be around 1,705 workers in late 2010. While only a small proportion of these jobs will be "new jobs", there is not expected to be a significant impact on existing businesses since the project will strengthen the level of labour force participation.

As called for by the EES Scoping Requirements, the EES addressed the potential for the project to cause adverse effects on productivity of agricultural land and other adjoining land uses, as well as on existing marine-based, commercial activities (including fishing and aquaculture) and eco-tourism activities, as well as costs of augmenting or upgrading of physical and social infrastructure to complement the project works and meet employees' needs. In this context, the EES identified the 'high' economic risks associated with construction as³:

- Losses from agriculture both during the construction of the Reference Project proposals for the power supply and transfer pipeline and/or due to potential impacts of dispersal of potato cyst nematode;
- The introduction (albeit unlikely) of abalone disease affecting the commercial viability of the local abalone diving industry;
- Reduced tourism-related business due to a reduction of tourist numbers in response to a perception of "industrialisation" of the Wonthaggi/Kilcunda coast;
- Demand for accommodation from workers impacting on the local availability and cost of accommodation and housing.

As discussed in section 3.10.3 of this Assessment, the 'worst-case' scenario for project impacts on agriculture from the power supply Reference Project could result in significant aggregate losses (in the range of \$3 to \$12 million in capitalised value). On-going impacts from the underground pipeline are unlikely to be in the same range as for an overhead powerline. Consequently, the appropriate siting of the powerline and pipeline

³ The 'high' socio-economic risks associated with the VDP's operation identified in the EES were predominantly "social impacts".

infrastructure as well as effective rehabilitation of the construction easements will be the key to minimise adverse effects on agriculture and hence economic losses.

In relation to commercial fishing, the impacts of entrainment and impingement on larvae and other marine biota at the seawater Intake, as well as the discharge of saline concentrate, are unlikely to have major consequences. However, there is some uncertainty involved in this regard. During the construction period at least, the key source of impact on marine-based commercial activities will be the existence of an exclusion zone, which will preclude fishing in the vicinity of the Intake and Outlet Structures. Consequently, in the context of the exclusion zone and potential operational impacts, some local fishers may need to pursue other fishing opportunities in region waters. These potential impacts are discussed in section 3.10.1 of this Assessment.

The Bass Coast Shire attracts an estimated 3.4 million visitors annually, a large majority of whom are from Victoria, and most (58 percent) are day-trippers. Ninety-four percent visit Phillip Island, the Shire's primary attraction. It is implausible that the VDP would cause an impact on the region's coastal amenity such as to affect visitation to Phillip Island. Moreover, since the development of the Desalination Plant to the west of Wonthaggi is only likely to have a localised and largely temporary impact on coastal amenity, a sustained reduction in the current 26 percent of visitors to Bass Coast for holidays and leisure who visit the Wonthaggi area is unlikely. In this context, any reduction in tourism-related income is not likely to be large or enduring. Total current expenditure by visitors to the Shire is estimated to be \$224 million per annum.

Project impacts on the local availability and cost of accommodation and housing will largely depend on the implementation of a sound strategy to provide workforce accommodation while mitigating adverse social effects. This issue is discussed further in section 3.11 of this Assessment.

Conclusion

Having regard to the EES investigation, public submissions and Inquiry's report, it is my assessment that:

- The implementation of the VDP is of critical importance for the orderly development of secure water supply infrastructure to meet the social and economic needs of Victorians.
- Its implementation will have an overall positive economic impact on regional income and employment, including increasing local industry participation in major infrastructure development.
- The VDP augmentation of high voltage power supplies to the Bass Coast/South Gippsland region will significantly expand infrastructure capacities for economic growth.
- 'Worst case' economic impacts on regional agriculture from the development of VDP linear infrastructure would be relatively minor compared to the economic and social benefits of the Project.
- Potential impacts of the VDP Marine Structures on marine-based commercial activities, though uncertain, would be relatively minor compared to the economic and social benefits of the Project.
- The VDP is unlikely to have a significant economic impact on regional tourism.
- While the VDP could have some adverse socio-economic effects in the Bass Coast region (e.g. in relation to housing costs), these could be mitigated if sound strategies are developed and implemented expeditiously.

3.2 Waste Management

Evaluation Objective - To ensure that performance criteria for construction and operation of project infrastructure will optimise avoidance, mitigation and management of waste streams consistent with the waste hierarchy and protecting beneficial uses.

Key Statutory and Policy Context

The *Environment Protection Act 1970* (EP Act) establishes a number of principles directly relevant to the generation and management of wastes, including the Principle of Waste Hierarchy and the Principle of Product Stewardship. A range of regulations and policies made under the EP Act are also relevant to the VDP, including:

- Environment Protection (Prescribed Waste) Regulations (1998) (Vic)
- Industrial waste management policy (Prescribed Industrial Waste) (2000) (Vic)
- Industrial waste management policy (Waste Acid Sulphate Soils) (1999) (Vic).

Project Context

Desalination Plant

The construction of the Desalination Plant would produce waste streams from two main activities:

- Bulk earthworks - site preparation and tunnelling of the intake and outlet structures would generate between 1,000,000 and 1,500,000 bulked m³ of mostly fill material, which could be utilised in the construction of a screening bund around the plant. There is also some potential for acid sulphate soils (ASS) to be excavated from the northern part of the plant site, which would present a disposal challenge. In addition, small volumes of wastes (e.g. bentonite slurry from tunnelling) likely to be classified as Prescribed Industrial Waste (PIW) could require disposal at a PIW landfill; and
- Infrastructure development – wastes from the construction of building and installation of structures and fit-outs, concrete batching plant, hydraulic, electrical and mechanical systems, and external works, that would include solid inert waste, putrescible waste and PIW.

The Desalination Plant's operation would generate various wastes streams specific to the desalination process, either continuously or intermittently. Wastes from the Reference Project would include:

- Screenings from the seawater intake, which would contain macroscopic marine biota, sediments and other entrained materials, which could be classified as putrescibles waste and/or PIW depending on waste odour and handling methods. The volume would depend on the intake location and marine environmental factors;
- Pre-treatment backwash wastewater from filter cleaning, which would contain colloidal material (i.e. suspended solids, organics, salt) as well as coagulants and flocculants (e.g. metal oxide, organic polymer coagulant aid) used to remove the colloidal material from seawater. Between 9,000 and 23,000 tonnes/year of wet sludge (15 - 35% solids) may be produced, depending on seawater quality and the efficiency of both the pre-treatment and dewatering processes. Its classification as either solid inert waste or PIW has yet to be determined;
- Pre-treatment media including sand (about 11,000 tonnes every 10 years), gravel and anthracite (about 10,000 tonnes every 10 years), which would need to be replaced and disposed to landfill;
- Discarded equipment (filter media, cartridge filter elements and RO membranes), which would be classified as solid inert waste or PIW needing to be disposed to landfill. Between 35,000 and 70,000 cartridge elements (weighing up to 420 tonnes in total) used to filter the pre-treated water prior to its entry to the first pass RO membranes would be produced each year. About 12,000 spiral-wound RO

membranes manufactured from a range of plastic material and weighing about 170 tonnes, but yet to be classified as solid inert waste or PIW, would be discarded to landfill each year;

- Lime sludge from the potabilisation of the produced water using lime water, amounting to between 3,500 and 10,500 m³/year of sludge, depending on the amount of lime needed and effectiveness of dewatering. This sludge would be disposed to landfill;
- RO plant membrane cleaning wastes, including both high pH solutions (e.g. caustic soda, sodium bisulphite, ammonia, detergents) used to remove salt scale from the RO membranes and low pH solutions (hydrochloric acid, citric acid, biocides) used to remove organic matter. Between 8,000 and 16,000 m³/year for each type of cleaning solution would be needed, depending on frequency of membrane cleaning. This liquid waste could be disposed to the ocean with the saline concentrate.

However, actual waste streams and quantities produced by the Desalination Plant may differ from these considered in the EES, depending on the adopted final design.

The EES assessed wastes generation during construction and operation of the Desalination Plant as well as waste management options against the waste hierarchy, in terms of opportunities for waste avoidance, reduction, reuse, recycling and recovery of energy⁴.

Water Transfer Pipeline

The volume of excess soil generated by trenching and laying of the pipeline will be about 6,600 m³ per km of pipe, allowing for a bulking factor of about 1.3. While around 550,000 m³ of this excess soil will be able to be disposed as clean fill, several sources of soil contamination will need further investigation and special management responses:

- Small amounts of soil contaminated with farm chemicals may be encountered from areas where there were previously dipping pits;
- Potential ASS will be encountered at the Powlett River crossing, and potentially at sites around the former Koo Wee Rup swamp. The total volume of these wastes is expected to be relatively small (e.g. less than 4,500 m³ at Powlett River);
- About 6 km of pipe will be constructed through a declared potato cyst nematode (PCN) area, which will generate at least 25,000 m³ of soil for treatment and/or safe disposal;
- An area of the pipeline corridor near the Bass River may be infected with Cinnamon Fungus *Phytophthora cinnamomi*. Infection with *Phytophthora* is listed as a threatening process under both the EPBC Act and the FFG Act, and soil from infected areas would need to be disposed of according to DSE protocols, and vehicle hygiene procedures put in place for construction vehicles operating in infected areas.

Power Supply

The EES indicated that waste arising from both the construction and operation of the Northerly Grid Connection for the Reference Project would be similar in nature to those for the Transfer Pipeline. The likely quantity of the excavated material was estimated as approximately 130,000 m³. Approximately 39,000 m³ of the construction material would not be reused due to low level of contamination due to either past and/or current land uses, including agricultural activities and railway lines.

⁴ EES Appendix 8 and Section 9 of the Works approval Application (WA 64404)

Discussion

The key waste management issues associated with the VDP are:

- Accurate classification of waste streams
- Application of the Waste Hierarchy and minimisation of waste generated
- Landfill capacity

Waste Classification

The EPA has yet to resolve which waste streams from the desalination process will be classified as the PIW, needing disposal to landfills licensed to receive PIWs. Waste streams would be characterised and classified based on the final detailed design. The classification of various waste streams will determine the landfill types and capacities needed to accommodate the VDP wastes.

Waste Minimisation

In considering the application of the waste hierarchy, the EES concluded that most waste streams from the operation of the VDP cannot be avoided, due to the specific nature of the desalination process. Moreover, it was concluded that alternatives for recovery and reuse of the salty wastewater or its constituents are not yet practicable and the likely initial handling method for the majority of other waste would be disposal to landfill. Some materials from the desalination process can be reused repeatedly until they degrade (e.g. RO membrane cleaning solutions). A key opportunity to reuse construction wastes is the use of the majority of excavated spoil as fill material for screening bunds around the plant.

Different scenarios for the volumes and characteristics of waste streams arise from project variations and options canvassed in the EES. For example, the quantity of pre-treatment backwash wastewater might be reduced by the use of alternative pre-treatment technology or further dewatering processes in the final design. Membrane filtration technologies, such as ultrafiltration or microfiltration were outlined in the EES as possible variations within the pre-treatment process used in the Reference Project. These technologies require less coagulant to remove suspended solids and organics from the intake seawater, and hence could reduce quantities of wet sludge. The final design may also incorporate further dewatering, e.g. using centrifuges, to reduce water content in the sludge (estimated at 65 to 85 percent seawater for the Reference Project).

Ocean discharge of the pre-treatment waste (i.e. backwash wastewater) together with the saline concentrate was identified as an option in the EES, but the toxicity of this whole pre-treatment waste stream has not been assessed (the EES considered toxicity testing results using waste stream samples from a Western Australian RO plant). The pre-treatment wastes are likely to include chemicals, such as ferric oxide, chlorine, acid, polyDADMAC, sodium bisulfite and polyphosphate. Ferric oxide has an intense red colour which is likely to remain in the pre-treatment sludge. Discharge of the pre-treatment waste (both solid and liquid) together with the saline concentrate could form a visible plume that may not adhere to the SEPP (WoV) aesthetic objective, which does not allow discharges to cause 'objectionable colours in waters'. Discharge of the pre-treatment sludge could also cause smothering of benthic biota in the immediate vicinity of the outlet and indirect effects due to iron precipitation in both sediment and water.

I note that the IEG advised that it "... would not support (pre-treatment) sludge disposal to sea as this is not world's best practice for desalination plant operation". Further, both the EPA and the Inquiry supported the Reference Project proposal for the disposal of pre-treatment wastes to landfill rather than to ocean, because this is the best practice approach being adopted by desalination plants currently being commissioned or designed in Australia and overseas.

I note that the Inquiry was concerned in relation to the crossing by the Transfer Pipeline and Northern Grid Connection of areas infected by potato cyst nematode (PCN) and *Phytophthora* noting “there is no estimate of the likely volume of contaminated spoil involved or identification of potential landfills” within the EES documentation. It considered that this issue had been inadequately assessed to date and could pose a serious problem; consequently, “route design variations which minimise crossing affected land” should be investigated. The key to minimising the extent of this problem, including the amount of contaminated spoil, will be to minimise the route length crossing infected land. The process for addressing route variations is addressed in section 3.12 of this Assessment.

The EES proposed PR 19.2 requiring the Project Company to “develop and implement a long term waste minimisation and management plan for the construction and operation phases of the Project”. The completion of such a plan to effectively minimise and manage a number of waste streams will be a key challenge for project implementation.

Landfill Requirements

The EES reviewed existing landfills within the Gippsland Regional Waste Management Group (GRWMG)⁵ and the Melbourne metropolitan area in terms of their capacity to accept different waste types as well as other issues or constraints with respect to the VDP (Technical Appendix 8):

- There is limited capacity to dispose of non-PIW (.e. solid inert and putrescible waste) to landfills in the GRWMG area. Landfills presently operating in the Melbourne metropolitan area may be in a better position to receive non-PIW from the VDP. A number of the latter landfills have a life expectancy greater than the design life of the VDP (i.e. post 2040 for putrescible waste);
- The only landfill licensed to accept most of the VDP’s solid PIW is the SITA landfill at Taylors Road, Lyndhurst in the Melbourne metropolitan area (expected to operate until 2020);
- None of the landfills in the GRWMG’s area are licensed to accept the range of PIW to be generated by the VDP, as well as acid sulphate soils. The Grantville, Callignee and Dutson Downs landfills could accept Category C PIW, providing it was demonstrated that these are best practice municipal landfills and an amendment to their licences was obtained from EPA;
- The SITA Elizabeth Drive Landfill, located in Kempas Creek, NSW, could accept a broad range of PIW wastes to be generated by the VDP. It is expected to operate for the next 15 to 20 years.

I note that the Inquiry found that the EES did not clearly identify which landfills have suitable capacity to accept the Reference Project’s waste streams. It will be necessary for the Project Company to characterise the various waste streams in consultation with the EPA and to identify and set in place long-term contracts with appropriate landfills licensed to take each stream.

Conclusion

Having considered the EES findings, the IEG’s advice and the Inquiry Report, it is my assessment that:

- The approach to waste minimisation and management outlined in the EES is generally sound, though vigorous efforts will be needed to effectively minimise and manage waste streams including pre-treatment backwash wastewater (sludge) as well as PCN and *Phytophthora* contaminated soils.
- The disposal of pre-treatment wastes to landfill (as opposed to the ocean) should be adopted since it is consistent with best practice for RO desalination plants.

⁵. The GRWMG operates within the municipalities of Bass Coast, Baw Baw, East Gippsland, Latrobe, South Gippsland and Wellington.

Further, it is my assessment in relation to the draft Performance Requirements (PRs) put forward in the EES as part of the Environmental Management Framework, that the following changes be adopted:

- **Modify PR 19.2** to require the Project Company to: "Develop and implement a long-term waste minimisation and management plan for the construction and operational phases of the VDP, incorporating best practice measures to reduce the quantities of particular waste streams and minimise associated environmental impacts - including landfill requirements and greenhouse gas emissions - to the extent practicable, to the satisfaction of the EPA."
- **Amend PR 5.4 to read:** "Comply with the *Plant Health and Plant Products Act 1995* and the *Plant Health and Plant Products Regulations 2006* relating to declared Potato Cyst Nematode (PCN) control area at Koo Wee Rup".
- Because *Phytophthora* affects both native and exotic plants, **amend PR 6.6 to read:** "Adopt construction hygiene measures for earthworks, specifically for movement of soil, plant, vehicles and personnel in and out of areas that may be infected with *Phytophthora cinnamomi* in accordance with 'Victoria's Public Land *Phytophthora cinnamomi* Management Strategy" 2008 and any specific protocols issued by DSE."
- As suggested by the Inquiry, add a **new PR 16.4:** "Ensure that the environmental management plan for the Powlett River crossing addresses potential acid sulphate soils in the vicinity of Powlett River and the project site, and its interaction with groundwater dewatering, floods, flora and fauna and the construction techniques".

3.3 Energy Efficiency and Greenhouse Gas Emissions

Evaluation Objective - To ensure optimal energy efficiency and mitigation of greenhouse gas emissions (GHG) associated with construction and operation of the project to minimise overall greenhouse gas emissions consistent with applicable policy.

Key Statutory and Policy Context

The *Renewable Energy Act 2006* establishes the Victorian Renewable Energy Target (VRET) scheme and requires the majority of wholesale buyers of electricity in Victoria to obtain a specified percentage of their electricity from renewable sources. This Act is similar in effect to the Commonwealth *Renewable Energy (Electricity) Act 2000* that introduced the Mandatory Renewable Energy Target (MRET) Scheme nationally. These two Acts have the purpose of encouraging investment in renewable energy generation.

Victorian regulations and policy to encourage energy efficiency and reduction of GHG emissions include the:

- *Environment Protection (Environment and Resource Efficiency Plans) Regulations 2007* made under the EP Act require the largest commercial users of energy (and water) to prepare and implement an Environment and Resource Efficiency Plan (EREP) to improve resource efficiency at their premises - including the reduction in GHG – and then report on their progress.
- *Protocol for Environmental Management: Greenhouse Gas Emissions and Energy Efficiency in Industry* (PEM), made under the State Environment Protection Policy (SEPP) (Air Quality Management), specifies the steps that companies need to take to demonstrate best practice energy efficiency and minimisation of GHG.

The Australian Government intends to introduce the Carbon Pollution Reduction Scheme (CPRS) in 2010, a single national 'cap and trade' scheme to abate GHG emissions that would replace both MRET and existing

state-based targets (including the VRET scheme) with a market-based system of carbon pollution permits within an overall target for emissions. It has not been confirmed whether the CPRS would apply to the VDP.

Discussion

The key issues for the VDP in relation to GHG emissions are:

- Response to the current policy on energy efficiency and mitigation of GHG; and
- Demonstration of best practice in the design and operation of the VDP (i.e. energy efficiency and minimisation of GHG, including transmission losses of the power supply infrastructure).

Wholesale electricity buyers in Victoria that are subject to both the Commonwealth's MRET and the State VRET schemes need to comply with both. In response to the current Victorian and Commonwealth statutory framework, the Victorian Government made the following 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 credits⁶ [sic - 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".⁷

The EES evaluated the benefits of this commitment by estimating the annual GHG emissions associated with operating the Reference Project (150 GL/year capacity), both with and without offsetting these emissions. The 1,047,700 tonnes CO₂ equivalent (t CO₂-e) that would be offset represents 94 percent of the estimated 1,117,950 t CO₂-e that would be attributable to the VDP operation. Of the GHG emissions to be offset, the most is associated with the 82 MW power requirement for the Plant (933,820 t CO₂-e) and with the 10 MW power needed for the Transfer Pipeline (113,880 t CO₂-e). The majority of the residual GHG emissions from operation of the VDP would result from decomposition of wastes⁸ from the desalination process (43,330 t CO₂-e). The embodied emissions of materials used for construction of the Desalination Plant amount to 988,350 t CO₂-e, comprising 823,280 t CO₂-e from construction materials and 165,070 t CO₂-e associated with the power consumption for tunnel boring.

The EES notes that the likely future increase of supply of low or no emission generation into the Victorian grid would gradually reduce the overall emission intensity of the Victorian energy generation, and consequently the VDP's emission factor would be also reduced⁹. However, the technology adopted for the VDP will be the key driver of its energy efficiency and emissions intensity.

Energy efficiency was also a criterion used in the evaluation of power supply options¹⁰. The Proponent's Closing Submission to the Inquiry stated that the Reference Project 220 kV overhead powerline would have power losses of 6.7 MW at a full load of 270 MW. In terms of underground options, a 220 kV HVAC underground powerline would have a lower power loss (3.7 MW), while a DC high-voltage underground powerline would have a higher power loss (10 to 11.3 MW). While the comparative efficiency was a matter of some debate at the Inquiry, I note the need for the proposed power supply augmentation to provide effective

⁶ In practice, implementation of the offset commitment would require an accredited renewable energy generator to generate and transfer to the grid an amount of renewable energy, equivalent to the electricity consumed for the operation of the VDP. Purchase of the required number of RECs would offset 100% of operational emissions of the VDP, as a Renewable Energy Certificate (REC or VREC) represents one megawatt hour (MWh) of electricity produced, without greenhouse gas emissions, by an accredited renewable energy generator.

⁷ EES Volume 1, page 13

⁸ These wastes are categorized as 'other indirect emissions' under the *National Greenhouse and Energy Reporting Act 2007* (Commonwealth). These emissions do not require reporting to avoid duplication with other reporting entities (i.e. landfill operators).

⁹ Technical Appendix 7, page 33

¹⁰ Technical Appendix 81

security of supply to both the VDP and the power grid in the Bass Coast/ South Gippsland region. I also note that other factors bear on the choice of the power supply option and route, as discussed in section 3.12.

The Reference Project incorporates a number of efficiency measures to minimise energy consumption, including:

- the use of open ocean seawater for the plant intake requires less pre-treatment and consequentially less energy;
- the civil layout design for the Desalination Plant minimises pumping requirements, since the plant would be located close to the coast and both the pre-treatment plant and saline concentrate outfall were designed to operate under gravity flows; and
- the process parameters and mechanical equipment were selected to reduce Specific Energy Consumption¹¹ (SEC) of the VDP (e.g. energy recovery devices, variable speed drives).

The EES estimated that the SEC for the Reference Project would range from 4.0 to 4.6 kWh/kL, which is within the range being reported by currently operating RO plants which varies from 3.6 to 4.3 kWh/kL of produced water¹². The relative coolness of the Bass Strait seawater increases the energy required for the RO process. I note that the IEG confirmed the Desalination Plant and marine structures components of the Reference Project to be consistent with industry best practice, incorporating proven techniques for reducing energy consumption including the use of isobaric energy recovery devices.

The EES proposed two performance criteria in relation to GHG, which require:

- Energy Efficient Design in accordance with Protocol for Environmental Management - Greenhouse Gas Emissions and Energy Efficiency in Industry.
- Compliance with the Environment and Resource Efficiency Plans reporting and management requirements.

In addition, PR 25.3 would require the Project Company to “demonstrate design, selection of project components and consumables [that] minimises Greenhouse Gas Emissions to the extent reasonably practicable”. In relation to energy efficiency, PR 11.3 requires a SEC for the desalination process that is “less than 4.6 kW/kL ... or to satisfaction of EPA”.

Conclusion

The VDP will entail significant GHG emissions, as an unavoidable environmental cost of the RO desalination process – which is nonetheless an efficient technology for desalinating water, to provide a secure source of potable water to augment supply capacities for metropolitan Melbourne and potentially the Bass Coast/South Gippsland area. In this context, the Victorian Government’s commitment to offset the GHG emissions associated with energy consumption for operation of the Desalination Plant and the Transfer Pipeline via the purchase of Renewable Energy Certificates is appropriate. However, it is also essential that best practice is applied to ensure optimal energy efficiency and minimisation of GHG emissions.

Having considered the EES, the IEG’s advice and the Inquiry’s Report, it is my assessment that the Project Deed between the State and the Project Company include an obligation for purchase of Renewable Energy Certificates that would have the effect of offsetting energy consumption sourced from the Grid for the operation of the Desalination Plant and the Transfer Pipeline.

¹¹ Specific Energy Consumption (SEC) is an indicator commonly used to assess an overall energy efficiency of a desalination plant. SEC is measured as the total operating energy per volume of potable water produced by the plant and expressed in kilowatt-hours per kilolitre of water (kWh/kL).

¹² EES Volume 1, Chapter 8, page 32

Further, it is my assessment that the following modification to the draft EES Performance Requirements be made in relation to the management of energy efficiency and GHG emissions for the VDP:

- **PR 11.3 be modified** to require a SEC for the desalination process that is “**low as reasonably practicable and to the satisfaction of EPA**”.

I also note the Assessment response in the previous section that PR 19.2 be modified to require the Project Company develop and implement a long-term waste minimisation and management plan, for among other purposes, to reduce greenhouse gas emissions to the extent practicable.

3.4 Waterways and Groundwater

Evaluation Objective - To avoid or minimise to the extent practicable adverse effects of project construction and operational activities on inland waterways, water resources and floodway function.

Key Statutory and Policy Context

While SEPP (WoV) provides the statutory policy framework for protection of the environmental quality and beneficial uses of surface waters in Victoria, SEPP (Groundwaters of Victoria) provides for the equivalent protection of beneficial uses of groundwater, including groundwater-dependent aquatic ecosystems.

Under the *Catchment and Land Protection Act 1994*, catchment management authorities (CMAs) are responsible for managing the health of waterways under their jurisdiction. River Health Strategies have been developed for the Port Phillip and Westernport Region as well as the West Gippsland Region, within the framework of the respective Regional Catchment Strategies made under the Act. CMAs also have specific responsibility to issue permits for works on designated waterways under the *Water Act 1989*. Such permits will be needed from Melbourne Water or West Gippsland CMA before VDP water crossings can be constructed.

DSE Water Supply Protection Areas are proclaimed under the *Water Act 1989*. The majority of the Transfer Pipeline corridor is proclaimed as a Water Supply Protection Area, and hence permits will be required for groundwater pumping for any dewatering in conjunction with the pipeline development.

3.4.1 Desalination Plant

Key Issues

Construction of the Desalination Plant will require some levelling of the plant site, and hence will result in areas of exposed soil. The associated erosion hazard will need to be managed using conventional construction site management techniques, including for stormwater runoff.

The Reference Project design envisages a split level site, which would not require fill extending beyond the Probable Maximum Flood line based on the 1 in 10,000 annual exceedance probability. While an increase in runoff from impervious surfaces on the site will occur during rain events, this will not increase aggregate runoff in the Powlett River catchment by more than 2 percent, and because the site is at the downstream end of the catchment, the increased runoff will not cause an increase in peak discharges.

With no measurable change to flooding or peak discharges at the site, there is not predicted to be any resultant impacts on local flood dependent ecosystems.

The elevation of the Desalination Plant site is more than 7.9 m above sea level. This is well above IPCC-projected maximum increases in sea level to 2100 as a result of climate change. Moreover, the foredunes

along Williamson's Beach sit on a raised rocky platform, which the EES indicates will provide protection from future storm surges.

Construction of the intake and outfall tunnels from the Plant site will require some dewatering around the access shaft and tunnels. The effects are expected to be localized and short term, with groundwater levels returning to normal once construction is complete.

During operation of the Plant, storm runoff would be directed to the Wonthaggi drain via an inline trap for oil grease and hydrocarbons, a sedimentation basin to remove coarse sediment, and a wetland system to trap fine sediments and adsorbed pollutants such as nutrients. The inline trap would also operate to retain spillages whenever necessary. The impact on water quality in the Powlett River should be negligible.

Conclusion

Having regard to the EES investigation and Inquiry's analysis, it is my assessment that:

- Construction and operation of the Desalination Plant will not significantly impact the Powlett River's water quality, flood regime or flood dependent ecosystems.
- Impacts on groundwater should be localised and short term.

3.4.2 Water Transfer Pipeline

Environmental Context

The EES identifies a 400 m wide investigation corridor as well as a Reference Project alignment for a 30 m wide construction easement for the 85 km long Transfer Pipeline. The EES identifies the potential for Variations of the pipeline alignment within the investigation corridor, as well as the Option of adopting an alignment within an alternative corridor. Alignment variations would still require the same number of waterway crossings, and most feasible alternative corridor alignments would also require a similar number of crossings, although possibly further upstream - to the east.

This Reference Project alignment would cross about 100 waterways, ranging from mainly dry drainage lines to moderately large permanent streams, some of which provide habitat for ecologically significant species, and many of which drain into Westernport. The present condition of the waterways to be crossed is variable, but many are in poor condition. Many of the streams have had their original riparian vegetation removed, their flows modified, and a number - in particular those flowing through the former Koo Wee Rup swamp - now flow through artificially constructed channels. Those for which water quality data is available do not conform to key SEPP objectives, with nutrients and zinc most often being the parameters that exceed SEPP limits.

Based on the Index of River Condition¹³ (IRC), the Bass River is the stream in the best condition near the proposed crossing site, with three IRC parameters rated as good or excellent. IRC ratings are also available for the lower Bunyip River, Lang Lang River, the Cardinia Creeks (Cardinia, Toomuc, Deep and Ararat Creeks), Eumemmering Creek and part of the Powlett River. None of them rated above good for any component and in each case most components were ranked poor to moderate.

A number of waterway channels are either known to be or are potential habitats of ecologically significant fish species, including the FFG-listed and EPBC-listed Dwarf Galaxias (*Galaxiella pusilla*) and Australian Grayling (*Protroctes maraena*) and possibly the FFG-listed Australian Mudfish (*Neochanna cleaveri*). In addition, the riparian zones at a number of possible waterway crossing sites may support ecologically significant marsupials

¹³ The Index of River Condition (IRC) provides a useful summary of river health, including assessments of water quality, aquatic life, habitat, riparian vegetation and flow modification.

(Southern Brown Bandicoot), amphibians (Growling Grass Frog), reptiles (Swamp Skink, Glossy Grass Skink) and birds (Swift Parrots). Hence, the impacts of crossing construction on riparian as well as aquatic species need to be taken into account. Crossing sites with known or potential significant fauna are as follows¹⁴:

- {105} Powlett River (Australian Grayling),
- {119} Bridge Creek (Dwarf Galaxias),
- {120} Woolshed Creek (potentially Growling Grass Frog, Swamp Skink, Glossy Grass Skink),
- {224} Bass River (Australian Grayling),
- {320} un-named stream (possible Swift Parrots),
- {410} Adams Creek South Branch (potentially Dwarf Galaxias – proposed trenching),
- {526} Yallock Cut and Levee (Dwarf Galaxias),
- {508} Yallock Creek (Growling Grass Frog habitat, Dwarf Galaxias),
- {509} Yallock Outfall Drain (Potential for Growling Grass Frog, Dwarf Galaxias),
- {535} South East Catchment Drain (Possible Dwarf Galaxias),
- {514} Bunyip River Main Drain (Australian Grayling, Dwarf Galaxias),
- {536} McDonald's Catch drain (Growling Grass Frog, possible Southern Brown bandicoot),
- {540} Hagelthornes Drain (Potential Dwarf Galaxias),
- {542} Deep Creek Catchment Drain (Growling Grass Frog recorded, potential Dwarf Galaxias),
- {544} Lower Toomuc Creek (Growling Grass Frog found, potential Swamp Skink, Glossy Grass Skink, Southern Brown Bandicoot, Dwarf Galaxias),
- {545} Lower Gum Scrub Creek (Growling Grass Frog recorded, potential Southern Brown Bandicoot),
- {621} Cardinia Drain (Australian Grayling, Dwarf Galaxias),
- {622} Cardinia Catchment Drain (Australian Grayling, Dwarf Galaxias),
- {620} Ti-Tree Creek D.S. (Dwarf Galaxias).

In addition to the above, there is the potential for impacts on Westernport, which is a listed Ramsar site, through increased sediment loads, especially from works on waterway crossings close to the respective waterway outfalls to Westernport. This is the case for crossings at Monomeith Drain (529-33), MacDonald's Drain (536-8), Deep Creek Drain (542-5), and at crossing numbers 341 and 419. Appropriate selection of construction techniques and timing of crossing works should effectively minimise any downstream effects and avoid impacts on the ecological character of the Ramsar wetland.

Flood control levee banks have been constructed along a number of streams to be crossed including MacDonald's Drain (crossings 536-8), Deep Creek Drain (542-45), Cardinia Drain (621-2) and Bunyip River Main Drain (513-6). Any disruption which weakens the levee banks may render adjacent areas more susceptible to flooding, which is an important issue in flat and flood prone areas. For these streams high flows and flood events occur most frequently from June to November, so any levee damage during this period poses a greater risk and should preferably be avoided.

Acid Sulphate Soils (ASS) have been recorded from the Powlett River Flats, and may also occur adjacent to stream channels and drains in the former Koo Wee Rup swamp area. Waterway crossings through these areas of potential ASS will require the spoil to be treated "on site" and disposed of appropriately. The management measures will need to ensure that acid-producing events are not triggered and leaching of acidic water into waterways does not occur.

There are known to be water extraction points downstream of a number of the crossing sites, where water is withdrawn for stock and domestic use, but the precise number of these is not known. These will need to be identified to enable alternative water supply plans to be established before works commence.

¹⁴ The crossing number listed in the EES Technical Appendix 63 is included in brackets

Key Issues

Waterway Crossings

The key issue in relation to the Transfer Pipeline is the selection of crossing techniques for particular waterways in order to minimise environmental impacts. Two main methods of constructing waterway crossings are identified in the EES: *trenching* in which a trench is cut through the channel bed, the pipe laid and the trench refilled; and *pipe jacking* which involves tunnelling beneath the channel bed. The EES also suggests that aerial crossings could be used at some sites.

For smaller streams and drainage lines during low or zero flow periods (January to June), and where there is no substantial riparian vegetation, trenching would be an appropriate construction method.

Pipe jacking is generally considered to reduce the risk of increasing sedimentation as well as disturbance to riparian vegetation, instream habitat and levee banks, relative to trenching. Pipe jacking may also assist in minimising ASS problems. Yet while it may often provide a superior environmental outcome, pipe jacking is also substantially more expensive. There therefore needs to be a clear environmental justification for adopting it in particular cases.

The EES identified 20 crossings at which the consultants considered the application of pipe jacking would reduce the risk of stream sedimentation compared with trenching, and 31 crossings where the risk of flooding would be reduced. In nearly every case the reduction in risk rating was from moderate to low. However, implementation of pipe jacking would need to be subject to strict controls to ensure that riparian vegetation, stream banks and groundwater conditions are not adversely impacted. I note that all the crossing sites with known significant fish species have been identified in the PRs as being sites where it will be necessary to specify appropriate construction methods to minimise environmental impacts.

The Inquiry noted a response from the Proponent (Document 47) which identifies three sites - Powlett River, Bass River and Lang Lang River - as likely to require pipe jacking, whilst at another ten sites a 'risk identification process' would be conducted to determine the most appropriate crossing construction methods. That process would need to include consideration of the channel form and geology, soil type, riparian vegetation present, possible ecologically significant species present and time of year for construction (in relation to flood risk).

Groundwater

Groundwater aquifers and conditions along the pipeline corridor are not well understood. Potential problems could arise due to requirements for dewatering of groundwater during construction, which may cause short-term local depletion. In addition, deeper excavation at pipe jacking localities could change the connections between surface and confined aquifers in proximity to waterways. The Inquiry supported the Proponent's identification of the need for further studies of groundwater impacts, particularly in the northern and coastal sections of the pipeline corridor.

Conclusions

Having regard to the EES investigation and Inquiry's analysis, it is my assessment that:

- Waterway crossings for the Reference Project's Transfer Pipeline would be able to be constructed without causing substantial impacts to ecologically significant species, or substantial increases in sediment delivery to Westernport, or increased risks from floods or ASS, if appropriate construction techniques and site management practices are adopted.

Further to this, it is my assessment that:

- Adjustments to the pipeline alignment be made where practicable to minimise impacts on natural riparian vegetation and reduce risks to aquatic ecological assets.
- The Project Company provide a risk assessment of individual waterway crossings, which is then to be peer reviewed by the Independent Reviewer that is to be jointly appointed by the Project Company and the State Government¹⁵, to inform statutory decision-making on crossing methods (e.g. by trenching or pipe jacking). The risk assessment is to consider the potential for impacts on ecologically significant species and vegetation, as well as the risk of sedimentation, heightened flood risk, ASS and impact on downstream water users, in relation to alternative crossing methods.

3.4.3 Power-Supply

The potential impacts on waterways and surface water environments of the Power Supply infrastructure will very much depend on the alignment and form of the infrastructure. Any overhead powerlines will not have any substantial impact on waterways, as long as pylons or poles are located away from the waterway.

Should underground cables be used in any areas, the waterway impacts could be similar to that of the Water Transfer Pipeline though probably less severe, both because less extensive earthworks would be required and because the alignment is further upstream for many rivers. The total number of waterways to be crossed is similar, i.e. approximately 100.

Having regard to the EES investigation and Inquiry's analysis, it is my assessment that:

- Construction and operation of the Reference Project's Northern Grid Connection would not have substantial impacts on waterways.
- A risk assessment approach be adopted to guide decision-making on waterway crossing methods for the underground section of the powerline.

3.4.4 Performance Requirements

It is my assessment that the following adjustments to the draft EES Performance Requirements be adopted in relation to waterway crossings, flooding and groundwater issues:

- **Amend PR 1.11** to read: "The transfer pipeline must be underground unless better environmental outcomes can be achieved at waterway crossings with an above ground solution."
- **Insert a new point in PR 7.2** "Undertake an environmental risk assessment of individual waterway crossings to guide decision-making on the most appropriate crossing method and related mitigation".
- **Amend PR 7.2 (b)** to read: "Site specific construction methods to minimise environmental impacts on ecologically significant species and vegetation, as well as the risk of sedimentation, heightened flood risk, acid sulphate soils and impacts on downstream water users".
- **Add new objective in PR 12, Flooding Control:** "Maintain ecological processes dependant on periodic flooding during project construction and operation to the extent practicable".
- **Add a new point in PR 12.4** "(c) Maintain flood dependent ecosystems to the extent practicable".
- **Amend PR 13** to read: "Minimise impacts on the interaction between groundwater and flora and fauna habitats, including waterways, wetlands and dunes".

¹⁵ see section 3.12 of this Assessment

- Amend PR 13.2 (d) to read: “Limiting any impact on, or diminution of, the existing flow regime in waterways, wetlands or groundwater aquifers arising from the interception and/or drainage of groundwater.”
- Amend PR 13.4 to read: “Monitor groundwater quality and levels during project construction in accordance with the requirements of the EPA and/or relevant Authorities”.
- Amend PR 14.3 to read: “Establish a surface water quality monitoring and reporting program for the Powlett River in the vicinity of the Desalination Plant site in consultation with the EPA and West Gippsland CMA”.
- Add new PR 16.4 to read: “Ensure that the environmental management plan for the Powlett River crossing addresses potential acid sulphate soils in the vicinity of the Powlett River and the project site, and interaction with groundwater dewatering, floods, flora and fauna and construction technique”.

3.5 Marine Ecology

Evaluation Objective - To avoid or minimise to the extent practicable adverse effects on marine (aquatic) ecosystems associated with marine construction or operation of the intake of seawater or discharge of saline concentrate.

Key Statutory and Policy Context

Consent of the Minister for Environment and Climate Change is required for the marine and coastal works, under section 37 of the CM Act, i.e. for the use or development of coastal Crown land. In considering an application for consent the Minister must have regard to the Victorian Coastal Strategy made under the Act.

The SEPP (WoV) defines environmental quality objectives and indicators within geographic segments that must be met to protect beneficial uses of the environment. It also outlines measures to manage activities that impact on water environments. The VDP Marine Structures fall within the Open Coasts segment, which consists of surface waters lying within 3 nautical miles of Victoria’s territorial baseline. As these waters are near pristine, this segment requires the highest level of environmental quality to protect ecosystems as well as other beneficial uses, including: primary and secondary contact recreation, aesthetic enjoyment and production of fish, crustacean and molluscs for human consumption.

The EP Act provides for the prevention of pollution and the protection of the environment for existing and anticipated beneficial uses. A Works Approval is required under the EP Act *prior* to the commencement of construction for works at scheduled premises that are likely to discharge waste to the environment. Prior to the actual commencement of operation of the VDP, a licence for discharge of waste to marine waters (as well as to other components of the environment) would need to be obtained from the EPA.

Clause 30 of SEPP (WoV) enables the EPA to approve a mixing zone for a wastewater discharge to the environment, where it is not practicable to avoid, re-use, recycle and effectively manage wastewater. Within a mixing zone, the beneficial uses of the marine environment are not protected, though a mixing zone must not result in environmental risks to beneficial uses outside the mixing zone or harm to humans or unacceptable impacts on plants and animals or a loss of aesthetic enjoyment or an objectionable odour. In applying for a mixing zone the licence holder will need to demonstrate that the extent of the mixing zone has been minimised to the extent practicable. Licence holders are also required to “develop and implement an environment improvement plan that includes effective management practices aimed at continuously reducing the size of the mixing zone and preferably achieving its complete elimination”.

Project Context

The Reference Project includes the construction of a seawater Intake and an Outlet for saline concentrate discharge, each of which would be connected to the Desalination Plant via a tunnel below the coastal dunes, Williamson's Beach and the seabed. It provides for sub-surface tunnels extending between from about 1 km up to 2 km offshore, the indicative lengths being about 1 km offshore for the Outlet and 850 m offshore for the Intake. Construction would be undertaken using a tunnel boring machine operating from the landward end of the tunnel, and Self Elevating Platforms (SEPs) offshore, drilling the vertical risers.

The Reference Project design includes measures to minimise operational impacts of both the Intake and Outlet, including PR 30.3b for the Intake to have a horizontal low inflow velocity of less than 0.15 m/sec to minimise impingement and entrainment of marine biota and for Outlet diffusers to achieve a 50:1 initial dilution of the saline discharge.

Variations to the Marine Structures for the Reference Project put forward in the EES were:

- multiple conduits rather than two large tunnels, with smaller Intake and Outlet structures possibly placed on the seabed;
- passive fine screens at the Intake Head;
- a pipeline diffuser rather than rosette diffusers; and
- alternate locations for the marine structures.

Options identified but not assessed in the EES were:

- a direct Intake with seabed filtration;
- a combination of tunnels and trenched pipes from the Plant to the structures; and
- ocean disposal of pre-treatment waste.

Discussion

The EES assessed both the existing conditions of the local environment and the predicted effects of the construction and operation of the Intake and Outlet structures. In reviewing the EES studies, the IEG commented that: "Overall, the IEG considers that no major potential marine ecological impacts have been overlooked or underestimated".¹⁶

Marine habitats were mapped to identify areas of environmental sensitivity and possible construction impacts¹⁷. The seabed habitat in the vicinity of the project comprises:

- intertidal sand;
- high relief reef located between 300 m to 1km offshore and to about 20m depth;
- moderate relief reef from 1 to 2km offshore to 30m depth; and
- predominantly gravel and cobbles extending beyond 2km.

I note that the IEG accepted the EES findings on ecological biodiversity and environmental sensitivity of the area.

According to the EES, from an ecological perspective, the order of preference, from highest to least, of marine environments for locating the intakes and outlets would be¹⁸:

- mobile sand or mobile gravel

¹⁶ IEG Advice, October 2008, page 4

¹⁷ EES Vol. 2, page 2-13 and Technical Appendix 5

¹⁸ Technical Appendix 31

- sand
- scoured reef and rubble
- lower relief reefs
- extensive, high relief or complex reefs.

Having regard to this ordering, depth-related considerations and the need to minimise 'short-circuiting' of outlet and inlet flows, the Reference Project proposes to locate the structures on moderate relief reef with less than 1m of relief.

Hydrodynamic modelling and toxicity testing were undertaken as part of the EES to predict the operational effects of both the Intake and Outlet. The IEG advice on the hydrodynamic investigations for the EES was that:

The collation of existing information from the area, supplemented with field measurements, has been undertaken in sufficient detail to characterise the major oceanographic features of the area. The suite of hydrodynamic models of varying complexity that were selected for this study is appropriate. They cover the full range of spatial scales and resolutions that are needed to interpret the effects of the construction and operation of the proposed desalination plant. The 2-dimensional South Eastern Australia (SEA) and the upper Bass Strait and Port Phillip and Western Port Bays areas (BAS) models are suitable for representing the main oceanographic processes occurring at a regional scale. The models are appropriately structured and calibration and validation of these models was good. (...) The results of these models should provide the basis for designating an acceptable "mixing zone" around the diffuser.¹⁹

Construction Impacts

The main issues arising from construction of the Intake and Outlet structures are the disturbance and loss of habitat in the immediate area, as well as the potential effects of noise on significant species and increased risk of introduction of marine pests.

The EES indicates that direct impacts from construction of the Intake and Outlet would be caused by the feet of the SEPs and the anchoring of the Intake and Outlet Risers that would support the Intake Heads and the Outlet Diffusers, as well as by sediment and accidental leakage of chemicals and fuel generated by the drilling required. High levels of noise may be generated through seismic surveys for geotechnical evaluation and drilling activities, and also through pile driving if this were to be selected as a construction technique. However, the structures proposed in the Reference Project would not require pile driving.

Construction impacts will be spatially limited, with the combined impact area of two SEPs being approximately 12,000m². The EES suggests that these impacted areas could recover over two to five years (i.e. in the opinion of the ecological consultant²⁰). In response, the IEG concluded 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.

¹⁹ IEG Advice, October 2008, page 4

²⁰ Technical Appendix 31, p96

A possible risk associated with construction is the potential for marine invasive species to be brought to the area by ships coming from infected areas (including the Port of Melbourne). Care will be needed to avoid this, in view of the longer term impacts associated with pests being introduced to the area.

The EES concludes that the impacts of noise during construction are not likely to have an appreciable impact on marine mammals including cetaceans. The potential impact area of the VDP is not a critical breeding or feeding area for any species of cetaceans. In fact most species pass through irregularly, spending relatively short periods in these potentially impacted areas. The exceptions are Southern Right Whales and Humpback Whales which migrate through or close to the area. Therefore impacts could be avoided if seismic surveys were conducted in January-April when these species are absent from Australian waters, and visual monitoring for cetaceans, "soft start" and low noise pile driving techniques are employed if such activities are necessary.

I note that the IEG accepted the EES findings regarding the construction impacts in the marine environment.

Intake Impacts

The key risks arising from operation activities include, first, entrainment²¹ and impingement of biota in the Intake, and secondly, the effects of the saline concentrate discharge on ambient water quality.

While high relief reefs are identified in the EES as the most diverse marine habitats in the area, moderate relief reefs also provide substantial habitat diversity. It is likely that a higher proportion of reef dwelling species have relatively short-lived, poorly dispersive larvae which settle in nearby reef habitats. Furthermore, these reefs are also key habitats for commercially harvested lobster and abalone. In contrast sand habitats and rubble areas are, in the judgement of the EES ecological specialists, likely to be less diverse and to be populated with species which tend to have longer-lived, more widely dispersive larvae.

Species with larvae that are short-lived and poorly dispersive are thought to be more at risk of local population reduction from entrainment effects than is the case for species with long-lived dispersive larvae, since the latter are more capable of colonizing from more distant sites, and are likely to lose a smaller proportion of their larval population to entrainment. For many marine species, recruitment to the population is not limited by larval abundance, and such species would be little affected by loss of larvae through entrainment, but it is not clear to what proportion of species this applies. While data on present community composition and abundance in all the habitats are limited, it does not appear that the biota of this area are substantially different to the biota at other similar localities along the Victorian coast.

The EES concluded that entrainment and impingement of marine biota through the Intake has the potential for minor long term impacts on biota, including some sessile marine species, but also on fish such as the King George Whiting. Modelling indicated that the likely reduction of abundance of larvae visiting the area would generally be less than 1.5 percent, with the reduction in plankton with wider dispersion patterns being less than 0.5 percent²². This level of reduction in planktonic population would most likely be unmeasurable within the expected range of natural mortality, variations in population and natural replenishment rates, in particular for highly dispersed phytoplankton and holo-zooplankton which have rapid turnover rates.

The Reference Project has incorporated mitigation measures to minimise effects of entrainment and impingement. The Intake Head would have a coarse mesh grating (an external grill space no greater than 100 mm by 100 mm, or 50 mm if other dimension is greater than 100 mm) to exclude larger organisms (PR30.2). It would be located 4 to 5m above the seabed, at a minimum of 15m below surface of seawater. These measures would reduce entrainment of sand and larvae derived from the reefs, while minimising risks to

²¹ Entrainment is the process of material, including biota, being drawn into the intake while impingement is the trapping of material, including biota, on screens

²² Technical Appendix 31

vessels. An inflowing water velocity of less than 0.15 m per second would be sufficiently slow to allow most fish and larger larvae to avoid entrapment. Water will be drawn horizontally into the Intake Head, since fish are more readily able to avoid horizontal currents than vertical currents.

Hydrodynamic modelling has been used to predict the proportion of passively drifting larvae that would be entrained, and concluded that in general this would be below 1.5 percent for species from all 'catchments'. However, there are some uncertainties particularly relating to species with short larval durations, and what proportion of species have populations limited by larval recruitment rates, and as noted these are most likely to be species associated with high and moderate relief reefs.

I note that the IEG considered:

that the risks from impingement, which is considered a relatively minor issue, have been assessed appropriately as part of the EES. The EES has also provided a valuable assessment of the effects of entrainment. The modelling approach is appropriate for widely-dispersing species with known or widespread spawning areas. The effects predicted for these species do not depend on small-scale features of the Project area. However, the models may not be accurate for species with short larval periods; the models were run for relatively short times and there is no capacity to consider the longer term consequences if small entrainment losses caused reduced adult populations, which in turn resulted in fewer larvae being produced. The most important uncertainty is whether particular species are limited by larval supply or not."

The Inquiry noted that locating the intake and outlet structures outside of the marine sensitive areas is acceptable. Efforts should also be made to minimise the impact on moderate relief reef if practicable.

Discharge Impacts

The Desalination Plant operating at 150 GL/year capacity would discharge on average 210 GL/year of saline concentrate. The saline concentrate would mostly contain elevated concentrations of compounds found in the intake seawater together with low concentrations of the RO membrane cleaning wastes (i.e. citric acid, hydrochloric acid, alkalis, surfactants, disinfectants and ammonia).

The EES investigations included toxicity studies and hydrodynamic modelling to assess the effects of the discharge into the receiving marine waters. The outcomes of these investigations also provided information on an indicative mixing zone in which the beneficial uses of the marine environment would not be protected.

I note that the Inquiry agreed with the conclusion of the EES consultant Scott 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.²³

While ecological effects on planktonic and pelagic communities may not extend more than 100 m from the discharge, benthic communities will have more exposure to the plume as it disperses along the seabed. Moreover, having regard to the uncertainty in the discharge plume behaviour and dispersion, a conservative approach to the definition of the mixing zone is warranted.

Overall, the EES modelling of the initial dilution and dispersion of the discharge indicate that the 95th percentile contour of an increase of 1 part per thousand (ppt) - the approximate equivalent of a dilution of 30:1 (adopted

²³ Technical Appendix 31

as a 'safe dilution' factor based on the toxicity studies) - would project laterally on the seabed 500 to 700 m around the Outlet. As the effluent plume would be released at a substantial depth (about 15 m) and be relatively dense, it would descend to the sea floor and not be visible at the surface. I note that the Inquiry considered that²⁴:

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 (...). 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 recommended that an additional PR for the outlet structure be included, viz:

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.

Toxicity studies for the EES were conducted on a range of relevant species using effluent from an existing RO desalination plant in Western Australia. The results indicated that it is unlikely that the discharge will have toxic effects beyond those directly attributable to elevated salinity, and that a safe dilution factor which will protect 99 percent of marine species is 20:1 for the saline concentrate alone.²⁵

The IEG agreed that "the main effects from the discharge are likely to be those associated with elevated salinity", and further noted that "as long as the discharge structures perform as expected, the plume should be diluted rapidly to levels at which elevated salinity would not pose a major risk to marine biota".²⁶ The IEG also advised that:

*There is unlikely to be lethal effects to water column marine biota within the anticipated boundaries of the mixing zone. The ecotoxicological studies also suggest that there is unlikely to be acute or chronic toxic effects on marine biota if the saline concentrate discharge is diluted at least 20 times. This result is indicative that an initial dilution of 50 fold to be required by the Reference Design is conservative and would therefore provide suitable protection to the receiving environment.*²⁷

Because the toxicity studies conducted to date have used a proxy discharge which will differ slightly in composition to one that will be produced from the VDP, confirmatory toxicity studies will be required on the discharge from the pilot plants that have been established by the PPP bidders. As noted by the IEG, "Further toxicity testing when an actual effluent is available will be essential to confirm these (e.g. responses to salinity stressor, safe dilution factor)".²⁸

The hydrodynamic modelling in the EES was conducted to simulate the effects of the discharge (both initial dilution and dispersion and advection) of saline concentrate into the receiving seawater over a variety of spatial and temporal scales. Initial models of the initial and mid-field dilution produced inconsistent results in relation to the performance of the diffusers selected for the Reference Project. The IEG advised that:

*The detailed models used to depict the initial dilution of the saline concentrate discharge and its subsequent advection and dispersion within receiving marine waters are appropriate. The proponents still need to combine the results of these two models into a consistent form to resolve the assessment of the plume impacts.*²⁹

²⁴ Inquiry Report, page 115

²⁵ Technical Appendix 24

²⁶ IEG Advice, October 2008, page 5

²⁷ IEG Advice, October 2008, page 5

²⁸ IEG Advice, October 2008, page 5

²⁹ IEG Advice, October 2008, page 4

Subsequent work by ASR consultants presented to the Inquiry Panel (Document 5) was reviewed by the IEG. In its response to the Inquiry's Question 4, the IEG noted that the inconsistency has been resolved.

The modelling of local hydrodynamic scenarios in the vicinity of the Outlet revealed the possible formation of a gyre, a large circular current, under calm conditions. The Inquiry noted concerns, including the EPA's view, that the gyre could reduce the dilution rates leading to an accumulation of saline effluent within a restricted area. Further modelling results presented to the Inquiry (Document 5) indicate that, even in the presence of a gyre, the area with salinity elevated to 1 ppt or greater would be approximately 1 km in diameter, so not substantially greater than the extent of elevated salinity on the seabed estimated above. I note that the IEG was satisfied with the outcomes of the further modelling presented at the Inquiry.

Project Variations and Options

In relation to the Project Variations put forward in the EES, the installation of passive fine screens at the Intake head would slightly reduce entrainment and impingement of biota, but if it required frequent cleaning with activities requiring boats, divers, and chemicals or noisy equipment there may not be a net environmental gain.

Other Project Variations included multiple subsurface tunnels or drill holes or alternately pipes laid on the seabed – for either the Intake or Outlet - instead of one large subsurface tunnel. I note that the Inquiry considered that although these variations may have advantages, the construction damage to offshore reef areas may be greater. Similarly, the Option of constructing a conduit via a tunnel from the shore to beyond the area of marine sensitivity and then trenching a pipeline into the seafloor could be considered, though it may entail an unacceptable footprint impact.

Use of pipeline diffusers, i.e. a pipe structure on the seabed with nozzle diffusers placed along it, was presented in the EES as a Variation that could be adopted instead of the Reference Project's rosette diffuser. If these diffusers would provide as good or better dilution than rosette diffusers, and especially if their use would reduce the area of the mixing zone, then they could be an acceptable choice. However, it is difficult to speculate how any risers might be needed and what the overall footprint might be.

Another important Variation is the alternative siting of the Inlet and Outlet structures. As noted, the Reference Project would locate these structures on moderate relief reef. Subject to compliance with the final Performance Requirements, including a mixing zone endorsed by the EPA, there could be considerable flexibility in siting these structures. PR 29.2 in the EES would prohibit construction with long-term impacts within designated marine sensitivity areas, while PR 30.3 would require the siting and design of the inlet structure to avoid significantly affecting beneficial uses within designated areas of high relief reef and coastal reserve. I note that the Inquiry considered that locating the marine structures "further offshore may assist in further minimising the low level of impacts" that are expected from careful siting of the structures on moderate relief reefs, based on pre-construction survey of biological communities.

Using direct seabed filtration was put forward as an Option in the EES. This Option would involve a sub-surface infiltration gallery intake system, with a submerged sand media filter constructed on the bottom of the ocean, connected via pipelines or tunnels to a series of intake wells located on the shore. Both the Inquiry and the IEG agreed that this Option may not be feasible given the geology of the area, and would require a considerably larger footprint during construction. It is also doubtful that it would provide a significant environmental benefit during operation.

The EES also identifies ocean disposal of pre-treatment waste together with saline concentrate as another Option distinguished from the Reference Project. Before pre-treatment waste sludge could be added to the saline effluent, additional toxicity evaluation would be required, because the sludge would contain a number of

potentially toxic components (e.g. including chlorine, acid, polyDADMAC, sodium bisulfite and polyphosphate) not present in the discharge that has been tested. Inclusion of pre-treatment sludge would require a higher level of dilution, and a larger mixing zone, as well as potentially creating toxicant, nutrient, discolouration and deoxygenation effects. Moreover, the IEG has observed that pre-treatment sludge disposal to the ocean is not world's best practice.

Monitoring

The EES predictions of both the Intake and the Outlet operational impacts are based on modelling the environmental performance of the Reference Project. These predictions need to be validated under a variety of seasonal and weather conditions in relation to the final design, through further hydrodynamic modelling, supported by effective monitoring programs to ensure that impacts are not more severe or more extensive than predicted by the models.

The EPA considered that further biological assessment is needed to better characterise the habitats in the investigation area, both to assist in finalising siting and design of the Outlet diffusers and also to provide baseline data to assess operational impacts. In this context, the Inquiry recommended a new PR 30.3 (e), to address the need for base-line monitoring:

'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'

The Inquiry supported the conceptual monitoring program outlined in Technical Appendix 31 of the EES. I confirm that it will be appropriate to: target benthic species, assess larval settlement on seabed habitats and cryptic reef biota, undertake toxicity monitoring. It will also be appropriate to identify control sites as well as impact monitoring sites within the mixing zones and around the area of intake entrainment. It is essential that monitoring commence as soon as practicable to provide a statistically sound basis for assessing post-commissioning ecological changes, as well as to allow refinement of monitoring methods.

The Inquiry also recommended amendments to the following Performance Requirements to refine the monitoring requirements, which I support.

Conclusion

Having regard to the EES, the IEG advice and the Inquiry findings and recommendations, it is my assessment that:

- The construction of the marine structures proposed for the Reference Project would have limited environmental impacts, since site damage would be localised and temporary with the likelihood of substantial ecological recovery occurring within five years, while there is limited potential for 'off-site' impacts including from noise disturbance to fauna if appropriate practices are applied.
- The operation of the marine structures proposed for the Reference Project would also have limited environmental impacts, since risks to marine biota from entrainment and impingement at the Intake, as well as toxicity effects of the saline discharge, would be of medium significance overall. There is, however, a potential for some impact on reef communities with weakly dispersive larvae if the Inlet was located too close, as well as some risk that adult stocks of King George Whiting in Corner Inlet could be reduced.
- The siting and design of the marine structures should avoid both short- and long-term ecological impacts on high relief reefs and seek to minimise impacts on moderate relief reefs to the extent practicable, having regard to the outcomes of further biological survey and assessment to characterise values and risks.

- A variation or option for the marine structures using some combination of tunnels, smaller conduits or trenched pipelines could be acceptable if it was demonstrated that the overall impact of the construction footprint and the discharge plume would be less than for the Reference Project.
- The Project Company will need to initiate the further investigations and monitoring program required under the relevant Performance Requirements, as amended in accordance with this Assessment, in a timely manner to inform the final siting and detailed design of the Intake and Outlet.
- The Minister for Environment and Climate Change, in considering whether or not to approve the development and use of the marine structures under the CM Act, and similarly the EPA in its consideration of the Works Approval under the EP Act, have regard to the need for further biological survey and assessment to inform the final siting and design of the marine structures
- The minimum practicable size of the mixing zone will need to be initially defined and subsequently refined through the Licence process under the EP Act, based on the results of water quality and biological monitoring programs to be established prior to the commencement of construction and continued for at least three years after the Plant commences operation.

I consider that the Performance Requirements in the EES relating to marine ecology are generally appropriate, but a number of modifications are warranted. In this context, it is my assessment that:

- **Amend the second Performance Criterion for PR 29** to read: “Avoid impacts on the ecology of reefs with high biodiversity, to the extent practicable.”
- **Amend PR 29.2** to read: “Avoid to the extent practicable direct impacts from construction in the designated areas presented in Figure PR Sensitivity Area – Marine Area, in Technical Appendix 5”.
- To emphasize the need to ensure cetaceans are protected as required under the EPBC Act, **amend PR 29.4** by adding “and cetaceans in particular.”
- **Modify PR 30.3 (a)** as follows:
 “To avoid significantly affecting the beneficial uses associated with designated areas of high relief reef and coastal reserve presented in Figure PR Sensitivity Area – Marine Area, in Technical Appendix 5, and minimise impacts on the ecology of moderate relief reefs if practicable”.
- To ensure that adequate biological and chemical monitoring will be put in place **add new PR 30.3 (d)**:
 “To inform final site selection and hydrodynamic modelling, undertake a survey prior to construction of the Intake structure to identify marine community composition and structure within 300 m of the proposed Intake site and use existing knowledge of larval behaviour to demonstrate compliance with relevant Performance Criteria.”
Amend PR 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 relevant Performance Criteria.”
- **Amend PR 31.6** header to: “Develop and implement pre-construction survey prior to construction of the outlet and post construction survey and monitoring program to demonstrate performance”
Amend PR 31.6 (d) to read: “Document the condition of high and moderate relief reef ecosystems in the vicinity of the mixing zone.”
- To ensure that the mixing zone, within which beneficial uses do not apply, is maintained as small as possible, **add new PR 31.10** to read: “Prior to construction of the diffuser the Project Company must demonstrate to the EPA, following examination by the Independent Reviewer, that the diffuser has been designed, and will be located and operated, in a manner that minimises the size of the mixing zone to the extent practicable and minimises environmental risks outside the mixing zone.”

3.6 Terrestrial Ecology

Evaluation Objective - To avoid or minimise to the extent practicable adverse effects of project construction and operational activities on species and ecological communities listed under the *Flora and Fauna Guarantee Act 1988* or EPBC Act, minimise impacts on other protected wildlife and indigenous species and communities as well as address requirements of the Native Vegetation Management Framework.

Key Statutory and Policy Context

Key statutes and associated policies and strategies relevant to this objective include:

- *Flora and Fauna Guarantee Act 1988* (FFG Act) and Victoria's Biodiversity Strategy, as well as *Victoria's Native Vegetation Management – A Framework for Action* (NVMF)
- *Planning and Environment Act 1987* (P&E Act)
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The purpose of the FFG Act is to enable and promote the conservation of Victoria's native flora and fauna. Its objectives include: "(c) to manage potentially threatening processes; and (e) to ensure that the genetic diversity of flora and fauna is maintained". Further to this, Victoria's Biodiversity Strategy made under the FFG Act includes two related goals, i.e.:

- "the present diversity of species and ecological communities and their viability is maintained or improved across each bioregion", and
- "there is no further preventable decline in the viability of any rare species or of any rare ecological community".

In the context of these goals, the Victorian NVMF is the principal document setting out Victorian Government policy for the protection of native vegetation. The "net gain" approach set out in the NVMF adopts a hierarchy of avoidance, minimisation and offset principles. The first priority is the avoidance of clearing and therefore losses of existing native vegetation.

One of the objectives for planning in Victoria under Section 4(1) of the P&E Act is: "to provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity". SPPF clause 15.09, "Conservation of native flora and fauna", complements this.

Of the two controlling provisions under the EPBC Act to which the VDP is subject, attention in here focuses on implications with respect to sections 18 and 18A, i.e. Listed threatened species and communities.

3.6.1 Desalination Plant

Native Vegetation

The proposed VDP site comprises six agricultural properties, together with two Crown road reserves (Lower Powlett Road and the unmade section of Mouth of Powlett Road). Apart from property 48, the agricultural land on the site comprises grazed paddocks, containing mainly introduced species with some scattered indigenous species. Remnant native vegetation on property 48 is in moderate to good condition. The western edge of the Plant site adjoins the Kilcunda–Harmer's Haven Coastal Reserve, which contains good quality native vegetation.

The EES field investigations by Biosis Research identified eleven ecological vegetation classes (EVCs) on the VDP site³⁰.

The location of the Plant on the site and the extent of vegetation clearing required for the Plant have yet to be established. Biosis has made a preliminary assessment of impacts on native vegetation, based on assumptions about patches of native vegetation that may be outside the construction footprint. It estimates that less than one hectare of an endangered EVC (Swamp Scrub) and less than one hectare of a vulnerable EVC (Coast Banksia Woodland) would be affected, if Patch C containing Swamp Scrub EVC is retained.³¹ While the conservation significance of these EVCs cannot be determined at this stage, Biosis considers that they are likely to be in the medium to very high range.

While the effects on native vegetation of the VDP site cannot be accurately assessed as yet, it is considered that the impacts would not be significant if the principles of the NVMF (avoid, minimise and offset) are fully implemented and the native vegetation in the designated sensitive areas in the PRs is protected.

Flora

The EES investigations of the Plant site's flora included searches of relevant flora databases, field surveys within the study area and targeted searches for listed threatened species. The field investigations identified 118 indigenous and 64 introduced vascular plant species in the VDP study area.

Of these species, only one is listed as a threatened species under the EPBC Act (River Swamp Wallaby-grass *Amphibromus fluitans*). Four individual plants were recorded within an area of introduced vegetation near a dam on property 336, though it is likely that other individuals of this species are present on property 48.

The EPBC Protected Matters Search Tool indicates that four other flora species listed under the EPBC Act have been recorded, or may be present, in the vicinity of the VDP site. None of these was recorded during the field investigations and they are unlikely to be present, having regard to the loss or absence of suitable habitat on the site. Similarly, no flora species listed under the FFG Act was recorded on the Desalination Plant site and it is unlikely that any plant species listed under the FFG Act would now occur on the site in light of habitat changes.

While there is uncertainty about the exact location of the Desalination Plant and the extent of disturbance by project works, it is likely that the VDP effects on significant flora species would be low, if appropriate measures are implemented to avoid direct and indirect impacts on indigenous flora on property 48 as well as within the Kilcunda–Harmer's Haven Coastal Reserve.³²

Fauna

The EES fauna investigations covered the Desalination Plant site, Powlett River, Kilcunda–Harmer's Haven Coastal Reserve and Williamson's Beach. They included searches of relevant fauna databases, field surveys and targeted surveys for significant species³³. Earlier surveys of the coastal reserve and the Wonthaggi wind farm site were also examined. These surveys recorded 83 vertebrate fauna species on the site and the adjacent portion of the Coastal Reserve.

³⁰ Detailed descriptions of the EVCs are provided in Technical Appendix 14.

³¹ I note that this area has not been identified as a sensitivity area in the proposed PRs, though the latter do designate Patch E (containing Swamp Scrub EVC) and property 48 as sensitive areas.

³² The PRs identify property 48 as an area of sensitivity for a number of reasons including the possible occurrence of River Swamp Wallaby Grass.

³³ These investigations are reported in Technical Appendix 13, Technical Appendix 14 and in *Addendum Report – Flora and Fauna Assessment: Desalination Project – Spring 2008 flora and fauna survey* Biosis Research (October 2008).

No fauna listed as threatened species under the EPBC Act were recorded during the ecological investigations of the Desalination Plant study area or Williamson's Beach.

Although three species listed under the FFG Act were identified during the EES fauna surveys, they were not recorded on the actual Desalination Plant site: White-bellied Sea-eagle (*Haliaeetus leucogaster*) was recorded flying over the dune/foreshore adjacent to the site; an Eastern Great Egret (*Ardea modesta*) was recorded foraging in the lower reaches of the Powlett River; and Hooded Plovers (*Thinornis rubricollis*) were regularly recorded along Williamson's Beach. The further survey undertaken in September 2008 also recorded the FFG-listed Swamp Antechinus (*Antechinus minimus*) in an area of sedgeland habitat on the Plant site adjoining the coastal reserve.

Biosis acknowledged that there is potential for significant fauna species, other than those recorded above, to occur in the Desalination Plant study area. An analysis of the likelihood of such species occurring within 5 km of the Desalination Plant site is provided in the EES³⁴. The species of most interest in respect to the construction and operation of the Plant are:

- Orange-bellied Parrot (*Neophema chrysogaster*)
- Southern Brown Bandicoot (*Isodon obesulus obesulus*)
- Hooded Plover
- Dwarf Galaxias (*Galaxiella pusilla*).

In considering the potential effects of the Desalination Plant on terrestrial fauna, a number of risks need to be taken into account. The risks include:

- Vegetation and habitat loss;
- Disturbance through noise and vibration arising from construction activities (including tunnelling under the beach and dune formations) and the operation of the plant;
- Disturbance by construction and operational plant personnel accessing Williamson's Beach;
- Disturbance from lighting (including vehicle headlights, lighting required at the plant site during construction and operation phases, and lighting on boats during construction phase); and
- Habitat degradation through changes in hydrology, sedimentation, pollution, dust, spillages, introduction of weeds and pests, etc.

A risk assessment approach was used by Biosis to identify risk levels from various construction and operational activities and to guide mitigation and management measures for risks rated as medium and above.

The potential effects on key species are discussed below.

Orange-bellied Parrot

The Orange-bellied Parrot (OBP) is listed as a threatened species under the EPBC and is also listed under the FFG Act. OBPs migrate from Tasmanian breeding grounds to winter on the south-eastern mainland coast.

There are six past OBP records within 5 km of the Plant site. There are five records from the mouth of the Powlett River and one record from 1 km upstream of the river mouth.

Targeted searches for the OBP were undertaken at the Desalination Plant site during the periods August to September 2007, March to July 2008 and May to September 2008. No OBP was recorded at the Plant site during these surveys.

³⁴ Table A4.2 in Technical Appendix 14

While the site does not contain the preferred saltmarsh habitat for the OBP, it may have some plants that could be used as food sources for the OBP. Although the OBP may be an infrequent visitor to the site, it is unlikely that the removal of flora species, that are generally abundant in the local area, would have a significant effect on the OBP population.

Southern Brown Bandicoot

The Southern Brown Bandicoot is listed as a threatened species under the EPBC Act, and a preliminary recommendation for listing under the FFG Act has been made.

There are no records of the species on fauna databases within 5 km of the desalination plant site. Moreover, targeted surveys for small mammals at the site from August to September 2007 and in September 2008 as part of the fauna investigations did not record Southern Brown Bandicoots.

On this basis, it is reasonable to conclude that the development of the Desalination Plant at the proposed site would not have a significant effect on the Southern Brown Bandicoot.

Dwarf Galaxias

The Dwarf Galaxias is a small freshwater fish listed as a threatened species under the EPBC Act. It is also listed under the FFG Act.

In July 2008, aquatic surveys were undertaken for the unnamed tributary of the Powlett River which flows through the Desalination Plant site. No Dwarf Galaxias were recorded on the site during the surveys. There are no records of the species in the Powlett River. It is concluded that the Desalination Plant is unlikely to have an impact on Dwarf Galaxias.

Hooded Plover

The FFG Act-listed Hooded Plover is the fauna species most at risk from the indirect effects of the construction and operation of the Desalination Plant. Up to 18 Hooded Plovers were recorded along Williamson's Beach adjacent to the Plant site. Biosis concluded that at least two pairs of Hooded Plovers breed at Williamson's Beach between the mouth of Powlett River and Lower Powlett Road. These birds nest from August to February above the high tide line or in the foredunes 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. Disturbance, for instance by dogs, even if restrained, can extend the period that adults spend off the nest, exposing chicks and eggs to predation by gulls, ravens and other birds.

Action Statement No.9 prepared under the FFG Act provides a description of the species, its conservation status and potential threats. In the context of the proposed Desalination Plant, the risks involve disturbance by an increased number of people accessing Williamson's Beach (possibly accompanied by dogs), noise and vibration from tunnelling operations and helicopter movements. Modelling of impacts of the seawater Intake on larvae suggests that there will be no indirect effects on Hooded Plovers via the food chain.

Biosis has made a number of recommendations to provide protection for Hooded Plovers, including monitoring of the Hooded Plover population at Williamson's Beach to ensure that the project does not impair the breeding success of the local population.

The PRs incorporate 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.

It is noted that the PRs have generally adopted the Biosis recommendations, apart from its recommendation on helicopter movements.

It is concluded that the potential risk to the Hooded Plover population on Williamson's Beach can be significantly reduced through the successful implementation of the PRs. Nevertheless a specific PR should be included to require that helicopters avoid low level flyovers of Williamson's Beach. There may be also be an opportunity for video monitoring (even as a 'web cam') of the beach in the vicinity of the Hooded Plover nesting area, to monitor and discourage behaviour that could disturb the birds.

Other Species

Other biodiversity values that the Desalination Plant site supports are likely to be largely of local or regional significance, including a range of common farmland species. However, some more significant species may occur from time to time, such as Latham's Snipe. Enhancement of wetland habitat in the north-western portion of the site, including use of local provenance plant of species from local EVCs, will compensate for the loss of habitat across the remainder of the site.

Conclusion

Having regard to the EES investigation and Inquiry's analysis, it is my assessment that the construction and operation of the Reference Project for the Desalination Plant would not have a significant effect on native vegetation or any threatened flora and fauna species listed under the EPBC Act or the FFG Act, providing that appropriate procedures and practices are applied.

3.6.2 Water Transfer Pipeline

Context

The Reference Project for the Transfer Pipeline is proposed to extend for some 85 km, generally installed in a conventional trench. It largely passes through pasture and other agricultural land, though it also traverses some areas of native vegetation and areas of scattered remnant trees.

The investigation corridor for the Transfer Pipeline is 400 m wide. The final pipeline easement is likely to be 15 to 20 m wide, though it would be preceded by a construction easement approximately 30 m wide.

The route for the Reference Project passes through some sensitive habitat areas in addition to requiring over 100 waterway crossings. The alignment generally seeks to minimise adverse impacts on terrestrial ecology by avoiding areas of significant native vegetation and key habitat areas. Most of the threatened species that may occur along the proposed pipeline alignment are associated with waterway habitats. Some major waterway crossings are proposed to be undertaken without surface earthworks in the channel by using pipe-jacking.

Biosis Research undertook the EES investigations³⁵. While field surveys for flora and fauna examined the 30 m construction easement, only desktop studies were conducted for the investigation corridor.

A total of 161 indigenous plant species and eight EVCs were recorded from the alignment during the EES surveys. Swamp Scrub EVC was found in all sections, while the FFG-listed Plains Grassland (South

³⁵ See EES Technical Appendix 15

Gippsland) Community was found within the Bass Coast Rail Trail adjoining part of the alignment. One of the most significant habitat areas along the alignment is the Holden Proving Ground, with Heathy Woodland EVC and Swampy Riparian Woodland EVC. All of the native vegetation assessed within the Transfer Pipeline alignment has been modified to some extent and Biosis considered it to be in poor to fair condition.

According to Biosis, potential habitat for four EPBC-listed flora species exists along or in close proximity to the pipeline alignment, viz. River Swamp Wallaby-grass, Matted Flax-lily, Maroon Leek-orchid and Green-striped Greenhood. The FFG-listed Pale Swamp Everlasting was found within the Bass Coast Rail Trail adjoining the alignment.

A total of 88 indigenous fauna species were recorded either from or adjacent to the pipeline alignment. Targeted surveys were conducted for species listed under the EPBC Act that could be affected, i.e. Giant Gippsland Earthworm (GGE), Dwarf Galaxias, Australian Grayling and Growling Grass Frog. While GGE and Australian Grayling were not detected during the EES surveys, Dwarf Galaxias and Growling Grass Frog as well as Swamp Antechinus were recorded either from or adjacent to the pipeline alignment.

Small remnants of woodland and forest are located along the pipeline route on private land, along waterways and roadsides, providing valuable habitat for woodland birds. The highest quality woodland and forest habitat adjoining the route is within the Holden Proving Ground. Some of the vegetation remnants crossed by the pipeline route have the potential to support other threatened fauna, including the EPBC-listed Southern Brown Bandicoot. This species is known to inhabit structurally dense remnant and introduced vegetation (including blackberries, rank grass, bracken) in road and rail reserves as well as along drainage lines and streams in the Kooweerup area.

While potential OBP habitat for occurs near the section of the pipeline alignment near the Powlett River, Biosis considered that suitable habitat is unlikely to occur elsewhere along the alignment. Other FFG-listed species that are likely to occur in habitats traversed by the pipeline alignment are: Ballion's Crane, Eastern Great Egret, Grey Goshawk, Powerful Owl, Chestnut-rumped Heathwren, Lace Goanna, Swamp Skink and Southern Toadlet. Biosis considered that the Swift Parrot, Grey-headed Flying Fox and Australian Mudfish are unlikely to occur, though they were referred to in the EES Scoping Requirements. However, Swift Parrot was subsequently observed at the Holden Proving Ground in September 2008.

Discussion

In the context of the highly modified vegetation along most of the investigation corridor, the main risks to ecological values associated with construction of the pipeline are:

- Further loss of native vegetation and habitat areas
- Disruption of watercourses with significant in-stream or riparian ecological values
- Dispersal of soil pathogens

A full assessment of the potential loss of native vegetation and habitat areas has yet to be completed. This will be necessary in part to enable the determination of 'net gain' requirements to offset vegetation losses.

Potential impacts on in-stream and riparian ecological values have been outlined in section 3.4.2 of this Assessment. I note that implementation of best practice methods to address environmental risks associated with waterway crossings will be the key to avoid significant ecological impacts. In addition to appropriate design based on careful site assessment, pre-construction surveys for significant species (indigenous fish, amphibians and reptiles, as well as flora) will be needed to guide the application of contingency measures to protect these species. Follow-up or post-construction monitoring will then be needed at sites with significant values to assess actual impacts and guide any ameliorative actions.

In relation to pathogen risks, the Reference Project pipeline alignment passes through areas infected by *Phytophthora cinnamomi*, which is listed under the FFG Act as a potentially threatening process. Consequently, it could impact on the spread of this pathogen. In this context it should be noted that the remnant native vegetation in the vicinity of Lang Lang and The Gurdies is highly significant in the context of West Gippsland and also likely to be particularly susceptible to *Phytophthora* dieback.

Conclusion

Having regard to the EES investigation and Inquiry's analysis, it is my assessment that the construction and operation of the Reference Project for the Transfer Pipeline, as well as an alternative alignment within the investigation corridor, would not have a significant effect on native vegetation or any threatened flora and fauna species listed under the EPBC Act or the FFG Act, if appropriate procedures and practices are applied.

Further, it is my assessment that key priorities in implementing the Transfer Pipeline will be:

- Addressing requirements under the NVMF, and in particular to apply the three-step Avoid – Minimise – Offset hierarchy. Because of the scattered distribution of remnant native vegetation in the area proposed to be traversed by the pipeline, avoidance should be possible to a large degree. Adjustments should be made to the alignment to avoid all areas of native vegetation of Very High Conservation Significance if practicable. Further, a Native Vegetation Offset Plan is to be developed in accordance with the NVMF to the satisfaction of the Minister for Environment and Climate Change.
- Avoidance of disturbance of waterways and associated remnant vegetation to the extent practicable through detailed route design and appropriate choice of crossing methods.
- Procedures for pre-construction surveys along the construction easement for flora and fauna listed under both the FFG Act and the EPBC Act, as well as associated contingency measures to be applied if these species are detected, need to be prepared to the satisfaction of DSE and the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA). Appropriate measures may include adjustment of the easement, translocation of individuals where there is a high probability of success, and provision of offsets if neither avoidance nor minimisation of impacts is practicable. Measures to minimise the trapping of indigenous fauna in open trenches are also needed.
- As a specific priority, disturbance of known or potential GGE habitat should be avoided since adult GGE individuals cannot recover even from minor injuries and translocation may only have partial success. Given the constrained nature of GGE habitat patches, and their likely proximity to watercourses, it should be possible for such areas to be avoided. Where this is not practicable, GGE individuals should be salvaged with due care, either for re-release into their home colony site when works in the locality have been completed or translocation.
- All earthworks in known or suspected *Phytophthora cinnamomi* areas should be conducted in accordance with relevant protocols³⁶.

3.6.3 Power Supply

Context

The Reference Project proposal for construction of a 220 kV overhead powerline, i.e. between the Woolamai Terminal Station and the existing 220kV transmission line at Tynong North, together with the construction of a 66 kV underground powerline from the Woolamai Terminal Station to the Desalination Plant site, may require the clearing of some native vegetation. Overhead and underground connections between a new 66 kV/22 kV substation and the Booster Pump Station for the Transfer Pipeline may also require vegetation removal.

³⁶ Consistent with PR 6.6, as amended in section 3.2 here.

Biosis Research undertook the investigations for the EES and subsequent flora and fauna studies³⁷. The investigation corridor for the Reference Project is 500 m wide along the overhead section and 400m wide along the underground section, stretching over the overall route of about 60 km. Parcels of land with remnant vegetation and potential habitat within a 40 m wide nominal alignment have been examined through field surveys. Targeted surveys were conducted only for the GGE and it is acknowledged that further targeted surveys for other species may be needed.

A total of 72 indigenous plant species were recorded from the alignment during the EES surveys. A range of remnant EVCs occur along the route, the most significant of which is the Plains Grassland (South Gippsland) Community found within the Bass Coast Rail Trail adjoining part of the alignment. All of the native vegetation assessed within the powerline alignment has been modified to some extent. Biosis considered that the EVCs on private land are in poor to fair condition, while EVCs on public land such as road and rail reserves are in fair to good condition.

Several species listed under the EPBC Act or the FFG Act occur within the area proposed to be traversed by the powerline and may be affected to some degree. According to Biosis, potential habitat for three EPBC-listed flora species exists along or in close proximity to the powerline alignment, viz. River Swamp Wallaby-grass, Maroon Leek-orchid and Strzelecki Gum. The FFG-listed Pale Swamp Everlasting was found within the Bass Coast Rail Trail adjoining the alignment.

A total of 46 indigenous fauna species were recorded either from or adjacent to the alignment. Targeted surveys for the GGE recorded three active populations, on the banks of Wattle Creek, the Bass River and a watercourse near Nyora. Potential habitat to support other EPBC-listed fauna including Southern Brown Bandicoot, Dwarf Galaxias, Australian Grayling and Growling Grass Frog also occurs either along or near the alignment. Six FFG listed species are likely to occur in habitats traversed by the powerline alignment, viz. Ballion's Crake, Eastern Great Egret, Powerful Owl, Lace Goanna, Swamp Skink and Southern Toadlet. Biosis considered that the OBP, Swift Parrot, Grey-headed Flying Fox and Australian Mudfish are unlikely to occur, though referred to in the Scoping Requirements for the EES

Key areas of ecological value along the route are: the Powlett, Bass, Lang Lang and Bunyip Rivers, Bass Coast Rail Trail and Bridge Creek.

Discussion

In the context of the highly modified vegetation along most of the investigation corridor, the main risks to ecological values associated with construction of the powerline are:

- Further loss of native vegetation and habitat areas
- Disruption of watercourses with significant in-stream or riparian ecological values
- Dispersal of soil pathogens

The extent of impact will depend substantially on the final alignment for the powerline, as well as on the adoption of overhead or underground technologies. Careful siting of lattice towers or poles for an overhead line could substantially avoid impacts on significant vegetation and habitats, including along waterways. In particular, it should be possible to avoid impacts on GGE habitat through careful siting. In contrast, the greater surface disturbance associated with use of underground cables would lead to greater direct loss of vegetation and habitat as well as pathogen risks – possibly comparable to the impacts of the Transfer Pipeline.

A full assessment of the potential loss of native vegetation and habitat areas for overhead and underground have yet to be completed. This will be necessary in part to enable the determination of 'net gain' requirements

³⁷ See EES Technical Appendix 15

needed to offset vegetation losses in accordance with the NVMF. I note that either removal or trimming of taller vegetation under the powerline will be necessary, in part to mitigate fire hazards.

There is some potential for birds and bats flying at night to strike an overhead powerline. Large waterfowl, wading birds such as ibis and herons and diurnal and nocturnal raptors, and possibly flying foxes could be affected if the powerline is transverse to key seasonal migration routes. This issue should be taken into account in the finalisation of the power supply design.

It is my assessment that the key priorities for implementing the Transfer Pipeline as set out in section 3.6.2 are also applicable to the implementation of the power supply.

Conclusion

Having regard to the EES investigation and Inquiry's analysis, it is my assessment that the construction and operation of the Reference Project for the power supply would not have a significant effect on native vegetation or any threatened flora and fauna species listed under the EPBC Act or the FFG Act, if appropriate procedures and practices are applied.

3.6.4 Performance Requirements

It is my assessment that the following modifications to the draft EES Performance Requirements for the protection and management of terrestrial flora and fauna be made:

- **Amend PR 6.2** to read: "Apply the net gain approach consistent with the Victorian Native Vegetation Management Framework to the satisfaction of DSE or the Minister for Environment and Climate Change as appropriate, including the endorsement of any removal of vegetation of Very High Conservation Significance and confirmation of the suitability of associated offsets prior to the commencement of works."
- **Add new PR 6.3 (d)** to read:
"Pre-construction surveys to detect any indigenous species (flora, birds, fish, amphibians and reptiles) listed under the EPBC Act or FFG Act for which potential habitat exists in the vicinity of proposed works"
- **Add new PR 6.3 (e)** to read:
"Development of contingency plans to apply in the event that as yet undetected populations of species listed under the FFG Act or EPBC Act are encountered prior to or during construction or before site rehabilitation, to the satisfaction of DSE and DEWHA".
- **Add new PR 6.3 (f)** 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".
- **Add new PR 6.3 (g)** to read:
"Post-construction monitoring to apply at construction sites with significant flora or fauna or aquatic ecological values to assess actual impacts and the effectiveness of rehabilitation".
- **Add new PR 6.3 (h)** to read:
"Post-construction monitoring of any dispersal of *Phytophthora cinnamomi* dieback in remnant native vegetation in close proximity to pipeline and powerline earthworks sites, for a minimum of two years after the completion of site rehabilitation works".

- Amend PR 6.4 (c) to refer to: “Australian Grayling” not “Australian Mudfish”
- Add the following to PR 6.4 (c): “; conservation of significant flora species (River Swamp Wallaby-grass, Green Striped Greenhood, Matted Flax Lily, Maroon Leek-orchid)”.
- Add new points PR 28.2 (f) and (g) to read:
 “Manage helicopter use to avoid low level flyovers of Williamson’s Beach to minimise impacts on Hooded Plovers.”
 “Monitor human activity in the vicinity of the Hooded Plover nesting area on Williamson’s Beach.”

3.7 Cultural Heritage

Evaluation Objective - To avoid or minimise to the extent practicable adverse effects of project construction on Aboriginal and post-settlement cultural heritage, as well as palaeontologic and geomorphologic values.

Key Statutory and Policy Context

The objectives of the *Aboriginal Heritage Act 2006* (AH Act) include: “(a) to recognise, protect and conserve Aboriginal cultural heritage in Victoria... ; and (d) to promote the management of Aboriginal cultural heritage as an integral part of land and natural resource management”. New procedures for protecting and managing Aboriginal cultural heritage in Victoria commenced under this Act in mid 2007. These procedures require cultural heritage issues to be considered early in the development planning process, through the preparation of CHMP. The AH Act recognises Aboriginal people as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage. Aboriginal cultural heritage can include the places, objects, artefacts, beliefs and behaviours that are valued by indigenous Victorians.

The main purpose of the *Heritage Act 1995* is “to provide for the protection and conservation of places and objects of cultural heritage significance...”. This Act provides the statutory context for the assessment of impacts on non-Aboriginal post settlement heritage.

The most pertinent objective of planning in Victoria, under Section 4(1) of the P&E Act, is: “to conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest or otherwise of special cultural value”. In the context of the VDP, this objective is relevant to the cultural heritage values that would potentially be affected, as well as to the palaeontologic and geomorphologic values could potentially be affected.

Clause 15.11 ‘Heritage’ of the SPPF addresses both Aboriginal and non- Aboriginal cultural heritage, directing that planning authorities consult with local Aboriginal communities.

3.7.1 Aboriginal Cultural Heritage

Cultural Setting

The VDP area is located in the territory of the Bun wurrung. There were six known clans of this group whose territory extended from Werribee to Wilsons Promontory.

Discussion

Fifteen Aboriginal heritage sites were recorded within the Desalination Plant site during the cultural heritage investigations for the EES. Eleven of these sites were assessed as having low archaeological significance,

while four are of moderate significance. The EES acknowledges that earthworks have the potential to affect known as well as undetected Aboriginal sites or objects on the Desalination Plant site.

The potential risks to Aboriginal heritage from earthworks on the Desalination Plant site were assigned a 'high' risk rating in the EES, on the basis that the consequences would be major and the likelihood is almost certain. The risks of cultural heritage impacts from tunnelling under the dune system are rated as moderate. It is noted that the cultural heritage investigations for the Plant site have involved participation by representatives of two Aboriginal groups, who are Registered Aboriginal Party (RAP) applicants under the AH Act ³⁸.

EES Technical Appendix 45 contains the outcomes of discussions with RAP applicants about the component of the draft CHMP for the Desalination Plant site. Both Aboriginal groups made a request that a particular artefact scatter site be protected. No provision has yet been made in the PRs for the protection of this site.

The EES also assigns a high risk rating to the potential effects on Aboriginal cultural heritage from construction of both the Water Transfer Pipeline and the powerline components of the VDP. It is not possible at this stage to quantify the number of Aboriginal cultural heritage sites that could be affected by the Transfer Pipeline and powerline since the cultural heritage site surveys have not been completed. I note that representatives of RAP applicants have expressed concerns about the possibility of burials being found in the vicinity of the Pipeline and considered that all burials, scarred trees and silcrete outcrops should be protected.

According to the EES, during the design and construction of the Desalination Plant, "Aboriginal representatives" will be consulted to assist in the location, assessment and management of Aboriginal artefacts and sites, and a CHMP will be finalised for approval following the assessment of the VDP by the Minister for Planning. The PRs provide for consultation with "relevant RAPs", however it is not explicit whether RAP applicants will be consulted if no RAP is registered under the *Aboriginal Heritage Act 2006* prior to works commencing on the VDP.

The EES asserts that compliance with the PRs will ensure that any impacts on Aboriginal sites due to earthworks or removal of topsoil are avoided or minimised. However, cultural heritage investigations are still underway, in consultation with Aboriginal Affairs Victoria, to assist in finalising the CHMP. This work includes completion of a subsurface testing program for the project to clarify the nature and extent of the sites initially identified for the EES and to finalise the CHMPs.

Conclusion

Based on the EES and Inquiry's Report, it is my assessment that:

- Since cultural heritage investigations are still underway to inform a final CHMP for the VDP, specific conclusions on the potential effects of the VDP on Aboriginal cultural heritage cannot yet be drawn.
- Procedures for the preparation and approval of a CHMP under the AH Act will provide a sufficient basis for assessing and managing the potential effects of the VDP on Aboriginal cultural heritage.
- In view of the cultural sensitivity of the areas affected by the VDP, consultation with RAP applicants should continue if practicable in the event that VDP works commence prior to the registration of RAP(s) under the AH Act.

Further, in relation to the draft Performance Requirements in the EES, it is my assessment that the following modifications be made:

- **Amend first Objective for PR 8:** delete "known".

³⁸ Note that there are an additional four RAP applicants for the area covered by the powerline alignment and three RAP applicants for the area traversed by the pipeline alignment.

- Delete first four Performance Criteria for PR 8 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)”

3.7.2 Non-Aboriginal Cultural Heritage

Discussion

There is one known post-contact heritage site (a nineteenth century enclosure) within the Desalination Plant area and two sites of local historical interest.

The EES does not identify any post-contact heritage sites within the Pipeline and powerline alignments for the Reference Project that would be impacted by the works, although further detailed site surveys have some potential to detect unidentified artefacts or sites. The EES rates the risks for non-aboriginal cultural heritage to be medium, on the basis that the consequences would be major but the likelihood is rather unlikely.

Works associated with the VDP marine structures are not expected to affect maritime heritage, based on the sidescan sonar and multibeam data collected as part of the EES investigations.

Conclusion

Based on the EES and Inquiry’s Report, it is my assessment that the Reference Project is not likely to have any significant impacts on post-contact heritage sites, apart from a nineteenth century enclosure within the Desalination Plant site.

3.7.3 Scientific Values

Discussion

A significant Cretaceous Period vertebrate fossil site occurs on Williamson’s Beach at mouth of the Powlett River. While the construction of shafts and tunnels for the seawater Intake and concentrate Outlet for the VDP may intersect these strata, they would not affect the known fossil site or diminish known palaeontologic values. However given the adoption of tunnels for the intake and outlets and their significant depth below the fossil sites, there would be no impact on these known sites.

Neither the Desalination Plant site nor the areas traversed by the pipeline and powerline for the Reference Project have geomorphologic values that would be adversely affected by the VDP.

Conclusion

It is my assessment that the VDP would not have adversely effects on palaeontologic or geomorphologic values.

3.8 Landscape and Visual Impacts

Evaluation Objective - To avoid to the extent practicable any adverse effects of project construction on the character of significant landscapes as well as minimise adverse effects on visual amenity.

Key Statutory and Policy Context:

Objectives of planning under section 4(1) of the P&E Act that are relevant to the consideration of implications of the VDP with respect to landscapes, open space and recreation values are:

- (c) to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria;
- (d) to conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value.

3.8.1 Desalination Plant

Environmental Setting

The proposed Desalination Plant site is situated on a coastal plain, gently falling towards the Powlett River, to the south of Bass Highway. It mostly comprises cleared pastures. The foreshore and dunes up to 25 m high along Williamson's Beach forms the southern site boundary.

The coastline near the Desalination Plant site was recognised having regional significance in the *Coastal Landscape Assessment Study* undertaken for DSE in 2006.

The Plant site is not subject to a Significant Landscape Overlay (SLO), though part of the site is subject to an Environmental Significance Overlay (ESO). One of the objectives of the ESO is to ensure that new development is compatible with the environmentally sensitive coastal areas.

Discussion

The EES, and subsequently the Inquiry, have considered the potential landscape and visual amenity effects of the Desalination Plant, in relation to its physical dimensions and coastal location.

The EES provides an indicative site concept, including infrastructure siting and landscaping, for the Desalination Plant within its 264 ha site³⁹. The Plant concept comprises a number of large buildings approximately 400 to 500 m from the beach and approximately 150 to 300 m from the site's northern boundary. The pre-treatment building would be 131m long, 72m wide and 12m high, while a clear water tank would be the highest structure, at up to 19m in height. As the EES indicates, the PPP procurement process adopted may result in a different layout from the Reference Project, and the building envelope set out in Technical Appendix 5 allows for variation, but a separate PR sets height limits.

³⁹ EES Volume 3, Figure 2-17

Both the construction and operation of the Plant are expected to be on a 24 hour, seven days per week basis. 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 EES provides an analysis of the Desalination Plant's viewshed. It predicts that beyond 4 km the visual impact of the Plant would be insignificant, based on an assumed maximum height 20 m for structures, corresponding to 27 m AHD. Areas above 30 m AHD would have elevated views of the Plant. The visual analysis shows that no locations along the Bass Highway within the viewshed would overlook the entire Plant.

Technical Appendix 34 provides an analysis of the visual impacts from 20 publicly accessible viewpoints, from Kilcunda in the north to Wonthaggi in the south. Within the viewshed of the Desalination Plant, the key public viewpoints are accessed from 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. Significantly, the visual analysis in the EES demonstrates that the Desalination Plant would not be visible from Williamson's Beach because of the height of the dunes and that the visual impact from the Bass Coast Rail Trail would be low. The visual impacts from the 20 public viewpoints are rated as either nil, negligible or low.

The greatest visual amenity impact would be experienced at 14 residential properties within 2 km of the Desalination Plant site. The EES includes an analysis of the visual impacts from a number of dwellings at various distances from the Plant. The impact on the visual amenity of dwellings near the Plant would range from low to high. There are opportunities to mitigate these effects through screening planting near dwellings. In the opinion of the Inquiry, "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". Consequently, 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."⁴⁰

Conclusion

It is my assessment that the Desalination Plant will:

- not have a significant impact on the visual values of Williamson's Beach and the Kilcunda – Harmer's Haven Coastal Reserve;
- is likely to have a significant impact on the visual amenity of several dwellings in the vicinity of the Plant, notwithstanding the landscaping and screening measures that are proposed; and
- overall, will have an acceptable level of impact on landscape quality from key public viewpoints.

3.8.2 Water Transfer Pipeline

Environmental Setting

The pipeline alignment for the Reference Project traverses relatively flat terrain from the Desalination Plant site to the Bass Highway before entering undulating to hilly terrain through the foothills of the Strzelecki Ranges. It passes through the Bass River valley before crossing low foothills and entering the expansive flood plains of the drains and waterways flowing into Western Port.

⁴⁰ Inquiry Report, pp.74-75

Discussion

Construction of the pipeline would involve temporary visual impacts in localised areas while the trench is exposed. Once the trench is backfilled and properly rehabilitated, no significant visual effects should be evident.

The main permanent visual component of the pipeline will be the Booster Pump Station located near the Ballarto Road/Cardinia Road intersection. This building would be approximately 94 m long, 12 m wide and 7 m high. This building is unlikely to be a noticeable visible element beyond a distance of 1 km. According to the EES, there are no dwellings close to the proposed Booster Pump Station site that would experience a high visual impact.

Conclusion

Having regard to the EES investigation and Inquiry's analysis, it is my assessment that the construction and operation of the pipeline would not cause significant long-term impacts on landscape quality or visual amenity.

3.8.3 Power Supply

Environmental Setting

The powerline alignment for the Reference Project traverses relatively flat terrain from the Desalination Plant site to the Bass Highway before entering undulating to hilly terrain through the foothills of the Strzelecki Ranges. Technical Appendix 68 has defined seven landscape units, some of which have a high sensitivity, including the 'coastal cliffs and shoreline', 'scrubby and low coastal heathland' and 'riverine' units.

As it leaves the Desalination Plant site, the powerline alignment moves through some coastal heathland with a significant proportion of its remnant vegetation intact, then into coastal plains that have been largely cleared for agricultural purposes. Following this it enters the agricultural land and rolling hills of the hinterland (with its views back to the coast and into the foothills of the Strzelecki Ranges), as well as crossing a reach of the Powlett River in an attractive area relatively close to the coast.

The powerline alignment continues past more agricultural land and residential townships at it moves through the foothills of the Strzelecki Ranges, before entering the alluvial plains north of the foothills that contains a mosaic of paddocks associated with market gardens and cleared farmland, as well as a number of farm dams.

Discussion

The Reference Project responds to the high landscape sensitivity of the coastal zone and the hills north of Kilcunda through the adoption of 66kV underground lines between the Woolamai Terminal Station and the Desalination Plant. However, the greater costs and practicability issues in the context of the project timeframe affecting the adoption of 220 kV underground technologies have led the Proponent to not adopt this option for the Reference Project from the latter Terminal Station to the proposed Tynong North terminal station. In this context, the Inquiry noted that the Proponent had not responded to the planning scheme recognition of landscape values of the Bass River valley and the hills between Nyora and Yannathan that separate the Bass and Lang Lang River catchments, i.e. SLOs in the Bass Coast and Cardinia Planning Schemes.

Direct landscape impacts of the overhead powerline would reflect the regular, artificial appearance of the supporting structures and the catenary curves of the lines. The impact would be greater where the structures are silhouetted against the sky or at close range. Indirect impacts would arise where removal of linear vegetation strips occurs to provide operational clearance for the powerline. The EES indicates the distance at

which the structure would be considered to be a dominant visual feature, but does not fully address the aspect of silhouetting.

The construction of a 220 kV overhead powerline within the EES investigation corridor would conflict with the objectives for the SLOs have within the Bass Coast and Cardinia Planning Schemes. This is a consideration to be strongly weighed in the decision whether to approve a particular alignment and design for the powerline under these planning schemes, having regard to wider considerations of public benefit, rather than being a basis for prohibiting any high-voltage overhead powerline development.

The objectives of the SLO1 – Strzelecki Foothills and Bass Valley in the Bass Coast Planning Scheme include:

- To protect and enhance the landscape quality of the area
- 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.

The Reference Project is likely to impact on these rural landscape values north of Woolamai, particularly in terms of the introduction of a dominant built element that is “out of character”. The proposed alignment north of Woolamai runs along the floor of the Bass River Valley, in which it would become a dominant feature but would be visible above the skyline only when viewed from the floor of the valley. However, the narrow shape of the valley would limit its capacity to absorb views of the structure.

Similarly, the SLO3 – Lang Lang/Heath Hill within the Cardinia Planning Scheme covers areas of indigenous heath amidst cleared farmland and has these objectives:

- 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 impacts through the Heath Hill area would be more significant as the powerline climbs the hills to cross between the valleys of the Bass and Lang Lang Rivers. Views from the lowlands to the west would be affected, both in terms of direct sight of the structure and losses of vegetation to accommodate the structure. Although the alignment can be designed to maximise the retention of native vegetation, there would still be some losses with landscape implications under the Reference Project scenario.

In addition to the visual impact of the Reference Project on landscape values, there would also be an impact on the visual amenity of neighbouring landowners and residents. From an amenity perspective, impacts of the powerline need to be considered in relation to all affected properties, not just those in areas covered by SLOs. Installation of an overhead 220 kV powerline through rural areas currently free of such structures can be expected to impact adversely on residents’ enjoyment of their outlooks, to the extent that the structures become a dominant or intrusive element of those views. However, north of Lone Pine Road most properties already have exposure to either the 500 kV powerline running east-west south of Tynong, the 220 kV powerline north of the Princes Freeway or other infrastructure such as the Freeway and the railway line. Impacts on those views need to be considered in the context of the infrastructure elements already present.

The Proponent has proposed as PR 2.4 that “on finalisation of the alignment, offer landscape mitigation measures on a case-by-case basis to residents within 0.7 km of the Transmission Line.” However, there is limited scope to screen a powerline with constructed elements up to 60 m high by planting vegetation. Planting could take significant time to reach adequate heights to screen structures. Alternately, if it is planted very close to viewing locations, the whole viewshed may be screened out. I note that the Inquiry considered that the use of vegetation to screen towers, poles or lines is likely to be ineffectual. However, this opportunity should be afforded to interested residents. Also, to reduce impacts on visual amenity of road users, a maximum practicable setback of lattice towers - or alternative structures - from roads in areas with recognised landscape values or carrying substantial tourist traffic will be desirable.

The EES recognises the potential to use steel poles rather than lattice towers within route sections, if the former are perceived to have less visual impact. Poles might reduce landscape impacts to some degree, where a simpler visual structure would be less visually intrusive than an overhead powerline using lattice towers. The adoption of poles may therefore be preferable to lattice towers within SLO areas. Since poles may be more costly than towers, their use may not be justified in areas without either an SLO designation or equivalent notable landscape values.

The Inquiry recommended that the overhead alignment should avoid areas covered by SLOs where possible. This would require significant changes to the Reference Project described in the EES. While The EES identified the availability of a project Variation involving development of an overhead powerline along a different alignment within the 500 m wide investigation corridor, it would not be possible to totally avoid impacts on the SLOs within the EES investigation corridor.

The EES also identified three relevant Options which could have major implications for visual outcomes, vis:

- adoption of an alternative corridor, i.e. outside the investigation corridor associated with the Reference Project;
- an underground grid connection from Tynong to Woolamai; and
- a gas-fired power station at the Desalination Plant site rather than a connection to the electricity grid.

The first Option would shift visual impacts to residents in the viewshed of an alternative corridor. Such an alternative alignment would require proper assessment and an opportunity for public comment. The second Option would have distinct environmental implications, as well as different implications for project delivery. While it would avoid significant impacts on landscape and visual amenity values, it could entail greater impacts on flora and fauna as well as on agricultural activities and soil pathogens. Further public comment would not be warranted if an underground connection within the EES investigation corridor were to be considered, as the potential impacts and related issues have been well characterised through the EES and Inquiry process. However, the approval processes that would need to be applied to the three Options above are addressed in section 3.12 of this Assessment.

I note that the powerline is proposed to cross the existing 500 kV powerline south of Tynong. In principle, the power connection could be made to this powerline rather to the 220 kV powerline approximately 5.5 km further north. The key factor driving this decision by the Proponent is the substantial cost of the required 500 kV to 220 kV transformation. I note that the Reference Project alignment north of the 500 kV line is of lower visual sensitivity than much of the more southerly parts of the alignment.

Conclusion

Having regard to the EES, public submissions and Inquiry's analysis, it is my assessment that:

- The Reference Project would have significant impacts on the landscape quality of areas covered by Significant Landscape Overlays in the Bass Coast and Cardinia Planning Schemes. The scope for mitigating those impacts through vegetative screening is limited;
- While the EES investigation corridor is generally suitable, further consideration be given by the Proponent and/or PPP bidders (as provided for by the bid process) to opportunities to reduce impacts on landscape and visual amenity values relative to the Reference Project to achieve better outcomes, through some combination of:
 - refining the powerline route alignment and placement of structures within the EES investigation corridor; and
 - use of either steel poles or underground cables in areas with recognised landscape values.

I note that while the Option of adopting a new alignment outside the EES investigation corridor to reduce the overall level of visual and other environmental impacts is available to the PPP bidders, this would both affect a new group of stakeholders and involve further challenges for project delivery.

3.8.4 Performance Requirements

It is my assessment that the following changes to the draft performance requirements related to landscape and visual issues in the EES be adopted:

- **Add the following to PR 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 of any above ground components of the desalination plant."*
- **Add the following to PR 1.7:** *"... having particular regard to the potential visual amenity and noise impacts on the northern and western boundaries."*
- **Add new Performance Criterion for PR 2 to read:** *"Minimise impacts on landscape quality in areas with high existing landscape quality."*
- **Modify PR 2.2 to read:** *"Minimise impacts on landscape and visual amenity values, especially within Significant Landscape Overlay areas, coastal areas and areas visible from key tourist routes including the Bass Highway, as well as on rural and residential properties, to the extent practicable."*

3.9 Residential and Recreational Amenity

Evaluation Objective - To avoid or minimise to the extent practicable adverse effects on residents' and coastal users' amenity due to noise, dust and related off-site effects during construction and operation of the project.

Key Statutory and Policy Context

Potential impacts on public and residential amenity, health and safety are inherent aspects of environmental effects to be considered as part of the assessment process under the EE Act, in accordance with the Ministerial Guidelines. A specific legislative basis for considering these type of effects of development exists under the P&E Act, one of the objectives of which under section 4(1) is to: "to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria"⁴¹.

⁴¹ Under s.4(1)(c) of the P&E Act.

In addition, the EP Act provides a comprehensive framework for the protection and maintenance of environmental quality sufficient to protect existing and anticipated beneficial uses of the environment, including to protect human health and residential amenity in relation to ambient air quality and noise. *SEPP (Ambient Air Quality) No.S19 (1999)* and *SEPP (Air Quality Management) No. S240 (2001)* provide for the protection of beneficial uses dependent on air quality, in particular human health, the health of other life forms and ecosystems and visibility.

The EPA is also responsible for SEPP and related policy guidance to assist the implementation of the EP Act to minimise impacts from noise:

- *SEPP N-1 (Control of Noise from Commerce, Industry and Trade No.S31 (1989))*
- 'Interim Guidelines for Control of Noise from Industry in Country Victoria', EPA Publication N3/89 (1989).
- 'Noise Control Guidelines', EPA Publication 1254 (October 2008), which replaces former noise control guidelines EPA Publication TG302/92 (1992).

There is no subordinate legislation or SEPP for industrial noise in regional Victoria that specifies maximum allowable noise levels for new development, such as SEPP N-1 for metropolitan Melbourne. However, in 1989 the EPA published the 'Interim Guidelines for Control of Noise from Industry in Country Victoria' N3/89, which continue to provide the policy guidance on what noise levels are acceptable for industry at sensitive receptors in regional Victoria. However, where background noise levels are comparable to those in metropolitan Melbourne, noise limits are to be determined using SEPP N-1.

3.9.1 Desalination Plant and Marine Structures

Project Context

The Desalination Plant site is approximately 5 km from Wonthaggi and 3 to 4 km from Kilcunda. There are 12 residences within 1.5 km of the Plant site, which have the potential to be affected by noise, vibration and reduced air quality and are therefore considered to be sensitive receptors for the purpose of the EES impact assessments. In close proximity to the site are Williamson's Beach, vegetated coastal dunes, the estuarine reach of the Powlett River, a caravan park near the mouth of the Powlett River and agricultural land.

The main recreational uses of the area are associated with the coastline and beach in particular. Williamson's Beach, located directly adjacent to the Plant site, is not used as much as the area west of this near the mouth of Powlett River, largely due to limited access and signage. A caravan park is located here as well, so the foreshore dunes and beach near the river attract much use during the peak summer tourist season – including recreational boating, dog walking, cycling, horse riding, and passive recreation. Outside of the peak season, use of this area is dominated by local people who know the area's features and the access routes.

The construction of the Desalination Plant and land-side aspects of the marine structures (i.e. onshore shafts) is to occur over a period of two years, which will inevitably produce some short-term impacts on local amenity largely due to noise and dust.

Ambient noise is generally low in this area, and is dominated by surf, wind, vehicle movements and some agricultural noises. A local small saw mill, which is approximately 500 m east of the site, is also likely to influence the ambient or background noise when in operation (although this is likely to only be intermittent). The noise levels during the day are generally lower than the night levels, with the minimum levels occurring around 10 am and again in the evening around 4 to 6 pm.

Discussion

Noise

The recorded minimum background noise levels at the site were just above the N3/89 limits for day and evening periods, which could enable the application of SEPP N-1 criteria for these periods at some receptors (due to the variation in background levels at the five different receptors at which monitoring was conducted). However, the Proponent has instead adopted N3/89 criteria (i.e. 37 dB(A)) for both the daytime and evening periods at all sensitive receptors, with the intention of applying “a measure of conservatism and consistency”. This approach was agreed to by EPA.

On the other hand, the EES adopts SEPP N-1 limits for all sensitive receptors at night time, which means that in combination with the background levels it is the local zoning that largely determines the acceptable noise criteria. The background levels at the Plant site are relatively high due to the noise of wind and surf nearby and thus the application of SEPP N-1 at night is appropriate.

The Plant's operations would occur 24 hours per day, seven days a week. The noise modelling indicates that under both the 150 GL and 200 GL scenarios the Plant would be able to meet the limits proposed by the EES, in fact be less than 37 dB(A) providing that recommendations of the EES⁴² are implemented, including in relation to roof design for the 200 GL scenario. Hence, local beneficial uses should be protected, including protecting against sleep disturbance during the operation of the Plant at night.

The EES proposes to adopt TG302/92 noise limits during the construction phase at the Plant site for day, evening and night, since the measured background levels are above the N3/89 limits for day and night. As noted in Appendix 50, the different policy documents have different approaches to dealing with construction noise. Moreover, N3/89 and TG302/92 seek to control different types of noise: N3/89 places limits on continuous noise, whereas TG302/92 is concerned with limiting short term noise events common during construction activities. Hence there is some justification for applying both approaches to protect amenity from construction-related noise⁴³.

Given that construction is likely to occur 24 hours 7 days a week to meet project timelines, potential noise exceedances are more likely to occur at night. Indeed, some construction noise at the site is likely to be outside the provisions of the Noise Control Guidelines and will require the development and application of specific controls consistent with these Guidelines, largely to ensure impacts on amenity are minimised in relation to protecting habitable rooms and preventing sleep disturbance. The Guidelines provide sufficient guidance on how this should be achieved.

Implementation of noise control measures during Plant construction and operation to protect beneficial uses at nearby dwellings will ensure that noise levels do not interfere with recreational activities at Williamson's Beach and the mouth of Powlett River. Moreover, the noise barrier of the foredune, as well as the separation distance and the competing noise from waves and wind will ensure that recreational activities are not affected.

Air Quality

During the two years of construction, dust and diesel fumes will be generated by earthworks, machinery and truck movements at and around the Plant site. The generation of dust also has the potential to impact on air quality such and consequently the general health of exposed members of the public (as well as workers). The generation of local dust plumes is likely, although any adverse impacts on amenity should be effectively minimised by applying mitigation and management measures in accordance with EPA requirements.

⁴² Technical Appendix 50

⁴³ noting that the 2008 'Noise Control Guidelines' have replaced TG302/92

The EES notes that a Dust Management Plan (DMP) will be prepared and implemented to ensure that air quality during the construction phase is controlled and does not have adverse impacts on air quality at sensitive receptors. EES Technical Appendix 48 concluded that impacts from dust are likely to be minimal and easily managed providing a number of specific measures are evaluated, trialled and effectively implemented through the DMP.⁴⁴

The Proponent's EPA Works Approval Application notes that the Reference Project design is consistent with best practice and thus emissions under the normal operational scenario will be minimised to the maximum extent achievable, such that the Plant complies with SEPP and does not impact on local beneficial uses.

An assessment of the potential impacts on odour from operation of the Desalination Plant is also included in EES Technical Appendix 48. Under a normal operational scenario the odour emissions of the Plant would readily meet the EPA odour criteria off-site, although under an "upset scenario" (i.e. malfunction of deodorisation equipment) emissions would be uncontrolled and could cause impact at the closest receptors.

As is the case for noise, the implementation of measures to protect air quality at nearby dwellings during Plant construction and operation will ensure that neither dust nor odour levels interfere with recreational activities at Williamson's Beach and near the mouth of Powlett River.

Conclusion

Having regard to the EES investigations and Inquiry's report, it is my assessment that:

- The potential impacts on local amenity at sensitive receptors due to noise are likely to be minimal during the operational phase of the project. Impacts are also likely to be largely minimal during the construction phase, providing that effective controls and preventative measures are incorporated into the Environment Management Plan, particularly in relation to night time noise and the prevention of sleep disturbance, which requires further consideration in consultation with EPA.
- The Desalination Plant and Marine Structure's components of the VDP will have negligible impacts on air quality and its beneficial uses from dust and odour, particularly with effective adoption of the mitigation and controls measures recommended in the EES documentation.

Further to this, it is my assessment that:

- A Noise Management Strategy be prepared in consultation with EPA, to establish the specific measures to be adopted to meet noise limits for the construction and operational phases of the Project.
- Noise limits during Plant construction incorporate relevant limits from both 'Noise Control Guidelines' EPA Publication 1254 and 'Interim Guidelines for Control of Noise from Industry in Country Victoria' EPA Publication N3/89.

3.9.2 *Water Transfer Pipeline*

Context

The Transfer Pipeline itself would be underground and not generally visible or noticeable. However, the Reference Project also includes a transfer pump station (located within the Desalination Plant site) as well as a Booster Pump Station. The Reference Project proposes that the Booster Pump Station would be located adjacent to the pipeline near the corner of Ballarto and Pound Roads near Cardinia.

⁴⁴ See pages 16 to 21

The EES identified a number of potentially sensitive receptors along the pipeline route. Eleven were selected as representative, the majority of which are private residences as well as one school/church.

Discussion

Noise

The EES proposes to adopt the N3/89 noise limits for the operation and construction phases for the water transfer pipeline component of the project. During the construction phase the limit would be: 55 dB(A) for the day (7 am-6 pm Monday to Friday, 7 am-1 pm Saturday), 37dB(A) for the evening (6 pm-10 pm Monday to Friday, 1 pm-10 pm Saturday, 7 am-10 pm Sunday) and 32 dB(A) at night (10 pm-7 am all days).

As previously discussed, N3/89 and TG302/92 seek to control different types of noise and therefore in principle both should be applied to the construction phase of the project. However, the 2008 Noise Control Guidelines have replaced TG302/92 and will therefore need to be addressed.

EES Appendix 66 accepts that most construction activities for the pipeline would occur primarily between 7 am and 6 pm on weekdays and between 7 am and 1 pm on Saturdays. It predicts that noise from these activities will probably exceed the N3/89 limit of 55 dB(A) during the day within approximately 200 m of the construction activities and thus have the potential to give rise to moderate impacts on local amenity and sensitive receptors. However, the moving nature of these construction activities suggests that sensitive receptors should only be exposed to noise beyond the N3/89 limits for short periods during the construction of the Transfer Pipeline.

Once operational, the Booster Pump Station would be considered as an industrial noise source. Therefore the application of N3/89 to establish noise limits is appropriate, and since the background noise levels are low, the noise limits would be 45 dB(A) during the day, 37 dB(A) for the evening and 32 dB(A) for the night.

Both the 150 GL and 200 GL scenarios were modelled for the operation of the Booster Pump Station. Under normal conditions it is predicted that noise levels would be below 32 dB(A) for all sensitive receptors. Under conditions that could exacerbate noise levels, such as temperature inversions, it is expected that noise limits would be exceeded only marginally, i.e. by approximately 2 dB(A). However, by selecting an appropriate pump this increase should be mitigated such noise limits are met.

Air Quality

Trucks, earthworks and the use of machinery are likely to generate dust and impacts on air quality along the route of the proposed Transfer Pipeline. The EES assesses the risks associated with dust generation to be medium for visual amenity and high for public health, given the major consequences and the low likelihood.

Due to the predicted levels within 200 m of the construction a "higher-level dust management system" is recommended within EES Technical Appendix 66, particularly for any earthworks and activities within 200 m of sensitive receptors (see above). This would entail a proactive and reactive dust management system (e.g. real-time particulate monitors). Short-term trigger levels will need to be developed and agreed with EPA.

Localised impacts on visual amenity (probably of a moderate level) are likely to occur within the vicinity of the construction activities. These will be short term as construction of the pipeline moves along the route.

General Access and Amenity

Residential amenity impacts might also arise from restriction of property access during underground installation of the pipeline. While it may be unavoidable that some such impacts occur, they should be mitigated and minimised as far as practicable through close consultation with affected residents and detailed

project planning and design so that trenched crossings of property driveways are completed on schedule and in minimum time. High risk periods (e.g. likely high fire danger periods) should be avoided as far as possible.

Conclusion

Having regard to the EES investigations and Inquiry's report, it is my assessment that:

- The potential impacts on local amenity at sensitive receptors due to construction and operational noise should be negligible if effective controls and preventative measures are adopted to minimise noise, including the selection of the pump for use the Booster Pump Station.
- The Transfer Pipeline and Booster Pump Station components of the VDP would have short-term impacts on local air quality, though protection of beneficial uses could be achieved by implementing the mitigation and controls measures specified in the relevant EES technical appendix.

3.9.3 Power Supply

Environmental Context

The Reference Project proposal for a new 220 kV overhead powerline has attracted significant concern in submissions, particularly from the rural residents along the route of the proposed powerline. Issues raised include impacts on visual amenity and property values, fairness in relation to the portions of the powerline proposed to be built underground and overhead, and electro-magnetic radiation. There may also be issues associated restrictions to property access and amenity during construction.

There are a number of sensitive receptors located within the vicinity of the powerline corridor, including schools, residences, sport facilities, health clinics and hospitals.

Discussion

Noise

The EES proposes to adopt the N3/89 Guideline noise limits for the construction of power infrastructure (55 dB(A)), which would apply for the construction timeframes outlined below. However, as already noted, N3/89 and TG302/92 (as well as the new Noise Control Guidelines) seek to control different types of noise. Both continuous and short event types of construction noise should be controlled, so there is cause for applying both guidelines to protect amenity from construction-related noise along the powerline route.

The EES⁴⁵ notes that the construction activities for the power infrastructure should occur primarily between 7am and 8pm on weekdays and 7 am and 1 pm on Saturdays. It is also predicts that noise from construction activities is likely to exceed 55 dB(A) within 200 m from the area of works within corridor. The transitory nature of the works will mean that sensitive receptors are likely to be impacted for short periods with varying degrees of exceedances, depending on the nature of construction activities occurring at different times.

The impacts on amenity from construction-related noise should be minimised and best addressed through a range of best practice control and monitoring measures, as outlined in the Noise Control Guidelines, which can be readily adapted for the purposes of the VDP in terms of the PRs.

Operational noise is only potentially significant for the proposed Woolamai Terminal Station, where there are three sensitive receptors 600 m or more from the site. The modelling predicts that the site will comply with the applicable noise limits: the EES proposes that N3/89 limits be applied given the low background noise levels. However, under worst case adverse weather conditions, impacts could be increased by 5 dB(A), which would

⁴⁵ Technical Appendix 77

exceed the N3/89 night time limit of 32 dB(A). Mitigation would therefore be required to ensure the protection of amenity, including the prevention of sleep disturbance. The EES⁴⁶ recommends some specific measures that should enable the night time limits to be met under all conditions, including the siting of the transformers as far away from the sensitive receptors as possible.

Air Quality

Trucks, earthworks and the use of machinery are likely to generate dust and impacts on air quality along the powerline route. EES Appendix 76 assessed the risks associated with dust generation to be medium, as though there could be major consequences these are unlikely or have a low likelihood. It also highlights that the impacts will be of a transient nature, as the construction moves along the route.

The modelled dust dispersion indicates that for worst case scenarios the daily predicted average level of dust will impact on air quality significantly within 100 to 200 m of the construction activities, i.e. exceeding the EPA criterion (i.e. PEM intervention level) of 60 µg/m³ for PM₁₀. This was particularly the case at the Pakenham site (as for the pipeline), where there are lower wind speeds that carry the dust for longer periods with reduced downwind dispersion.

The level of impact within 200 m of the construction activities necessitates a “higher-level dust management systems”, in particular when the activities are within 200 m of sensitive receptors as outlined above. Thus as for the pipeline, a proactive and reactive dust management system is needed, including real-time particulate monitors. While the 24 hour limit or intervention level is set at 60 µg/m³, short-term trigger levels will also need to be developed and agreed with EPA.

General Access and Amenity

Similar issues will arise for the Power Supply infrastructure as for the Transfer Pipeline in terms of restriction of residential property access during construction, especially during any underground installation works. A similar approach should also be taken to mitigate and minimise such impacts.

Electro-Magnetic Fields

Electro-magnetic fields were raised as a matter of concern by some submitters. This matter has been considered in the EES and by the Inquiry, which concluded that the EMF levels will be an order of magnitude below those specified under the relevant Australian standard. I note both that the standards applying to the VDP will be the same as those applying to construction of any other 220 kV powerline in Victoria, and that the new powerline should perform at least as well as any other 220 kV overhead powerline (of which many hundreds of kilometres already exist) in Victoria. In this context, the Inquiry concluded that the predicted electro-magnetic fields will not give rise to any significant effects.

Conclusion

Having regard to the EES investigations and Inquiry’s report, it is my assessment that:

- Impacts of noise associated with construction and operation of the Power Supply infrastructure on local amenity at sensitive receptors are likely to be minimal if effective controls and preventative measures are incorporated, particularly in relation to night time noise near the Woolamai Terminal Station.
- Construction of the powerline would have some impacts on local air quality during construction, although these would be short term only. Beneficial uses should be protected if mitigation and controls measures specified in the relevant EES technical appendix are adopted and implemented effectively.

⁴⁶ Technical Appendix 77

- Electro-magnetic fields associated with the VDP would not entail significant environmental effects, given that the Reference Project should comply with the relevant standards for Australian powerlines.

Further to this, it is my assessment that:

- A Noise Management Strategy be prepared in consultation with EPA, to establish the specific measures to be adopted to meet noise limits for the construction and operational phases of the Project. This Strategy is to incorporate noise source reduction and treatment wherever possible, including in relation to night time noise during the construction phase. Specific measures recommended in EES Technical Appendix 77 should be adopted to enable the night time criteria to be met under all conditions, including the siting of the transformers as far away from the sensitive receptors as possible.
- Noise limits during construction of Power Supply infrastructure incorporate relevant limits from both 'Noise Control Guidelines' EPA Publication 1254 and 'Interim Guidelines for Control of Noise from Industry in Country Victoria' EPA Publication N3/89.

3.9.4 Performance Requirements

Further it is my assessment that the following changes and additions are needed for the PRs (and Performance Criterion (PC)) identified below:

- **Change PC for PR 22** – i.e. from: "During construction, comply with TG302/92 for Desalination Plant.", to: "During Construction, comply with EPA Publication 1254, as well as relevant aspects of EPA Publication 480 and N3/89 for the Desalination Plant."
- **Change PC for PR 22** – i.e. from: "During construction, comply with Section 5 of EPA Publication 480, TG302/92 and N3/89 (depending on background noise levels) for the Transfer Pipeline and Electricity Grid Connection and Assets."; to "During Construction, comply with N3/89 (given background noise levels) as well as EPA Publication 1254 and section 5 of EPA Publication 480, for the Transfer Pipeline and Electricity Grid Connection and Assets"
- **Add to PR 1.7** – "... having particular regard to the potential visual amenity and noise impacts on the northern and western boundaries".
- **Add to PC for PR 21.4** – "... and ensure no offensive odours beyond the boundary of the premises".
- **For PR 22 and the PC**– ensure EPA Publication 1254 replaces TG 302/92.

3.10 Other Land-uses, Activities and Infrastructure

Evaluation Objective - To avoid or minimise to the extent practicable adverse effects of project construction and operational activities on land uses (including agriculture and residential), tourism, marine activities (including commercial and recreational) and physical infrastructure.

Key Statutory and Policy Context

A key aspect of the minimising environmental effects of the VDP is to avoid or minimise effects on adjoining activities and infrastructure. The Ministerial Guidelines made under the EE Act specify that an EES needs to assess a project's potential effects on existing land uses and infrastructure that support current patterns of economic and social activity. A specific legislative basis for considering such effects exists under section 4(1) of the P&E Act, as the objectives of planning in Victoria include:

- (a) to provide for the fair, orderly, economic and sustainable use, and development of land;

- (c) to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria.

The CM Act and associated Victorian Coastal Strategy also establish the priority of minimising conflicts between different coastal activities.

3.10.1 Desalination Plant and Marine Structures

Project Context

The 264 ha Desalination Plant site is approximately 3 to 4 km from Kilcunda, directly adjacent to densely vegetated coastal dunes and Williamsons Beach, and less than 1 km from the estuarine reach of the Powlett River. Williamsons Beach and the high vegetated dunes separating the beach from the site are encompassed within the Kilcunda–Harmer’s Haven Coastal Reserve. A caravan park and other tourist accommodation exist nearby, near the mouth of the Powlett River.

Apart from the recreational and commercial uses of the local coastal/marine environment, the other land-uses in the general area are agriculture and wind energy facilities. The site itself is largely cleared of vegetation has been mostly used for grazing with perennial pastures.

The main recreational and commercial uses of the area are associated with the marine areas and beach. Williamsons Beach is used less for recreation than the area near the mouth of Powlett River, due to limited access. During the peak summer tourist season there is an increase in the recreational use of this coastal area for boating, dog walking, fishing, cycling, horse riding, and passive recreation. Outside of the peak season the coastal area adjoining the site is primarily used by locals.

Recreational shore fishing occurs along this stretch of the coast, usually by locals, with Williamsons Beach being used by local clubs and individuals on the weekends and during evenings throughout the year, including for competitions. This beach is also often used for surfing and swimming by locals and by tourists/campers in the summer. Almost one quarter of the local population are involved in surfing within the local area.

In addition to tourism in the peak season, the key commercial use near the Plant site and area within which the Marine Structures are to be located is commercial fishing. The fisheries include abalone, rock lobster and scallops (mostly via diving), as well as finfish, trawl fish species and Southern Squid. There are approximately five operators that harvest lobster from the local reefs and two key reef areas are used by licensed abalone divers, whereas there is little scallop fishing in the area of the proposed marine structures. The local finfish fishery is very active, with approximately 40 to 60 days per year of fishing being undertaken by the local fishers in this area. Some approved trawling does occur in the project area although it appears to be quite limited in scale. The use of the area for Southern Squid Jig fishing is not likely to be regular.

Discussion

Land Use and Marine Activities

The use of nearby agricultural areas is unlikely to be impacted on by the proposed construction and operation of the Plant.

While the development of the Plant site may present some issues in terms of noise and dust affecting the amenity of local residents, as noted in section 3.9.1 these effects are unlikely to affect local recreation activities. However, the effects of Plant construction activities, including truck traffic and visual impacts, together with the construction of the offshore Marine Structures, would be likely to have short-term moderate impacts on local visitation and eco-tourism activities such as diving, boating, fishing and passive recreation

(i.e. in the area immediately adjacent to the works). Any deflection of tourism from the region is likely to be insignificant, both in the short-term during construction and in the longer-term as the revegetation of the plant site progresses.

As the Desalination Plant does not encroach upon Williamson's Beach, the operation of the Plant itself will not affect recreational activities on Williamson's Beach. Moreover, in relation to the operation of the marine Outlet, I note the Inquiry's view (p.112) 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 [of bottom waters] on the surfing community will be most unlikely".

There are likely to be some restrictions on access to Williamson's Beach during construction and possibly during the operational life of the facility, although these restrictions are likely to be minor and have little impact on the overall use of the coastal area.

The exclusion of recreational and commercial users from the marine area where the Inlet and Outlet structures are to be placed is likely to be more restrictive, in order to protect public safety. There is proposed to be a temporary exclusion zone of about 2 km by 2 km, precluding all marine activities from occurring in the marine area where construction is to occur for a 2 year period. This exclusion will impact on the use of this area by both commercial and recreational fishers, divers and surfers.

The components of the region's commercial fishing industry that use this area on a regular basis are relatively small, although it is used quite frequently for licensed rock lobster and abalone divers, particularly the near-shore environment. These users are the most likely to be impacted by the construction exclusion zone. The permanent mixing zone (approximately 500 to 700 m in dimension around the Outlet structure) may not reduce the access to this area for most fishing activities (commercial and recreational), but the exact impacts of the mixing zone on these activities and users is unclear until its location and extent is finalised through the EPA Works Approval process and CM Act consent. Rock lobster and abalone fishers are likely to use the marine areas to east and west during the construction timeframe.

The EES predicted that the likely impact of the VDP 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 Plant⁴⁷. However, there is some uncertainty involved in this regard. I note the Inquiry's finding that: "If significant species such as abalone are affected, ... 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". It also considered that the EES had overlooked the potential effect on the King George Whiting stocks on the commercial and recreational fishery that occurs within Corner Inlet. In the context of the exclusion zone and potential operational impacts, some local fishers may need to pursue other fishing opportunities in region waters.

Returning to the Plant itself, it is possible that it may store sufficient quantities of hazardous chemicals to be classified as a Major Hazard Facility. In this circumstance, a Safety Management System that complies with the Major Hazard Facility Regulations will be needed. While consultation with relevant authorities including WorkSafe, emergency services and Bass Coast Shire Council will be appropriate in developing a Safety Management System, I note that the Major Hazard Facility Regulations are administered by WorkSafe and that the latter will guide the Project Company in its response.

Road Infrastructure and Traffic Management

The only significant impact of the Plant development on local physical infrastructure will be on local roads. The EES suggests that delivery and removal of material from the Plant site would generate approximately 150

⁴⁷ Technical Appendix 11

truck movements per day during construction. I note that this estimate is based upon spoil being disposed of on-site, and that should spoil removal be required, an estimated additional 295 truck movements per day would be required during construction. There would be additional traffic associated with workers travelling to site each day from Wonthaggi, Inverloch and Melbourne (depending on workforce accommodation outcomes).

The Traffic Impact Assessment (TIA) for the EES suggests that traffic generated by development at the Plant site would push traffic volumes to capacity on the Bass Highway in the vicinity of Lower Powlett Road, resulting in deterioration in traffic flows, particularly during peak seasons such as the summer and Easter holiday periods. While there is capacity for Lower Powlett Road and the Lower Powlett Road/Bass Highway intersection to operate satisfactorily throughout the Project construction period (even under a scenario where spoil is removed from the site), upgrades have been recommended on safety and operational grounds. I note that the draft PRs for the VDP require the Project Company to upgrade the Bass Highway / Lower Powlett Road intersection and the Lower Powlett Road, to mitigate these impacts. While this should be sufficient to minimise potential delays for people travelling to either east or west (particularly relevant for those travelling to their place of work or business), on-going monitoring of delays and other traffic impacts will be needed.

The impact of traffic at the Plant is likely to cause some minor impact on the use and amenity of the caravan park and nearby residences, particularly during the peak holiday seasons.

In relation to the Transfer Pipeline, the TIA estimates that 250 traffic movements per day (including delivery trucks and worker transport) will be generated for each construction site (pipeline section). I note that there are eight local schools and seven health/community service facilities that are currently served by roads that are likely to carry construction traffic, and thus there is some potential for accessibility impacts on the community in these areas. However, it is likely that any impacts which do arise would be limited in time and duration, and would vary depending on the specific construction activities occurring in the locality.

Similarly, traffic impacts associated with the powerline connection would be limited in time and duration, and intensity of impact will vary depending on the nature of construction activities. The EES concludes that the capacity of local roads to absorb traffic increase across the powerline corridor is adequate.

I do note, however, that the Inquiry has concluded that there would be significant traffic impacts both at the Plant site and along the pipeline and powerline corridors during the construction phase of the VDP, particularly in relation to the interface between school and construction traffic and disruption of access to public facilities.

Further, I am aware that the Inquiry has found that this impact is likely to be discernable and concerning to the local community and I note its recommendation that priority be placed on early implementation of PRs, including the early development of a Traffic Management Strategy, with significant involvement of and consultation with the Bass Coast Shire Council. This is supported.

Conclusion

Having regard to the EES investigations and Inquiry's report, it is my assessment that:

- Impacts on local land uses and recreation activities in the area near the Desalination Plant site are likely to be minor to moderate during its construction. These impacts will be acceptable as they are short term and should be effectively minimised through implementation of best practice measures. Impacts on local land uses and recreation activities should be negligible during the operation of the Plant.
- Moderate impacts on marine commercial activities are likely to occur during construction of the Marine Structures, primarily as a result of an exclusion zone required for public safety, though a lower level of constraint and impact may continue during operation of the Marine Structures. Actual impacts will depend on the availability of alternative commercial fishing opportunities.

Further, it is my assessment that:

- To address community concerns in relation to traffic impacts on amenity, safety and accessibility, a Traffic Working Group, with membership comprising affected Councils, VicRoads, community representatives and impacted landowners, be convened by DSE to provide advice to the Project Company on traffic-related issues emerging during the construction phase.

3.10.2 Water Transfer Pipeline

Environmental Context

The proposed Pipeline will transport approximately 150 GL per year of potable water from the Desalination Plant, 85 km to Melbourne Water's Cardinia-Pearcedale main, south of Cardinia Reservoir. From there, the water will be transferred via existing infrastructure to Cardinia Reservoir.

A portion of the Transfer Pipeline corridor passes through the Koo Wee Rup Swamp horticultural area, established as a Special Use Zone under the Cardinia Planning Scheme and through the PCN control area.

Discussion

The major impact of the pipeline on agricultural areas would occur in the construction phase. Impacts may occur through loss of production, severance, loss of capital improvements, inadequate rehabilitation and on-going farm management difficulties. Loss of production may be caused in the short-term if construction activities occur on a property during a crop growing season or through temporary loss of grazing feed. It also may occur in the long-term, if the soil is compacted by heavy equipment or if the soil profile is significantly disturbed during trenching, particularly if the segregation of material during trenching is not sufficient to restore the correct soil horizon profile.

Severance may occur when part of a property is effectively isolated, for example if a pipeline was installed at too shallow a depth to allow ploughing over the top, part of a paddock could be isolated or at least require ploughing in a separate operation. Impacts may be minimised if the route is aligned with, and adjacent to, existing boundary and fence lines thus avoiding severance.

Farm infrastructure, including fences, piping and other structures may also be impacted during construction, but should be able to be replaced or compensated in consultation with property owners. As identified by the Inquiry, close supervision of construction activities will be required to ensure that rehabilitation is completed in a timely and satisfactory manner.

Appropriate protocols will need to be implemented for areas potentially infected with PCN (as specified under the *Plant Health and Plant Products Act 1995*), which will include implementing hygiene protocols for construction vehicles to ensure PCN is not spread either within or outside the Koo Wee Rup PCN Control Area, as well as appropriate disposal of any excess spoil generated within that area during construction.

Concern has been raised about the social impacts of pipeline construction, and whether construction should be undertaken in school holidays when the two primary schools fronting the pipe track at the northern end are closed. The construction period at any section of the pipe is likely to exceed the period of school holidays, and whether it is better for construction to take place at a time when children are in school or on holidays and possibly less closely supervised is arguable. Noise from construction works may be distracting, so on balance if construction can be timed for the holidays that may be preferable. I endorse the findings of the Inquiry that

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

The Inquiry has recommended that the Project Company “consider alternative locations for the Booster Pump Station to reduce noise and visual impacts on the township of Cardinia”. However, this Assessment has found that the building itself would not have a high visual impact, while effective mitigation of operational noise from the pump should be feasible. While sufficient grounds have not been established to justify shifting the Reference Project location for the Booster Pump Station, the bidders and selected Project Company should further consider whether a suitable site with lower amenity impacts is available.

Conclusion

Having regard to the EES investigations and Inquiry’s report, it is my assessment that:

- The potential impacts on agricultural and other local land uses, activities and infrastructure along the pipeline corridor will be minor and can be readily managed.
- The potential for infections from the spread of the PCN pathogen is a risk that needs careful management, although effective adoption of appropriate protocols under the *Plant Health and Plant Products Act 1995* should address this risk.

Further, it is my assessment that:

- Consultation with landholders needs to continue, to enable refinement of the final pipeline alignment and appropriate mitigation of potential construction impacts on landholders and adjacent land users.
- The construction of the Transfer Pipeline in the vicinity of the Berwick South Primary School and St Catherine’s Primary School/ St Francis Xavier College Junior Campus be undertaken as far as possible to minimise impacts on school operations.

3.10.3 Power-supply

Project Context

Construction of a high voltage powerline through the Koo Wee Rup intensive agricultural areas could impact on agricultural businesses in a number of ways, including⁴⁸: restrictions on movements of vehicles and machinery, due to height; restrictions on use of some types of irrigation equipment; restrictions on aerial spraying; restrictions on use of (or removal of) conductive materials in fencing, piping, etc; construction impacts on soil profile and health, pipework and fencing; and implications for biosecurity. The impacts on movement of vehicles, irrigation and spraying are specific to installation of an overhead powerline, while the remaining issues could apply to either overhead or underground installation. While the latter issues may be of more significance for underground installation, this is likely to be more the case for the more extensive earthworks associated with the Transfer Pipeline than for an underground powerline option.

The Reference Project powerline alignment traverses two closely overlapping areas of particular importance in terms of agriculture: the Special Use Zone (SUZ) in the Cardinia Planning Scheme and the declared Potato Cyst Nematode (PCN) area. Both areas lie in the northern part of the alignment, generally between the Lang Lang River and Tynong.

⁴⁸ As recognised in EES Technical Appendix 17 and in the Inquiry Report (p. 158)

Discussion

The Reference Project's impacts on agricultural productivity have been quantified in widely divergent terms by different parties during the Inquiry process, and it is therefore difficult to make a definitive statement about the potential impacts in dollar terms. The EES (Volume 5) estimated the loss of agricultural productivity would be in the order of \$4.4 million, although the proponent revised this down to \$2.3 million following refinement of the route at the Inquiry. Other estimates advanced by expert witnesses of agricultural losses as a result of the powerline were greater (e.g. \$6.3 million for grazing and \$6.1 million for horticulture).

Notwithstanding the variation in estimated losses, it is clear that the loss to the region's agricultural productivity has the potential to be substantial. The Koo Wee Rup SUZ is one of the most productive intensive agricultural areas in Victoria, as recognised by its unusual zoning.

Avoiding and/or minimising the impacts on productive agricultural land in the Koo Wee Rup SUZ would be of benefit to both individual landholders and the State. However, this would either require refinement of the current alignment within the corridor to take greater advantage of property boundaries, roads and so forth, or selection of a different corridor option to that investigated in the EES, and/or adoption of an underground solution that does not exacerbate pathogen dispersal or other agricultural issues.

In its report the Inquiry recommends that "further investigations on the Power Supply Reference Project, Variations and Options" be undertaken "as part of the ongoing procurement process". This recommendation is made in the context of its concerns regarding the agricultural and landscape impacts of the Reference Project. More specifically, it recommends that:

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).*

The potential for infections from the spread of the PCN and bacterial potato wilt pathogens are risks that need careful management. Rigorous monitoring and application of relevant protocols, including those specified under the *Plant Health and Plant Products Act 1995*, will be essential. This would include having hygiene protocols for all vehicles and equipment to ensure PCN is not spread, either within or outside the Koo Wee Rup PCN Control Area. Appropriate disposal for any excess spoil generated within that area will also be essential to manage this biological risk. DSE will need to establish mechanisms to address any failure of pathogen control, including remediation if practicable.

In terms of the alignment following property boundaries where possible, I note that many of the affected properties crossed by the Reference Project are of an irregular shape, and may be considerably wider than the 500 m corridor described in the EES. In some circumstances it may be mutually beneficial to landholders and the Project Company to vary the powerline alignment outside the EES investigation corridor, i.e. within property holdings traversed by this corridor.

Conclusion

Having regard to the EES investigations and Inquiry's report, it is my assessment that:

- The potential impacts of Power Supply infrastructure on horticulture in the Koo Wee Rup SUZ area are sufficiently significant to warrant further consideration of the practicability of reducing them substantially. However, they are not so significant in themselves as to justify the rejection of either an overhead or underground 220 kV powerline within the EES investigation corridor. Further information as well as other factors will need to be taken into account in coming to a final decision. The process to be adopted is addressed in section 3.12 of this Assessment.
- The potential for infections from the spread of the PCN and bacterial potato wilt pathogens is a risk that needs careful management, through effective application and monitoring of appropriate protocols under the *Plant Health and Plant Products Act 1995*. DSE will need to establish mechanisms to address any failure of pathogen control, leading to spread of these pathogens.

3.10.4 Performance Requirements

Further it is my assessment that the following changes and additions are needed for the PRs identified below, which relate to effects of VDP infrastructure on adjoining land uses and physical infrastructure:

- In relation to the Desalination Plant, **amend PR 4.3** to read: "Develop a Safety Management System for the facility in consultation with WorkCover, emergency services and the Bass Coast Shire Council. This system is to comply with any requirements under Major Hazard Facility regulations".
- In relation to the Transfer Pipeline, as recommended by the Inquiry, add a **new PR 5.2** to read: "In design, minimise impact on agricultural productivity including following road reserves and/or property boundaries where practical subject to further investigations and landholder consultation."
- In relation to the Transfer Pipeline, as recommended by the Inquiry, add a **new PR 5.6** to read: "Detail the methodology for any soil removal, assessment, reuse and management to manage any biohazard risk including Potato Cyst Nematode and *Phytophthora cinnamomi*."
- In relation to the overall Project, **amend PR 24.2** to: "Develop and implement, in consultation with relevant Councils, a traffic management strategy and systems to address:
 - a) Communication
 - b) Incident and emergency management
 - c) Route specification to avoid sensitive facilities and activities
 - d) Temporary construction site parking
 - e) Staging works and construction traffic to minimise impact on the road network
 - f) Road closures
 - g) Site access"

3.11 Social and Community Infrastructure

Evaluation Objective - To avoid or minimise to the extent practicable adverse effects on social well-being including the local availability of social infrastructure and housing, due to construction and operation of the desalination plant and other project components.

Key Statutory and Policy Context

Social effects, including impacts on social well-being, housing and social infrastructure, residential amenity, and recreational and social values of landscapes are relevant aspects of environmental effects to be considered as part of the assessment process under the EE Act. Social effects are also a relevant consideration under the P&E Act, underpinned by the objectives of planning in section 4(1) of the Act including:

- (c) to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria.

Social Context

The construction and operation of the Desalination Plant at the proposed site will have a range of direct and indirect impacts on residents and visitors in local towns, especially Wonthaggi, Dalyston and Kilcunda, and to a lesser extent Inverloch. While the construction of an underground Transfer Pipeline will cause some disruption for residents as well as businesses, the construction of an overhead powerline would have ongoing effects at least on perceptions of landscape quality. There are 49 dwellings within the investigation corridor for the powerline (i.e. within 250m of the Reference Project alignment), and 60 dwellings within the investigation corridor for the transfer pipeline (i.e. within 200m of the Reference Project alignment).

Wonthaggi, with a population of approximately 7200 people, is located 5 to 7 km east of the Desalination Plant site. It functions as a major local service centre, providing higher-order community services including several schools and the Wonthaggi District Hospital. Wonthaggi is currently experiencing population growth in the order of 0.7 percent a year, while Dalyston, Kilcunda and Phillip Island are experiencing higher growth rates. The EES describes the existing housing market in the Shire as 'tight'.

A range of aspects of the social profile of the Bass Coast community in the vicinity of the Desalination Plant site indicate a relatively high degree of social-economic vulnerability⁴⁹:

- The age profile in Wonthaggi and Bass Coast Shire as a whole currently includes a much higher proportion of people over 65 years than for Metropolitan Melbourne, while the trend is for this proportion to increase in the next two decades;
- Median household and individual income levels in Bass Coast Shire are markedly lower than the Metropolitan Melbourne and Victorian levels. The income levels reflect educational and occupation profiles, including a high proportion of retirees, as well as higher than average levels of unemployment within the Shire. The Shire has a significantly higher proportion of residents employed as labourers, technicians and trades workers compared to Metropolitan Melbourne;
- Median rental levels in Wonthaggi in 2006 were \$140 per week, compared to \$200 per week in Metropolitan Melbourne;
- A high proportion (11.7 percent) of Wonthaggi residents does not have a car, while there is limited public transport.

⁴⁹ Appendix 55 in the EES provides detailed information on existing social conditions.

Cardinia Shire and Casey Shire, which would be exposed to effects of the Transfer Pipeline and the proposed Northern Grid Connection, also score more highly on indices of social-economic vulnerability than Metropolitan Melbourne though not as markedly as Bass Coast.

The number of workers needed for the construction of the Desalination Plant will vary through the construction period, but is anticipated to peak at 910 workers in late 2010. The overall peak workforce (based upon the NGC option) is expected to be 1750, with some 500 of these jobs associated with construction of the Transfer Pipeline and grid connection.

The permanent operational workforce for the Plant is expected to be between 50 and 90 workers. A high proportion of these may be highly-skilled roles which may draw workers from outside the local area. The EES estimates the long-term permanent population increase in Wonthaggi as a result of the project to be 30 to 50 workers and their families.

In this context, the key issues for consideration with respect to the social impacts of the VDP are:

- How worker accommodation requirements can be effectively managed to minimise adverse effects on the existing renters;
- How a significant short-term increase in demand for access to social infrastructure and community services can be accommodated to meet the needs of workers and their families without detrimental impacts on existing residents; and
- How potential impacts on community identity and social cohesion can be managed through a period of intensive, but short-term, population change; and
- How impacts on community enjoyment of rural landscapes and coastal areas affected by the project can be minimised.

Discussion

Accommodation and Housing Affordability

The Social Impact Assessment (SIA) undertaken for the EES⁵⁰ assumes that about 50 per cent of the workforce associated with construction of the Plant is likely to relocate to the local area, suggesting that accommodation will be needed for up to 450 workers at the peak time. It is assumed that the other Plant workers will be drawn from the local area. The EES also assumes that workers employed on the transfer pipeline and grid connection are unlikely to relocate to the local area, given the transient nature of the day-to-day work location. While these assumptions are not unreasonable, they have not been substantiated and hence significant uncertainty is entailed.

PR3.5 in the EES would require the Project Company to “develop and implement a construction workforce accommodation strategy to minimise impacts on the local accommodation sector”. I note that the Inquiry recommends that this matter be addressed as a matter of priority.

There is a good supply of holiday homes in the Bass Coast region, the majority being located on Phillip Island. There are about 234 holiday homes located in Wonthaggi and about 111 in Kilcunda. There are about 670 rental properties in Wonthaggi and 350 in Inverloch. In addition, there are 24 caravan parks in Bass Coast Shire with a total capacity of 3,065 sites/units, including 80 on-site vans, 2,414 powered sites.

The SIA suggests that existing commercial, holiday home and long-term rental accommodation could accommodate up to 25 percent of the Plant workers (say 115) without significantly disrupting the housing market, with other accommodation needed to house the remaining 335 workers. It suggests more specifically

⁵⁰ Technical Appendix 56

that Inverloch offers significant potential for use of existing holiday homes by construction workers, particularly as residents are used to seasonal influxes of temporary residents using such properties.

The EES outlines potential detrimental impacts which may result from over-reliance on existing rental properties to accommodate construction workers, including: existing or potential residents needing to pay higher rents to compete with construction workers, which may result in renters being temporarily priced out of the market altogether and potentially deciding to move away from the area; and flow-on impacts for tourism-related businesses if holiday homes are used on a longer-term basis by workers. These potential impacts point to the need both to monitor effects on local rental prices, rental availability and housing stress, as well as possible need to augment local programs to assist households facing difficulties.

The EES suggests that caravan park accommodation may be most suitable option for commuting workers who return home to their families on weekends. However, this option would also reduce the availability of low-cost, long-term caravan park accommodation for local residents. At the same time, commercial accommodation targeted at the 'high-end' visitor market is likely to be unsuitable for the majority of the construction workforce, though it may suit workers who only need to stay in the region for short periods. Both of these options would reduce accommodation available during holiday periods for holidaymakers, and according to the EES, possibly give rise to conflict between construction workers and holidaymakers due to their different activity patterns.

The EES suggests that a temporary 'construction village' could be located at the Plant site, to complement the role of local rental market to house workers. This option was not, however, assessed as part of the EES. In addition to the potential for direct environmental impacts of an on-site 'construction village', such an option could affect community cohesion and provide unsatisfactory access to services for workers and their families.

The alternative of developing temporary accommodation within an existing township was not canvassed in the EES. This option could offer benefits in by making best use of and building upon existing social infrastructure and services, providing direct economic stimulus for business within the selected township, and maximising opportunities for the construction workers to integrate and make a valuable contribution to community life. On this basis, I believe this option warrants serious consideration.

The EES briefly discusses the purchase of existing homes and/or development of longer-term accommodation in Wonthaggi, but concludes that there is both a shortage of permanent accommodation and greenfield land for new development. It suggests that further demand for existing permanent dwellings could result in increased house prices and associated housing stress at the lower-end of the housing market.

Contrary to this, Technical Appendix 55 in the EES states that there is 50 ha of undeveloped, residentially zoned land available at Wonthaggi, which could potentially contribute to accommodation requirements associated with VDP. I am also aware that Bass Coast Shire Council, with funding support from Regional Development Victoria, is currently pursuing several planning initiatives that seek to provide additional future residential development⁵¹. While this option alone could not be implemented in time to meet all workforce accommodation needs, it is my view that this option can make a useful contribution to a broader strategy.

In light of the issues associated with accommodation options, it is clear that a multi-pronged approach will be needed, including:

- Some use of on-site units in caravan parks for "working week" accommodation by workers without families, as well as commercial accommodation for intermittent use;
- Use of rental properties to house a significant proportion of workers - with or without families;
- Further consideration of the development of a temporary village within township boundaries to house some workers;

⁵¹ Received as part of the 'Moving Forward - Planning for Growth' initiative

- Expedite development of permanent housing within township boundaries to house some workers and increase the longer-term housing stock; and
- A program to protect existing low-income renters affected by project-related competition for housing.

Community Services and Infrastructure

The EES indicates that due to population growth, an aging population and difficulties in managing seasonal demands, current social infrastructure and community services in the region are currently experiencing capacity constraints.

The most significant impact of the VDP with respect to community services is likely to be increased demand for health services. The EES concludes that both general practice and hospital services would require augmentation to cope with both the temporary and permanent population increases resulting from the project. An increase in hospital beds as well as additional staffing could be needed. Whilst plans are already in place to upgrade the Wonthaggi District Hospital, further capacity may not be created in time to manage project-related pressures. The State Government will therefore need to identify alternative arrangements to meet this increase in demand.

Other impacts of the project identified in the EES include:

- increased demand for recreational facilities;
- increased demand for council waste management services;
- increased demand for school places (in excess of 50 new students), early childhood services and libraries; and
- pressure on emergency services, including police.

For example, the existing Wonthaggi Leisure Centre is thirty years old and is unlikely to cope within increased patronage and competition for space. The EES suggests that there may be a need to upgrade this service in the short- to medium-term to cater for both temporary and permanent population growth.

I am cognisant that many potential impacts on community services and social infrastructure are likely to be short-term only, and as such adjustment and augmentation responses will need to be flexible and scale-appropriate. Since increased demand for services will be primarily linked to the construction of the Plant, and therefore most likely to be felt in Wonthaggi and neighbouring townships, the State Government will need to assist Bass Coast Shire Council to manage impacts on local services and facilities for which Council is responsible. In this regard, on-going monitoring of social impacts, including aspects of capacity and accessibility, will be important to inform the augmentation of local programs, services and infrastructure.

The State Government will also need to manage impacts on higher-order services and facilities, including schools and emergency medical services. Where augmentation is required, but is not able to be achieved through current programs, DSE and State agencies will need to resolve how such demands will be met without comprising accessibility for either project staff or other community members.

Community Cohesion

The EES concludes that the existing Bass Coast community is somewhat vulnerable to rapid demographic changes, given the socio-economic characteristics of the existing community. Social cohesion is likely to be impacted by the temporary relocation of workers to the region, followed by rapid population loss following the completion of the construction phase of the project.

I also note that the potential for impacts upon perceptions of community safety and the challenges of integrating the VDP workforce within the local community were raised by Bass Coast Shire Council. These issues will need to be carefully considered by the Project Company in establishing its operational, workforce

and accommodation strategies. At the same time, there will be an opportunity for project workers to positively contribute to community life, including through participation in community events, groups and networks for broader community benefit, and this should be actively encouraged.

In addition to calling for a construction workforce accommodation strategy, the PRs in the EES also require the Project Company to:

- 3.2 Develop and implement a communications strategy to inform the community about Project Activities.
- 3.3 Establish, during construction, a Community Reference Group to provide timely information on aspects of the Project in order to minimise any potential impacts on the local community.

While good information flow to the community during project implementation will be vital to minimise unnecessary misunderstanding and anxieties, strong communication between the Project Company, stakeholders and the wider community will be equally important to address project issues related to both off-site effects and community outcomes. In this context, a Community Reference Group (CRG) could be useful as part of a broader community engagement program if it enables two-way communication, especially during the construction phase.

In addition to a CRG designed to enable information-sharing and dialogue in relation to project implementation, there will also be a need for input from experts, agencies and stakeholders specifically in relation to the monitoring of social impacts and the allocation of resources to augment social infrastructure and community services.

Landscape Change, Social Enjoyment and Dislocation

I note that the Inquiry has found that the Desalination Plant will have a minor impact on visitor's perceptions of the Bass Coast coastal landscape, given that perceptions tend to be formed on totality of an experience, rather than from site-specific elements. Reduced enjoyment from the coastal landscape is therefore more likely to be experienced by local people who use Williamson's Beach regularly. Direct impacts on recreational and residential amenity are considered in section 3.9 of this Assessment, while impacts on visual and landscape values are considered in section 3.8.

The EES identifies the potential for a long-term impact on resident's perceptions of rural landscape quality in those areas affected by the presence of an above-ground transmission line. The Inquiry acknowledged that there is deep concern and distress in the community in relation to this issue, not only from landowners potentially directly affected by infrastructure on their property, but also from those whose enjoyment of, and relationship to, elements of the landscape will be impacted through changes to their viewshed.

The EES suggests that, in the worst case, this may manifest (on an individual basis) as decision to either change plans for future development of landholdings or to move way from the area altogether, with associated implications for community cohesion. The EES concludes that these social dislocation impacts of the transmission option could be significantly reduced to negligible levels by siting the powerline underground. The practicality of this option is considered in section 3.12 of this Assessment.

If the final project proceeds in a form similar to the Reference Project, the Project Company will need to ensure that stress to affected communities is minimised as far as possible, though certainty of process, ongoing consultation and communication, and availability of support services.

Disruption and Construction Impacts

I have considered the impact of the project on agriculture, other land-use and activities in section 3.10 of this Assessment.

Conclusions

In light of the EES, public submissions and the Inquiry's report, it is my assessment that potentially significant impacts on social well-being could occur in relation to two aspects of the VDP:

- (i) Temporary impacts on accommodation availability and costs as well as access to community services in Wonthaggi and nearby townships, during the construction period; and
- (ii) On-going impacts on residential amenity in the vicinity of an overhead 220 kV powerline.

Further, it is my assessment that the following measures for communicating, monitoring, managing and offsetting social impacts be implemented via the PRs:

- **Amend PR 3.3** to read: Establish a Community Reference Group (CRG) with Council and community representatives and an independent Chair to enable two-way communication during the construction phase with respect to the management of off-site impacts, including to provide timely information in order to minimise any potential project impacts on the local community and to enable the Project Company to seek advice on its communications strategy and other project implementation issues.
- **Amend PR 3.5** to read: Develop and implement a Construction Workforce Accommodation Strategy, in consultation with affected Councils, DPCD and Office of Housing, to the satisfaction of the State Government, that will:
 - (i) Minimise housing stress for low-income households in rental accommodation in Wonthaggi and nearby townships, to the extent practicable;
 - (ii) Create any new housing within township boundaries;
 - (iii) Minimise the need for new physical and social infrastructure, especially where Councils would be responsible for this;
 - (iv) Minimise any adverse effects on community cohesion; and
 - (v) Consider opportunities to supply new housing to meet local needs once the VDP construction is complete, including potentially for low-income households.

It is also my assessment that the following additional measures to address social impacts be implemented by the State Government:

- A Regional Impact program be established to address social impact issues arising from the VDP, including:
 - Monitor social impacts
 - Support community engagement and community-building initiatives
 - Augment local social infrastructure and services to meet increased demand
 - Address impacts on housing costs for low-income renters
 - Provide access to personal counseling for distressed individuals

This program is to be administered by DSE in consultation with Councils, relevant agencies and other stakeholders.

- In addition to the above, augment or complement existing health services and infrastructure, as well as education facilities and staffing and emergency services, in order to meet increased demands during the project construction period.

- A social impact monitoring program be established by the State Government to assess project impacts and inform responses, including:
 - (i) Rental cost and availability in the regional housing market, particularly in relation to the housing needs of low-income households;
 - (ii) Demand for social infrastructure and services, and accessibility for different segments of the community;
 - (iii) Traffic delays and access; and
 - (iv) Indicators of community satisfaction.

The results of this monitoring program are to be provided to Councils and summary results made publicly available.

3.12 Management of Environmental Effects

Evaluation Objective - To provide a transparent framework with clear accountability for managing environmental effects and risks associated with the project to achieve acceptable outcomes.

3.12.1 Approach Proposed by Proponent

The EES provides an outline of the proposed framework for environmental management of the VDP. Further information was provided to the Inquiry, though a fully detailed framework has not been available, since this is to be further resolved through the PPP bid process and then translated into more detailed plans developed by the successful Project Company.

The PPP process for the VDP requires the short-listed bidders to respond to an outline proposal issued by DSE with a detailed scope of works (i.e. Project Scope) that complies with a set of Performance Requirements (PRs). This Project Scope is to include various plans required by the PRs. In addition, the bidders are to prepare an Environmental Management Framework (EMF) to address project governance and the PRs, as well as a draft whole-project Project EMP. The EES presents a draft EMF, which incorporates environmental PRs corresponding to those in the Outline Proposal.⁵²

The PRs form a core of both the bid process and the proposed EMF. They are intended to be “output specifications” that will function as “bid parameters, evaluation criteria, performance assessment criteria and above all as contractual terms which form the basis of obligations ... in the Project Deed” between the State of Victoria and the selected Project Company⁵³. They have been framed having regard to relevant legislation, policy and required approvals. Consequently, the Proponent expects them to provide an effective basis for accountability. At the same time, the Deed will reinforce a general obligation for the project to comply with any requirements under environmental laws, including conditions of approval.

The successful Project Company would need to develop and implement an environmental management system (EMS) including a final Project EMP and more detailed, discrete EMPs for the main project components within the framework of the EMF. Implementation of the latter EMPs for the Desalination Plant, Marine Structures, Transfer Pipeline and power supply would be the immediate responsibility of the respective contractors, in relation to design and construction as well as for operation and maintenance.

⁵² This summary relies substantially on Document 146 tabled at the VDP Inquiry by DSE, i.e. “Response to Questions on Notice concerning Performance Requirements”.

⁵³ Ibid

To ensure strong coordination and accountability for implementing the environmental requirements, the Project Company is to nominate an Environmental Management Representative to lead the environmental management of the project, including monitoring, auditing and reporting environmental performance. This representative would be responsible for external communications, including addressing issues and complaints raised by stakeholders and liaising with the State on relevant matters.

While the Environmental Management Representative will have an important bridging role, their primary accountability will be to the Project Company. Recognising the need for independent review, DSE has proposed that the Project Company appoint an Independent Reviewer, jointly with the State. The reviewer is to “check whether the design and construction works are undertaken in accordance with the environmental management plans and the environmental requirements and will only issue a certificate if he is satisfied that the plans and requirements have been complied with”.⁵⁴

The Project Company is to establish a program to monitor environmental performance as part of the EMPs. It will also be required to prepare a reporting and auditing schedule that is consistent with the program. Environmental performance reports will be required on a monthly basis. In addition to its own internal audit program, the Project Company is to engage an “independent, qualified environmental auditor” who would “carry out quarterly audits of each component of the environmental management plans, the implementation of the environmental management plans on site and the operation of the environmental management system”⁵⁵. The EES indicates that the Independent Auditor would audit on-going compliance with the PRs.

The EES indicates that either DSE or a State-owned enterprise established to implement the VDP would have ultimate responsibility to monitor, review and audit performance against the PRs, and take “corrective action” if necessary. Though the EES was not explicit, the model presented is predicated on the Project Deed being the key instrument for the authorisation of project works. The Project Deed will play a significant role in relation to statutory approvals and will need to incorporate any requirements arising from the latter.

3.12.2 Decision-making and Environmental Management

The proposed framework for environmental management, as described above, provides a generally robust basis for ensuring sound environmental outcomes through the implementation of the project. In the context of the PPP process, applicable legislation and policy, and best practice environmental management, this framework needs to:

- (i) Either be founded on - through the EES process - or ensure a rigorous assessment of environmental aspects underpinning the authorisation of development;
- (ii) Provide certainty of environmental outcomes in relation to both public and landholder interests, as well as requirements of statutory approvals; and
- (iii) Provide sufficient flexibility for bidders and the selected Project Company to develop a commercially feasible proposal.

Having regard to the above criteria, this Assessment has recognised that some aspects of the project require further refinement (though the Assessment has provided broad directions to enable this):

- (i) The form and siting of the power supply to achieve acceptable outcomes, especially for horticulture/agriculture and landscape/visual amenity values;

⁵⁴ DSE Proponent's Closing Submissions, paragraph 12.23, page 40

⁵⁵ Ibid, paragraph 12.27, page 40

- (ii) The management of solid and liquid wastes from the Desalination Plant, as well as potential acid sulphate or contaminated soils from earthworks including pipeline trenching;
- (iii) The response to pressures on housing supply and costs, community services and community well-being in Wonthaggi and local settlements near the Plant; and
- (iv) The siting, design and operational parameters for the offshore marine structures.

In resolving these and other matters related to the implementation of the VDP, a combination of mechanisms under the Project Deed and statutory approvals need to be applied. While the Project Deed will provide the core of the State Government's requirements with respect to the project, statutory approval requirements will exist external to the Deed.

I note that in relation to waste management, this Assessment confirms that a plan will need to be developed for long-term waste minimisation and management (see section 3.2). This plan will be specific requirement of Project Deed. Moreover, the management of solid and liquid wastes from the Desalination Plant will need to be addressed as part of the Works Approval under the EP Act.

This Assessment has determined that the selected Project Company should be required to develop and implement an agreed Construction Workforce Accommodation Strategy, and, further, that a contribution to the augmentation of Social Infrastructure and Services in Bass Coast Shire should be made. If these provisions are incorporated in the Project Deed, it will not be necessary for the planning approval to include equivalent provisions.

The subsequent parts of this section address the approvals process for resolving the power supply, as well as approvals and related environmental management requirements for other project components.

3.12.3 Power Supply

The EES investigation corridor is generally suitable however a variation to the Reference Project alignment within the EES investigation corridor (as provided for in the PPP bid process) - could provide opportunities for improved outcomes.

The potential impacts of Power Supply infrastructure on horticulture in the Koo Wee Rup SUZ area are sufficiently significant to warrant further consideration of the practicability of substantially reducing these impacts. However, they are not so significant in themselves as to justify the rejection of either an overhead or underground 220 kV powerline within the EES investigation corridor. Similarly, the impacts of the Reference Project powerline on landscape and visual amenity values in some sections of the route are sufficiently significant to warrant further consideration of the practicability of substantially reducing these impacts. Again, these impacts are not so significant in themselves as to justify the rejection of an overhead powerline for the whole section north of the Woolamai Terminal Station to Tynong North.

It is my assessment that the powerline alignment, transmission technology, placement of structures and ancillary measures (i.e. for mitigation, offset or compensation) forming a proposal will need to demonstrate an optimal balanced response to the performance criteria, in the context of the project goals of delivering water by the end of 2011, achieving value for money and providing a shared power solution that would augment the supply to the Bass Coast region. Any variations must satisfy all performance requirements for the project and should adopt the following requirements for particular areas:

- a. General Farming Zone, Green Wedge Zone and Special Use Zone 1 – Koo Wee Rup Horticulture Area

- Lattice towers and steel poles are acceptable technologies for an overhead powerline
 - An underground powerline is also an acceptable technology
 - Consider mitigation measures including opportunities to reconfigure fields or modify farm layouts in order to accommodate power assets and also maintain or enhance productivity of horticulture or agriculture where practicable
- b. Koo Wee Rup Potato Cyst Nematode (PCN) Control Area
- Either an underground powerline or an overhead powerline may be used subject to:
 - a. Compliance with DPI requirements for the cleaning and inspection of vehicles moving out of the Koo Wee Rup PCN Control Area
 - b. Rigorous monitoring of any potential dispersal of PCN and bacterial wilt of potato, as well as implementation of mechanisms to address any spread of these pathogens.
- c. Significant Landscape Overlays
- Steel poles are preferred to lattice towers for an overhead powerline
 - An underground powerline is also an acceptable technology
- d. Section from Terminal Station at Woolamai to Desalination Plant
- An underground powerline is to be adopted

It is my assessment that for a powerline generally within the Northern Grid Connection corridor from Wonthaggi to Tynong North, (though potentially shifted outside the corridor within properties held in the same ownership if a lower impact alignment is available) the approvals process for a specific proposal would involve three steps:

- (i) Authorisation under the P&E Act of the use and development of a 220 kV powerline within the investigation corridor, subject to the endorsement of a Development Plan and an EMP;
- (ii) Endorsement by the Minister for Planning of a Development Plan describing an area up to 200 m wide within which a construction easement of minimum practicable width may be located, and the powerline developed, following:
 - a. negotiations with landholders on adjustments of the detailed alignment; and
 - b. relevant statutory approvals, including approval of a CHMP by AAV/RAP;
- (iii) Endorsement by the Minister for Environment and Climate Change of an EMP describing environmental management measures and arrangements for the design and construction of the power supply, as well as for operations and maintenance, following:
 - a. consultation with the Minister for Planning or his delegate and the EPA;
 - b. other relevant statutory approvals; and
 - c. confirmation of a Native Vegetation and Species Management Plan by the Australian Government Minister for the Environment, Heritage and the Arts or his delegate.

This EMP would need to encompass environmental matters that otherwise would need to be addressed under decision guidelines for planning permits.

Should other options be identified in the bid process, advice will be required from the Minister for Planning on approvals requirements.⁵⁶

As indicated above, to provide an efficient mechanism to authorise the powerline across several municipalities, it will be appropriate for the Minister for Planning to amend relevant planning schemes to authorise the use and development of the powerline within a defined corridor, subject to the endorsement of a Development Plan and EMP. This might be best done by using clause 52.03 'Specific Sites and Exclusions' of the Victoria Planning Provisions to exclude the use of land and buildings and works from the provisions of a planning scheme, subject to compliance with an incorporated document that contains use and development requirements. A relevant purpose of this clause is "to provide in extraordinary circumstances specific controls designed to achieve a particular land use and development outcome". The VDP qualifies for this purpose.

I consider that no compelling case for adoption of a gas-fired power station as an alternative to a power grid connection has been advanced, while this option is also likely to be incapable of meeting the timeframe for delivery of the VDP. If a proposal for a gas-fired power station either on the Desalination Plant site or at another location were to be advanced, this would require assessment via the Works Approval process under the EP Act as well as applicable procedures under the P&E Act and the *Pipelines Act 2005*.

3.12.4 Water Transfer Pipeline

While the EES corridor for the Transfer Pipeline is acceptable, and effective mitigation of environmental risks is feasible, a specific proposal, including a construction easement, will need to be authorised. It is my assessment that an equivalent approach to that required for the authorisation of the power supply be adopted for the Transfer Pipeline.

I note that both siting adjustments for the pipeline (in part to address the preferences of landholders) and design solutions at individual waterway crossings will need to be confirmed as part of the EMP, within the framework of an approved Development Plan.

A similar approach to authorising the pipeline works across several municipalities to that proposed for the powerline will also be appropriate, i.e. for the Minister for Planning to amend the relevant planning schemes using clause 52.03 'Specific Sites and Exclusions'.

3.12.5 Desalination Plant

The direct impacts of developing the Desalination Plant component of the VDP on the chosen site – including impacts on flora and fauna and landscape/visual amenity - have been well assessed through the EES process. This Assessment has concluded that the PRs to be embedded in the Project Deed will provide a generally adequate framework for managing these direct impacts, in combination with required statutory approvals.

There are two main options for facilitating the Plant under the Bass Coast Planning Scheme.

First, the approach adopted for Amendment C80 under this planning scheme authorises the site to be used and developed for preparatory works for (but not including) the construction and operation of water desalination infrastructure, via an incorporated document in clause 52.03. This mechanism could also be used

⁵⁶ A proposal for a powerline outside the Northern Grid Connection corridor investigated as part of the EES might need to be referred under the *Environment Effects Act 1978* if relevant criteria under the Ministerial Guidelines for Assessment of Environmental Effects (MGAAEE) were applicable.

to authorise the development of the site for a Desalination Plant of up to 200 GL/year capacity. Potentially, a single amendment to clause 52.03 of the Bass Coast, South Gippsland, Cardinia and Casey Planning Schemes could be made to facilitate the Transfer Pipeline, the Power Supply as well as the Desalination Plant.

In this case, the incorporated document would include requirements for endorsement of both: (i) a Development Plan describing the works area and works to be developed; and (ii) an EMP addressing the environmental management measures and arrangements for design and construction as well as for operations and maintenance. If this approach were adopted, an EMP endorsed under the Project Deed would need to be consistent with an EMP endorsed under the planning scheme, though the former might be more comprehensive.

Alternatively, a Public Use Zone (PUZ) could be applied to the site – either at the outset or subsequent to the authorisation under clause 52.03 of the construction of a Desalination Plant. The purposes of the PUZ are:

- To recognise public land use for public utility and community services and facilities.
- To provide for associated uses that are consistent with the intent of the public land reservation or purpose.

A PUZ would recognise the use of the land for the specific purpose of a Desalination Plant. In view of the strategic significance of this public utility, designation as a PUZ is considered appropriate. Under a PUZ, the development of a Desalination Plant by or on behalf of a public land manager would not require a permit.

The PUZ could not incorporate special requirements, including for a Development Plan and EMP. Consequently, if a PUZ was applied at the outset, the Project Deed would need to specify equivalent requirements for a Development Plan and EMP requirements to those that would apply under the first option – including to address matters arising from this Assessment – and also provide substantial transparency and public access to relevant documents. The practicability of this is not known at this time.

It is my assessment that the Minister for Planning consider the following three options for amendments under section 20(4) of the P&E Act to facilitate the use and development of a Desalination Plant of up to 200 GL/year capacity, having regard to the need for a transparent but workable framework for establishing accountability with respect to the siting and design of works as well as environmental management:

- (i) Use of an incorporated document under clause 52.03 addressing the design, construction and operation of the Desalination Plant;
- (ii) Use of an incorporated document under clause 52.03 addressing the design and construction phases only, followed by a further amendment after the completion of construction to establish a PUZ for the Desalination Plant;
- (iii) Establishment of a PUZ for the Desalination Plant at the outset to enable both its construction and operation.

3.12.6 Marine Structures

In relation to the marine structures, the Ministerial consent under the CM Act for use and development of Coastal Crown land will provide the primary approval for the siting, design and implementation of marine works - including for the connecting tunnels (or pipes) - and hence the protection of the seafloor environment. Subject to the decision-making process, this consent may occur in parallel with the granting of Works Approval under the EP Act. The latter provides the most pertinent mechanism to ensure that works are implemented in accordance with SEPP, including for the protection of beneficial uses, the most limiting of which in terms of water quality is the protection of aquatic ecosystems. The Works Approval, in combination with the subsequent EPA Licence that will govern the operation of the marine structures, will provide the strongest regulatory framework for on-going protection of marine beneficial uses (environmental values). If the EPA

requires an Environmental Improvement Plan to be prepared under the EP Act, this could be aligned with the EMP required under the Project Deed as well as any parallel requirement under the CM Act consent.

3.12.7 General Aspects of EMPs and Environmental Management

Key aspects of the EMF put forward by the proponent are supported here, though some modifications in approach are proposed. To begin with, it is my assessment that the following recommendations of the Inquiry be adopted:

- Both “the Independent Reviewer (design and construction) and the Independent Auditor (operations and management) roles” should be joint appointments by the State and Project Company.
- Provide for regular public release of information based on verifications of the Independent Reviewer for the design and construction phase and for the quarterly reports of the Independent Auditor.
- 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.

I consider that these measures will contribute to an appropriate high-level of transparency for the environmental management of the VDP.

It is also my assessment that:

- (i) The environmental PRs incorporated in the Project Deed be revised to be consistent with this Assessment;
- (ii) If an overarching Project EMP encompassing all project components is required, either under the Project Deed or under planning approvals, that this be subject to endorsement by the Minister for Planning and the Minister for Environment and Climate Change
- (iii) Development Plans describing project works (or changes to plans) be subject to endorsement by the Minister for Planning before relevant works commence;
- (iv) EMPs to guide the implementation of project works (or changes to EMPs) be subject to endorsement by the Minister for Environment and Climate Change, following the endorsement of the associated Development Plans, before relevant works commence;
- (v) An Independent Reviewer be jointly appointed by the Project Company and the State, with responsibilities to:
 - a. certify that project design and construction works are undertaken in accordance with the environmental PRs and endorsed EMPs;
 - b. advise the Project Company in the first instance, and then the Minister for Planning and/or Minister for Environment and Climate Change where appropriate, in relation to environmental issues or stakeholder complaints that are not resolved by the Environmental Management Representative appointed by the Project Company;
- (vi) An “independent, qualified environmental auditor” be appointed by the Project Company with the agreement of the State to carry out quarterly audits of the implementation of the EMPs and the operation of the environmental management system, as well as any additional audits requested by either the Project Company or the State.

Both the Project EMP and specific EMPs for project components will need to address matters identified in this Assessment as well as specific matters arising from statutory approvals.

It is my assessment that the EMPs for the VDP project components incorporate, as a minimum:

- (i) Performance objectives and criteria consistent with both this Assessment and the adopted PRs, which will provide a clear basis for accountability with respect to environmental outcomes;
- (ii) Details of pre-construction survey procedures;
- (iii) Risk assessment procedures to be applied in evaluating siting, design, mitigation and offset measures;
- (iv) Contingency measures to be adopted if significant environmental risks are either identified through the risk assessment process or encountered during project construction or operations;
- (v) Details of monitoring procedures to be applied during project construction or operations;
- (vi) Details of procedures for monitoring, reporting, auditing and management review with respect to environmental performance;
- (vii) Details of communication procedures, including for complaints handling.

It is also my assessment that the EMPs for the VDP project components be:

- (i) Endorsed by the Minister for Environment and Climate Change following:
 - a. consultation with the Minister for Planning or his delegate and the EPA;
 - b. consultation with DEWHA in relation to relevant matters under the EPBC Act; and
- (ii) Made publicly available.

As indicated above, amendments to clause 52.03 of the Bass Coast, South Gippsland, Cardinia and Casey Planning Schemes could potentially be made to facilitate the Transfer Pipeline, the Power Supply as well as the Desalination Plant. If this were to be done, a Project EMP could be required under these amendments, in addition to specific EMPs for project components. However, it may suffice to only require a Project EMP under the Deed if this is comprehensive and publicly accessible, and is also consistent with EMP requirements under the planning approval(s), CM Act and EPA Works Approval.

While the Project Deed will provide contractual mechanisms to enforce its provisions, including with respect to these EMPs, the statutory approvals may provide a further regulatory basis for requiring and enforcing the EMPs and specific environmental conditions. It will be vital for the Project Deed to incorporate effective contractual obligations to ensure appropriate rehabilitation of areas disturbed by works, as well as to provide effective mechanisms to address pathogen control.

3.13 Ecologically Sustainable Development

Evaluation Objective - To enable outcomes consistent with ecologically sustainable development over the shorter and longer-term, having regard to the likely overall economic, social and environmental effects.

Key Statutory and Policy Context

The *Ministerial Guidelines for Assessing Environmental Effects under the Environment Effects Act 1978* (June 2006) require an Assessment to take account of the objectives and principles of ecologically sustainable development (ESD), as well as applicable legislation, policy, strategies and guidelines.

ESD was originally defined in 1992 under the Inter-Governmental Agreement on the Environment and the National Strategy for Ecologically Sustainable Development, signed by the Commonwealth, State, Territory and local governments as: "development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends". The objectives and principles have

subsequently been incorporated in various relevant legislation, including the EPBC Act, EP Act and *Commissioner for Environmental Sustainability Act 2003*.

The guiding principles of ESD, as articulated in the EPBC Act, are:

- (a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;
- (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- (c) the principle of inter-generational equity — that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- (d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;
- (e) improved valuation, pricing and incentive mechanisms should be promoted.

The P&E Act also incorporates broadly equivalent objectives. Moreover, clause 11.02 of the SPPF sets a goal of “integrating environmental, social and economic factors in the interests of net community benefit and sustainable development”.

Conclusion

Overall, it is my assessment that the VDP would provide a net societal benefit to the State of Victoria, having regard to long-term and short-term economic, environmental, social and equity considerations.

This Assessment recognises that the VDP is a project of state significance that will contribute to diversification and security of water supply to a capital city and highly urbanised metropolitan region.

Further, this Assessment has:

- 1) effectively integrated both long-term and short-term economic, environmental, social and equitable implications of the VDP, having regard to the need to improve net community well-being and ensure the sustainability of development;
- 2) recognised that the development of the VDP will provide a major economic stimulus to the Bass Coast region, in terms of regional income, employment opportunities and industry participation, as well as the augmentation of both water supplies and high-voltage power supplies;
- 3) recognised that the VDP will generate a range of waste streams that will require further and on-going efforts to reduce waste volumes and establish optimal management strategies;
- 4) acknowledged that while the operation of the VDP will involve high levels of power consumption and hence associated greenhouse gas emissions, the Victorian Government’s commitment to address these emissions through the purchase of renewable energy offsets will provide an appropriate response;
- 5) established, with the assistance of advice from a high-level Independent Expert Group, that: (a) the proposed construction and operation of the Desalination Plant is based on best practice approaches and (b) would not have major or enduring ecological effects on the marine environment outside of a relatively small mixing zone, and that residual uncertainties can be further addressed and effectively managed;

- 6) concluded that potential effects of the construction and operation of the Desalination Plant, Transfer Pipeline and Power Supply infrastructure would not have major or enduring ecological effects on any flora or fauna species listed under either the FFG Act or the EPBC Act;
- 7) acknowledged that the construction of the Power Supply infrastructure in particular would have significant impacts on agricultural activities, especially within the Koo Wee Rup horticultural area, which should be reduced to the extent practicable;
- 8) acknowledged that the construction of an overhead 220 kV powerline would have significant impacts on landscape values within two areas covered by a Significant Landscape Overlay under the respective planning schemes, which should be reduced to the extent practicable;
- 9) recognised that potential impacts of project works on Aboriginal heritage will need further attention in the context of finalising Cultural Heritage Management Plans;
- 10) concluded that the siting and design of the Desalination Plant at the proposed location near Wonthaggi will not unduly impact on general visitation to the coast nor on existing regional key attractions;
- 11) recognised that potential social impacts in Wonthaggi and surrounding townships could result from the influx of a substantial construction workforce and consequently a range of strategies and measures will be needed to address housing issues, augment social infrastructure and services and assist positive community outcomes;
- 12) put forward improvements to the Environmental Management Framework for the VDP, to ensure appropriate transparency and accountability of project implementation as well as optimal environmental outcomes.

4 Response to Inquiry's Recommendations

The Inquiry's recommendations were largely in relation to the Performance Requirements (PRs), as well as mitigation of environmental impacts through further refinements to the VDP. Therefore my responses to the recommendations have been addressed through the conclusions within section 3 of the Assessment. The table below consolidates the responses to the Inquiry's recommendations in Chapter 13 of its Report and references the relevant section in this document.

Table 4. Summary of Responses to Inquiry Recommendations

Inquiry Recommendation	Response	Relevant Section and Any Modifications
<i>Legislation and Policy Framework</i>		
Amend the first Objective in 8 (Aboriginal Heritage) to delete the word: ... <i>"known"</i> .	Support	Section 3.7
Delete the first four PCs in 8 (Aboriginal Heritage) and replace with: <i>"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)"</i> .	Support	Section 3.7
<i>Desalination Plant</i>		
Add the following to PR 1.4: <i>"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"</i> .	Support with modifications	Amend PR1.4 to add: <i>"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 of any above ground components of the desalination plant"</i> (Section 3.8)
Add the following to PR 1.7: <i>"... having particular regard to the potential visual amenity and noise impacts on the northern and western boundaries"</i> .	Support	Section 3.9
Amend PR 4.3 to read: <i>"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"</i> .	Support	Amend PR 4.3 to read: <i>"Develop a Safety Management System for the facility in consultation with WorkCover, emergency services and the Bass Coast Shire Council. This system is to comply with any requirements under Major Hazard Facility regulations"</i> . (Section 3.10)
Add the following to PR 6.4 (c): <i>"; conservation of significant flora species (River Swamp Wallaby-grass, Green Striped Greenhood, Matted Flax Lily, Maroon Leek-orchid)"</i> .	Support	Section 3.6 and Appendix 1

<p>Include reference to the involvement and consultation with the Bass Coast Shire Council in the following PRs 3.2, 3.3, 3.4, 3.5, 24.2, 24.5, 24.6 and 24.7.</p>	<p>Support with modifications</p>	<p>e.g. Amend PR 3.3 to read: <i>“Establish a Community Reference Group (CRG) with Council and community representatives and an independent Chair to enable two-way communication during the construction phase with respect to the management of off-site impacts, including to provide timely information in order to minimise any potential project impacts on the local community and to enable the Project Company to seek advice on its communications strategy and other project implementation issues.”</i> (Section 3.11)</p>
<p>Add the following to PC 21.4: <i>“... and ensure no offensive odours beyond the boundary of the premises”</i>.</p>	<p>Support</p>	<p>Section 3.9</p>
<p>Update the PC 22 & PRs for Airborne Noise to refer to EPA Publication 1254.</p>	<p>Support</p>	<p>Section 3.9</p>
<p>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.</p>	<p>Support with modifications</p>	<p>Section 3.11: Amend PR 3.5 to read: <i>“Develop and implement a Construction Workforce Accommodation Strategy, in consultation with affected Councils, DPCD and Office of Housing, to the satisfaction of the State Government”</i> Also, the State Government should:</p> <ul style="list-style-type: none"> • Establish a Regional Impact Fund to be managed by DSE to address social impact issues arising from the VDP. • In addition, augment or complement existing health services and infrastructure, as well as education facilities and staffing and emergency services, in order to meet increased demands during the project construction period. • Establish a social impact monitoring program to assess project impacts and inform responses.
<p><i>Marine Structures</i></p>		
<p>Add a new PR 28.2(f) to read: <i>“Manage helicopter use to avoid low level flyovers of Williamsons Beach to minimise impacts on Hooded Plovers”</i>.</p>	<p>Support</p>	<p>Section 3.6</p>
<p>Amend the second PC in 29 to read: <i>“Avoid impacts on ecology of high relief reef”</i>.</p>	<p>Support with modifications</p>	<p>Modify to read: <i>“Avoid impacts on the ecology of reefs with high biodiversity, to the extent practicable.”</i> (Section 3.5)</p>

Amend PR 29.2 to read: <i>"No construction and impacts from construction in the designated areas presented in Figure PR Sensitivity Area – Marine Area, in Technical Appendix 5".</i>	Support with modifications	Modify to read: <i>"Avoid to the extent practicable direct impacts from construction in the designated areas presented in Figure PR Sensitivity Area – Marine Area, in Technical Appendix 5."</i> (Section 3.5)
Add a new PR 30.3 (d) to read: <i>"Minimise impact on moderate relief reef".</i>	Support with modifications	Modify PR 30.3 (a) to read: <i>"To avoid significantly affecting the beneficial uses associated with designated areas of high relief reef and coastal reserve presented in Figure PR Sensitivity Area – Marine Area, in Technical Appendix 5, and minimise impacts on the ecology of moderate relief reefs if practicable."</i> (Section 3.5)
Add a new PR 30.3 (e) to read: <i>"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".</i>	Support with modifications	PR 30.3 (d) to read: <i>"To inform final site selection and hydrodynamic modelling, undertake a survey prior to construction of the Intake structure to identify marine community composition and structure within 300 m of the proposed Intake site and use existing knowledge of larval behaviour to demonstrate compliance with relevant Performance Criteria."</i> (Section 3.5)
Amend PR 30.5 to read: <i>"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".</i>	Support	Section 3.5
Amend PR 31.6 header to read: <i>"Develop and implement a pre-construction and post-commencement survey and monitoring program to demonstrate performance".</i>	Support with modifications	Modify to read: <i>"Develop and implement pre-construction survey prior to construction of the outlet and post construction survey and monitoring program to demonstrate performance"</i> (Section 3.5)
Amend PR 31.6(d) to read: <i>"Document condition of high and moderate relief reef ecosystems".</i>	Support with modifications	Modify to read: <i>"Document the condition of high and moderate relief reef ecosystems in the vicinity of the mixing zone."</i> (Section 3.5)
Add a new PR 31.10 to read: <i>"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".</i>	Support	Modify to read: <i>"Prior to construction of the diffuser the Project Company must demonstrate to the EPA, following examination by the Independent Reviewer, that the diffuser has been designed, and will be located and operated, in a manner that minimises the size of the mixing zone to the extent practicable and minimises environmental risks outside the mixing zone."</i> (Section 3.5)

<i>Water Transfer Pipeline</i>		
Amend PR 1.11 to read: " <i>The Transfer Pipeline must be underground unless superior environmental outcomes at waterway crossings can be achieved with an above ground solution</i> ".	Support	Section 3.4
Amend PR 5.2 to read: " <i>In design, minimise impact on agricultural productivity including following road reserves and/or property boundaries where practical</i> ".	Support with modifications	Modify to read: " <i>In design, minimise impact on agricultural productivity including following road reserves and/or property boundaries where practical subject to further investigations and landholder consultation</i> " (Section 3.10)
Add a new PR 5.6 to read: " <i>Detail the methodology for any soil removal, assessment, reuse and management to manage biohazard risk including Potato Cyst Nematode and Phytophthora cinnamomi</i> ".	Support	Section 3.10
Add a new PR 16.4: " <i>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</i> ".	Support with modifications	Modify to read: " <i>Ensure that the environmental management plan for the Powlett River crossing addresses potential acid sulphate soils in the vicinity of Powlett River and the project site, and its interaction with groundwater dewatering, floods, flora and fauna and the construction techniques</i> ". (Section 3.2 and Section 3.4)
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.	Support with modifications	Modify to read: " <i>The construction of the Transfer Pipeline in the vicinity of the Berwick South Primary School and St Catherine's Primary School/ St Francis Xavier College Junior Campus should be undertaken as far as possible to minimise impacts on school operations</i> ". (Section 3.10)
Consider alternative locations for the Booster Pump Station to reduce noise and visual impacts on the township of Cardinia.	Not supported	Section 3.9
<i>Power Supply</i>		
Undertake further investigations on the Power Supply Reference Project, Variations and Options as part of the ongoing procurement process.	Support	Section 3.12

Development of the alignment for the Power Supply Reference Project (and any Options and Variations) should, where possible: <ul style="list-style-type: none"> • 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). 	Support	Section 3.12
Consider additional mitigation measures to address visual, agricultural productivity, and social impacts for those affected by the powerline alignment.	Support	Section 3.8, Section 3.10 and Section 3.12
Amend the second PC in 5 (Agriculture) to read: <i>"Prepare appropriate rehabilitation plans with individual landholder input in order to restore land to similar existing conditions"</i> .	Support	Section 3.10 and Section 3.12
<i>Other Issues</i>		
Add a new Objective in 12 (Flooding Control): <i>"Maintain ecological processes dependent on periodic flooding during project design, construction and operation"</i> .	Support with modifications	<i>Modify to read: "Maintain ecological processes dependent on periodic flooding during project design, construction and operation to the extent practicable"</i> (Section 3.4)
Add a new point in PR 12.4 as follows: <i>"(c) Maintain flood dependent ecosystems"</i> .	Support with modifications	<i>Modify to read: "(c) Maintain flood dependent ecosystems to the extent practicable."</i> (Section 3.4)
Amend the second PC 13 to read: <i>"Minimise impacts on the interaction between groundwater and flora and fauna habitats, including connected surface waterways, wetlands and dune vegetation"</i> .	Support	Section 3.4
Amend PR 13.2 (d) to read: <i>"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"</i> .	Support	Section 3.4
Amend PR 13.4 to read: <i>"Monitor groundwater quality and levels during the Project Term in accordance with the requirements of the EPA and/or relevant Authorities"</i> .	Support	Section 3.4
Amend PR 14.3 to read: <i>"Establish a surface water quality monitoring (including reporting) program for the Powlett River, in the vicinity of the Desalination Plant Site in</i>	Support	Section 3.4

<i>consultation with the EPA and West Gippsland CMA".</i>		
Add a new PR 24.8: <i>"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)".</i>	Support with modifications	Modify to read: <i>"To address community concerns in relation to traffic impacts on amenity, safety and accessibility, a Traffic Working Group, with membership comprising affected Councils, VicRoads, community representatives and impacted landowners, be convened by DSE to provide advice to the Project Company on traffic-related issues emerging during the construction phase."</i> (Section 3.10)
<i>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.	Support	Section 3.12
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.	Support	Section 3.12
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	Support	Section 3.12
<i>EPBC Act Commonwealth Matters</i>		
Add a new PR 6.3 (d) to read: <i>"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"</i> .	Support with modifications	New PR 6.3 (e) to read: <i>"Development of contingency plans to apply in the event that as yet undetected populations of species listed under the FFG Act or EPBC Act are encountered prior to or during construction or before site rehabilitation, to the satisfaction of DSE and DEWHA"</i> . (Section 3.6 and Appendix 1)
Add a new PR 6.3 (f) to read: <i>"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"</i> .	Support	Section 3.6 and Appendix 1
Amend the PR 6.4 (c) to refer to the <i>"Australian Grayling"</i> not <i>"Australian Mudfish"</i> .	Support	Appendix 1

Appendix 1 - Matters of National Environmental Significance

On 4 February 2008, the Victorian Desalination Project was determined to be a controlled action under the EPBC Act.

The controlling provisions under the Act relevant to this project 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 EES assessment process for the VDP as the process required under section 87 of the EPBC Act, in order to inform the Government's decision whether to approve the project under that Act.

Wetlands of International Importance

The Western Port Ramsar site is recognised as a wetland of international importance under the EPBC Act. According to the EES, the proposed marine structures of the VDP would be located within 10 km of the nearest point of the Western Port Ramsar site.

A decision on whether or not to approve the VDP under the EPBC Act must take into account the potential impacts of the proposal on the ecological character of the Ramsar site. The main considerations for this Assessment are:

- Potential indirect effects from marine structures through the intake of sea water and discharge of brine
- Potential effects on water quality from crossing of waterways by the water Transfer Pipeline within the catchment of the Western Port Ramsar site.
- Potential effects from powerline works undertaken near waterways within the catchment of the Western Port Ramsar site.

The EES modelling concludes that there will be no significant impacts on the Ramsar site arising from the entrainment of larvae in the intake and consequential food chain impacts (see section 3.5). Potential effects are likely to be limited to an area within 2 km of the intake.

The hydrodynamic modelling in the EES demonstrates that the discharge from the marine structures is unlikely to have any discernible effect on the Western Port Ramsar Wetland. The Inquiry has examined and accepted these findings after taking into account the advice of the Independent Expert Group.

The most significant risk of impact on the ecological character of the Ramsar site is likely to arise from works required for waterway crossings for the pipeline, and to a lesser extent works near waterways for the powerline. These works will need to be carefully managed to prevent an increase in sedimentation and water turbidity within waterways that drain into Western Port and hence protect seagrass and mangrove habitats in the Ramsar site. Compliance with State Environment Protection Policy (Waters of Victoria 2003) will ensure that water quality would protect aquatic ecosystems both in waterways and Western Port..

This Assessment recommends in section 3.4 that the Performance Requirements (PRs) for implementation of the VDP be modified as follows:

- **Insert a new point in PR 7.2 "Undertake an environmental risk assessment of individual waterway crossings to guide decision-making on the most appropriate crossing method and related mitigation".**
- **Amend PR 7.2 (b) to read: "Site specific construction methods to minimise environmental impacts on ecologically significant species and vegetation, as well as the risk of sedimentation, heightened flood risk, acid sulphate soils and impacts on downstream water users".**

The options available for waterway crossings include trenching – which should occur under dry conditions – and pipe-jacking under the waterway. The latter method would be likely to reduce risks of downstream impact in some circumstances, but a risk assessment of each crossing will be needed to establish whether trenching will suffice or pipe-jacking would be both effective and justified in terms of the much higher cost.

Thorough preparation will be needed to ensure that where trenching is undertaken, interruption to natural stream flows is either avoided or kept to a minimum possible period. There will also be a need for contingency measures to be in place to deal with sudden storm events causing major runoff during works for waterway crossings.

It is noted that permits would be required under the *Water Act 1989* for works on waterways. The final decision under Victorian law on the construction methodology used for each waterway crossing will be decided through this approval process.

Construction of the powerline is less likely to have an impact on waterways than the water pipeline, because effects would be limited to pole or tower footings near waterways and works would be further upstream of Western Port. The PRs should be sufficient to avoid impacts on waterways.

It is considered that the PRs for the VDP, together with approvals required for waterway crossing under the *Water Act 1989*, would provide an adequate framework to ensure that impacts from construction of the VDP are managed in such a way that there would be no significant impact on the ecological character of the Western Port Ramsar site.

Listed Threatened Species and Communities

The EES identifies a range of species listed under the EPBC Act which could potentially be affected by the various components of the VDP. This identification takes into account searches of relevant data bases as well as field investigations of the Desalination Plant site and along sections of the Reference Project pipeline and powerline alignments that are most likely to contain threatened flora and fauna.

Potential impacts on listed threatened species are summarised in Volume 1 of the main EES document. They are addressed in more detail in EES Technical Appendices 12, 13, 14, 15, 16, as well as the proponent's closing submission to the Inquiry (Document 180) and other documents tabled at the Inquiry (Documents 6, 19, 21 and 47).

Although the EPBC Act Protected Matters Search Tool identified a range of species possibly occurring in the vicinity of the project, not all of these were recorded in the EES field investigations. Further, an analysis of the habitat requirements for some of these species suggests that they are unlikely to be affected by the VDP.

The key species that are listed as threatened under the EPBC Act and have been recorded either on or in the vicinity of the project area are:

- River Swamp Wallaby-grass (*Amphibromus fluitans*)
- Southern Brown Bandicoot (*Isodon obesulus obesulus*)
- Giant Gippsland Earthworm (*Megascolides australis*)
- Orange-bellied Parrot (*Neophema chrysogaster*)
- Growling Grass Frog (*Littora raniformis*)
- Dwarf Galaxias (*Galaxiella pusilla*)
- Australian Grayling (*Prototroctes maraena*)
- Southern Right Whale (*Eubalaena australis*)

- Humpback Whale (*Balaenoptera musculus*).

This Assessment recommends in section 3.6.4 that the PRs for implementation of the VDP be modified as follows:

- **Add new PR 6.3 (d)** to read:
“Pre-construction surveys to detect any indigenous species (flora, birds, fish, amphibians and reptiles) listed under the EPBC Act or FFG Act for which potential habitat exists in the vicinity of proposed works”
- **Add new PR 6.3 (e)** to read:
“Development of contingency plans to apply in the event that as yet undetected populations of species listed under the FFG Act or EPBC Act are encountered prior to or during construction or before site rehabilitation, to the satisfaction of DSE and DEWHA”.
- **Add new PR 6.3 (g)** to read:
“Post-construction monitoring to apply at construction sites with significant flora or fauna or aquatic ecological values to assess actual impacts and the effectiveness of rehabilitation”.

River Swamp Wallaby-grass

The EES field surveys recorded four individual River Swamp Wallaby-grass plants on property 336 within the Desalination Plant site. A population is also likely to occur on Property 48; however the species identity of the Wallaby-grass on this property has not yet been confirmed.

Although the flora surveys for the pipeline and powerline corridors have not identified River Wallaby Swamp-grass, the species may occur on the margins of shallow wetlands and dams within the vicinity, and immediately adjacent to, the pipeline alignment and the powerline alignment.

It is noted that the PRs proposed in the EES identify property 48 as an area of sensitivity; however the four individual plants on property 336 are not identified in the same manner. It is uncertain whether these four plants will be removed during the construction of the Desalination Plant. These four plants are not considered by the EES to comprise an important population of the species. For this reason, it is concluded that their loss would not cause a significant impact on the species.

It is noted that the PRs in the EES do not specifically address the potential presence of River Swamp Wallaby-grass in the pipeline and powerline alignments. The proposed adjustments to the PRs above will provide an effective means of addressing this issue.

Southern Brown Bandicoot

Targeted surveys for the Southern Brown Bandicoot did not detect the species at the Desalination Plant site nor in the adjoining Kilcunda–Harmer’s Haven Coastal Reserve. Nevertheless, the EES acknowledges that the species could occur within the coastal dune vegetation.

The EES also acknowledges that Southern Brown Bandicoots may occur within strips of suitable structurally dense remnant and introduced vegetation along the pipeline corridor and in the northern section of the powerline alignment. It is known that Southern Brown Bandicoots occur in the Koo Wee Rup area. The species often uses habitat that has low floristic values but contains a suitable dense ground layer.

The general fauna surveys along the pipeline and powerline alignments did not detect any Southern Brown Bandicoots. Although the native vegetation in the Holden Proving Ground (along pipeline alignment) has habitat suitable for this species, targeted surveys conducted in September 2008 did not detect it.

According to the EES, the alignment of the Reference Project pipeline has been located to avoid potential habitat of the Southern Brown Bandicoot wherever possible, and as a result, construction works should affect only a small area of available habitat.

While there is also potential for the possible occurrence of the Southern Brown Bandicoot to occur in strips of remnant vegetation in the northern section of the grid connection alignment, disturbance would be generally confined to pole or tower locations. (It is noted that vegetation under 3 metres in height will be retained under powerlines, hence there is unlikely to be a long-term significant impact on this species.)

The PRs provide for the Southern Brown Bandicoot by designating sensitivity areas along the powerline and pipeline alignments which contain potential Southern Brown Bandicoot habitat.

It is expected that PRs (6) and (7) would generally mitigate potential impacts on the Southern Brown Bandicoot.

While PR28 (coastal flora and fauna) is primarily intended to mitigate impacts on the Hooded Plover, it would also benefit any Southern Brown Bandicoot potentially utilising the habitat in the coastal dune vegetation near the desalination plant site.

Giant Gippsland Earthworm

The EES investigations identified three active populations of the Giant Gippsland Earthworm in the Reference Project powerline corridor. These were on the banks of Wattle Creek, the Bass River and a small watercourse east of Nyora. At three additional sites, old burrows (possibly of extinct populations) were found.

Targeted surveys did not find populations in the pipeline alignment, though potential habitat for the species has been identified in the EES.

In addition to the new generic PRs 6.3(d), (e) and 6.3(g), this Assessment also recommends a **new PR 6.3(f)** in relation to the Giant Gippsland Earthworm:

[“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”](#)

Minor adjustments of the pipeline and powerline routes, following pre-construction habitat surveys, are likely to provide a straightforward means of avoiding impacts on Giant Gippsland Earthworm habitats, which have a patchy pattern of distribution.

It is unlikely that construction of the pipeline would have a significant impact on any Giant Gippsland Earthworm populations identified provided that the PRs above are implemented.

Orange-bellied Parrot

There are past records of the Orange-bellied Parrot (OBP) in saltmarsh habitat along the Powlett River. For this reason, targeted surveys were conducted at the Desalination Plant site. No OBPs were sighted during these surveys.

The Desalination Plant site, as well as the areas where the transfer pipeline and powerline routes would cross the Powlett River, offer no resources for the OBP that are not abundant and widespread in the local area and across similar agricultural landscapes along much of the coastal zone of Victoria.

PR 28.3 calls for a program of OBP monitoring from March to September prior to and during the construction activities, which would inform any appropriate mitigation measures in the event that the OBP uses the area.

It is concluded that any loss of potential food sources from the VDP works are unlikely to have a measurable impact on the local viability of the species.

Growling Grass Frog

Growling Grass Frog populations were found inhabiting six drains along the Reference Project alignment for the pipeline.

Suitable habitat was also found in waterways in the Reference Project powerline alignment.

No Growling Grass Frogs were identified in the terrestrial surveys for the Desalination Plant site.

Further surveys are proposed for Growling Grass Frogs on properties and waterways likely to contain the species.

In the PRs, areas of known or potential Growling Grass Frog habitat along the pipeline and powerline corridors have been identified as sensitivity areas. The PRs set out the waterways requiring appropriate construction methods to minimise environmental impacts at waterway crossing points.

It is concluded that the PRs would ensure that the VDP would affect only small areas of Growling Grass Frog habitat and these effects would be temporary.

Dwarf Galaxias

The Dwarf Galaxias has been recorded on two sites in Yallock Creek near the Reference Project pipeline alignment.

The species could potentially inhabit a number of waterways within the powerline and pipeline alignments. There is also suitable habitat for Dwarf Galaxias in the Powlett River and the unnamed tributary on the desalination plant site.

It is very likely that further populations of this species occur in the project area and may be detected during construction of the powerline and pipeline.

The PRs contain general provisions for minimising impacts on terrestrial flora and fauna (PR 6) and protecting waterways and wetlands (PR 7). These PRs will mitigate many of the potential impacts on the Dwarf Galaxias.

It is noted that PR7.5 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 Galaxias.

Having regard to the proposed modifications to the PRs, it is concluded that the potential effects on the Dwarf Galaxias would not be significant.

Australian Grayling

The Australian Grayling has been previously recorded in the Cardinia Creek, Bunyip River and Lang Lang River and could potentially occur in other large waterways crossed by the pipeline or power line.

As with the other recorded fauna species, the general PRs addressing terrestrial flora and fauna (PR 6) and protecting waterways and wetlands (PR 7) will mitigate many of the potential impacts on the Australian Grayling. The potential migration movements of Australian Grayling need to be taken into account in the implementation of these measures.

PR 6.4 (c) needs to be amended to include the "Australian Grayling".

Whales

The Southern Right Whale and Humpback Whale may pass through or near the marine section of the VDP project area during the May to December migrations of the species, though the VDP area is not important habitat for the Humpback Whale or the Southern Right Whale (i.e. it is not a defined breeding, calving, feeding or resting area, or a confined migratory route).

The primary risk to these species is the potential impact of noise during the construction phase. The potential noise effects from drilling and piling operations were considered by the EES to be low risks to whale species as these activities would be short-term and whales are only likely to visit the project area periodically.

Construction activities that cause repulsive and or repetitive noise may cause disturbance and avoidance of the area by cetaceans. While pile driving could cause disturbance to cetaceans, DSE considers that it is unlikely that pile driving would be used for the Reference Project. Were it to be used, however, a range of mitigation techniques could be applied, e.g. visual monitoring for cetaceans, "soft start" and low noise pile driving techniques.

The EES acknowledges that pre-construction seismic investigations could have an impact on whales and other cetaceans. The risk of noise from geophysical (or seismic) survey is assessed as low as any geophysical surveys will be conducted in accordance with the EPBC Act Policy Statement 2.1, including the requirement for whale-observations and the cessation of activities if an individual is detected within specified distances of the acoustic source. It would be desirable to plan geophysical surveys for the January-April period when the Southern Right Whale and Humpback Whale are not in Victorian coastal waters.

There are a number of mitigation measures included in PRs 29, 29.1 to 29.4, 35 and 35.2. These include surveys to comply with EPBC Policy Statement 2.1.

It is considered that the VDP is unlikely to have a significant effect on the Southern Right Whale and Humpback Whale provided the PRs are implemented.

Other Species

It is noted that the Green Striped Greenhood, Matted Flax Lily and Maroon Leek-orchid have been recorded in the vicinity of the VDP. Other threatened flora species may also occur in the vicinity of the VDP including the Cream Spider Orchid, Metallic Sun Orchid and Swamp Everlasting. The potential occurrence of these EPBC-listed species is addressed by the new PRs 6.3 (d), (e) and (g).

The EPBC Protected Matters Search Tool has also identified some species as possibly occurring in the vicinity of the VDP (such as the Spotted-tailed Quoll and Swift Parrot). 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 VDP area, and the widespread range of the species means that the limited removal of native vegetation for construction of the pipeline and powerline is unlikely to have a significant effect on habitat critical to the species. Given the proximity of the Wonthaggi wind farm and the migratory species recorded at that site, it is considered prudent to ensure that lighting at the Desalination Plant site is baffled to minimise light spill upwards and towards the coast.

The EES and the supporting technical appendices address the potential occurrence and the potential effects of the VDP on an extensive range of species listed as threatened under the EPBC Act including the key species discussed above in this section.