

Independent Panel of Experts for the NCIG Coal Export Terminal, Kooragang Island

January 2007

Allen Kearns (Chair), Peter D'Abreton and Neil Gross
Independent Panel of Experts.

Executive Summary

Introduction

The Minister has directed that under its terms of reference, the Independent Panel of Experts will consider and advise on:

- a) The following impacts on the project:
 - i) Noise and vibration impacts associated with the project
 - ii) Air quality impacts, particularly dust and cumulative dust impacts
 - iii) Ecological impacts, particularly on amphibian and avian species, endangered ecological communities, and surface water and groundwater dependent ecosystems
- b) Relevant issues raised in submissions in regard to these impacts; and
- c) The adequacy of the proponent's response to the issues raised in submissions

The Panel were briefed on the proposed Newcastle Coal Infrastructure Group (NCIG) CET Project in Sydney on November 1st, 2006 by staff from the NSW Department of Planning (NSW DoP) and representatives from NCIG and their consultants. The Panel then held three days of public hearings in Newcastle that commenced on November 7th, 2006 with a site visit to the proposed location of the NCIG Project. The site visit was arranged by NSW DoP and NCIG whose staff provided an on-ground explanation of the proposed plans for the CET infrastructure and operations. Members of the public were invited to attend the site visit, including those who were going to give submissions over the following three days. Finally, after the three days of hearings the Panel were invited by Port Waratah Coal Services to visit their

operational coal loading facility in order to gain a better appreciation of an operational coal export facility.

A Summary of Community Opinions and Perspectives Expressed to the Panel

There were more than 700 written submissions from people in organisations and community groups as well as residents and government agencies, and 31 verbal submissions made to the Panel (see Appendix 1).

The overwhelming numbers of written submissions from the public were concerned with long term climate change impacts at the global level. Many writers said they expected these global changes would be expressed locally in Newcastle Harbour and the Hunter Valley through changes to sea level and warmer, drier climatic conditions as a result of global warming through the increased combustion of fossil fuels.

Most of the speakers at the public hearings referred to the regional scale of cumulative impacts associated with the proposed NCIG coal export terminal, such as the adverse environmental consequences of more coal mine development and coal transport through the Hunter Valley. A number of speakers referred to concerns about the emergence of the Hunter Valley coal supply chain as an integrated regional infrastructure system. A number of speakers recognised that the coal supply chain consists of existing and new mines, rail transport corridors and coal export terminals that had only been assessed piece-by-piece, not as an integrated whole, without due consideration of cumulative impacts.

Many speakers raised the issues of cumulative impacts not being adequately assessed by the NSW Government because of the focus on this project-by-project assessment rather than integrated regional assessment of a substantial, long term system of industrial infrastructure.

Fewer speakers were solely interested in the Project-scale impacts of the proposed NCIG operations on Kooragang Island (KI) although many speakers referred to the potential loss of habitat for the Green and Golden Bell Frog (*Litoria aurea*), wading birds and the endangered plant, *Zannichellia palustris*, caused by the industrial

footprint of the proposed NCIG project. Speakers with expert local area knowledge were concerned about the lack of firm commitments by NCIG for financial offers and governance arrangements to back up compensatory habitat initiatives in the long term. Several speakers also called for more attention from NCIG to identify opportunities in the planning and design phases of the NCIG proposals to eliminate the adverse impacts of railway embankments and other barriers that they believe will severely jeopardise the ecological value of current bird habitat in Deep Pond and elsewhere on the proposed NCIG site, such as Big Pond.

Many speakers commented on what they perceived to be the inadequacy of the Director-General's Requirements by localising the environmental impact focus in the Environmental Assessment (EA) to the NCIG project boundaries on Kooragang Island. Their concerns were that the major issues of global climate change and regional scale impacts of enhanced coal mining, caused by opening up the bottleneck of the current limited capacity for coal exports from Newcastle Harbour, were ignored by focusing on the local Project-scale impacts of NCIG within the Project boundary.

Many speakers made broad assertions that the planning processes and environmental impact assessment techniques in NSW, and elsewhere, were not adequately addressing cumulative impacts at the local, regional and global scale. Some speakers pointed out that in their opinion the EA for the NCIG proposal adequately covered the local environmental impacts but said that the Independent Hearing and Assessment Panel still needed to examine other regional and global issues arising from the local impacts of the NCIG proposal.

In summary, the overwhelming number of people making public submissions called for explicit consideration by the Panel and the NSW Government of the full life cycle consequences of the mine site production, transport and overseas combustion of coal passing through the proposed coal export terminal (CET).

A list of the community members who made submissions is provided under Appendix 1.

Summary of Issues Arising from the Written Submissions and Public Hearings

The overwhelming number of written and verbal submissions addressed not just the local Project-scale issues in the Terms of Reference (ToR) for the Panel, but the community's perceptions of the regional and global ecological impacts of the coal industry. Accordingly, the Panel in consultation with NSW Department of Planning representatives at the Hearings agreed to listen to all the community's opinions, as expressed in their written and verbal submissions, and respond where possible within the ToR on these broader regional and global ecological impacts.

The Panel had not formed an opinion at the start of the Hearings about the relevance and relationship of these broader regional and global ecological issues raised by the public and attributed to the local scale NCIG Project. However, the Panel agreed to attempt to respond to the community's views, once they had been fully heard and duly considered by the Panel, in the Panel's publicly available report.

Accordingly, the Panel has considered the wide range of issues and assertions raised by the public about possible impacts from the NCIG Coal Export Terminal Project and organised them into three scales of impacts.

1. Local scale, (or NCIG Project-scale) environmental impacts on Kooragang Island and surrounding areas caused by the proposed NCIG construction works and ongoing operations. These impacts include noise and dust generation and ecological impacts on amphibian, avian and plant species and endangered ecological communities caused by construction of the coal export terminal infrastructure and the railway embankment across Deep Pond.

These local project-level impacts fall directly under the Terms of Reference for the Panel and were the focus of the Director-General's Requirements for the NCIG EA.

In addition to the local Project-scale impacts, the majority of public written submissions raised concerns at the regional scale of the Hunter Valley and at the global scale. These scales of impact assessment were not specifically part of the

scope of the NCIG EA or the ToR for the Panel. These regional and global scale impacts are summarised below.

2. Regional scale environmental and social-economic impacts that the public attributed to the increasing rate of development of coal mines and coal transport in the Hunter Valley.

Many members of the public who presented submissions considered that the proposed NCIG operations would directly facilitate and increase the rate of coal mining and export along the Hunter Valley 'coal supply chain'. Accordingly, many of the public presenters called upon the Panel to consider these regional impacts in assessing the adequacy of the Proponent's response to the issues raised in submissions.

3. Global scale impacts from the eventual overseas combustion of exported Hunter Valley coal resulting in a contribution by NCIG, as part of the Hunter Valley coal supply chain, to the global, regional and local impacts of climate change and sea level rise.

Many of the public presenters explicitly called upon the Panel to consider these global greenhouse impacts in assessing the adequacy of the Proponent's response to the issues raised in their submissions.

Summary of the Main Findings by the Panel

Noise and Vibration

In summary we find the noise and vibration assessment to be comprehensive, albeit we have recommended the areas of Fern Bay and Stockton should, in the context of the NSW DEC Industrial Noise Policy, be considered as suburban rather than urban. We have recommended noise criteria to address both short term "intrusiveness" issues and longer term "amenity" issues in the surrounding residential areas which are slightly different to those nominated by either the proponent or the DEC. Our justification for these revised criteria are provided in Section 3.1. We consider the proposed project can achieve the revised criteria on the basis that the source noise levels from all equipment and plant comply with the noise levels used in the EA for

prediction purposes (and can be maintained at those levels) and the noise mitigation measures discussed in the EA are adopted.

We recommend the proponent will need to establish manufacturers' performance guarantees during tendering and undertake monitoring / auditing during the commissioning phase and ongoing operational phases.

We consider an Operational Noise Management Plan should be prepared to the satisfaction of the Director-General which summarises the specifying and procurement of plant and equipment and the proposed noise mitigation measures and more importantly describes in detail the proposed compliance monitoring regime which will allow the proponent to accurately identify their noise contribution in the presence of another coal loading facility, other industrial noise and surrounding traffic noise.

Given the complexity of this total noise environment, the ability to combine real time equivalent on site noise levels and prevailing weather data to determine compliance at the receiver areas identified in the EA is essential.

Air Quality

In terms of air quality impacts, particularly dust and cumulative dust impacts, the Panel found that the assessment adequately addresses the local scale issues associated with the project and complies with the NSW DEC's Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales. We recommend that an integrated air quality-monitoring program should be installed as part of the consent condition. Once a full year of local monitoring becomes available, the uncertainties associated with modelling the dust impacts should be addressed by a model validation study. In addition, an integrated regional air quality modelling and/or monitoring study should be undertaken for the lower Hunter Valley, including a quantitative health risk assessment.

Ecological Impacts at Local Scale

Despite considerable criticism by the public over the adequacy of the EA, as heard many times by the Panel during the submissions, the Panel considers that NCIG in

general has adequately responded to the local Project-scale ecological issues raised in the submissions. However, further commitment will be required by NCIG in some specific areas as outlined below and explained in more detail in Section 3.3.

The Panel finds that NCIG will need to more adequately consult with local stakeholders in order to address the ecological requirements for successful construction of compensatory habitat for Green and Golden Bell Frog and for the northern spur line embankment across Deep Pond. This consultation will be needed during development of the Flora and Fauna Management Plan and during the integrated planning and design phases of compensatory habitat projects. It is important that this consultation is undertaken with stakeholders before commencing design and construction of compensatory habitat works. In addition, effective monitoring and evaluation of ecological changes at the species, population and community level in areas of new compensatory habitat and on the NCIG project area will also require careful consultation, planning and design in order to develop agreed approaches that will deliver useful monitoring, evaluation and management information.

The Panel considers that if NCIG undertakes these sorts of participatory engagement processes with community interest groups such as the Kooragang Wetlands Rehabilitation Project, the Hunter Bird Observers Club, government agencies such as DEC and researchers at the University of Newcastle and elsewhere then there is a much more sound platform for achieving effective habitat rehabilitation outcomes for Green and Golden Bell Frog, avifauna and other species. These participatory engagement processes need to commence in the development of the Flora and Fauna Management Plan and continue through regular consultation and open communication processes during the life of the Project.

Ecological Impacts at Regional and Global Scale

The main ecological impacts and issues raised by the public at the hearings were mostly concerned with greenhouse gas emissions and climate change impacts that would arise from combustion of coal. The Panel's response to these issues recognises that in preparing the EA, NCIG has adequately accounted for the greenhouse gas emissions from within the proposed NCIG Project boundaries on

Kooragang Island, although this was not explicitly called for in the Director-General's Requirements for the EA. Subsequent to the hearings in Newcastle, in December 2006 NCIG prepared a response to submissions made by the public on the subject of greenhouse gas emissions, including the combustion of exported coal. The Panel received the extra NCIG material on greenhouse gas emissions on December 14th, 2006 and included it in our review of the relevant issues raised in submissions in regard to ecological issues.

The Panel clearly recognises that the public have identified numerous regional and global externalities of the coal industry that need deeper consideration by all stakeholders committed to sustainable development in the Hunter Valley and mitigation of the adverse impacts of climate change. Consideration of regional and global externalities was not an explicit part of the ToR for the Panel or the Director-General's Requirements for the NCIG EA. However, due to overwhelming public interest in discussing these relevant ecological issues the Panel, in consultation with the Department of Planning, agreed to listen to and consider the public's views. Following the hearings, the Panel needed to consult additional expertise in CSIRO on climate change, greenhouse gas emissions and energy technology. These consultations were necessary for the Panel to consider a range of viable mechanisms and sustainability options that respond to the complex interactions and trade-offs between the relevant ecological issues expressed to the Panel by the public about global climate change and cumulative regional development impacts, while addressing the economic benefits of increased coal export from the NCIG Project and the challenges for global energy security and sustainable development in the Hunter Valley.

The Panel considers that NCIG has adequately responded at the local project-scale to the Director-General's Requirements for the EA for the proposed NCIG Coal Export Terminal. The Panel considers that NCIG would play a critical role in the further development of coal mining and export from the Hunter Valley as part of the 'coal supply chain' by removing the export bottleneck of limited coal loading capacity in the Port of Newcastle. As such, the NCIG Project would play an integral role in increasing the supply of coal to expanding overseas markets and consequently the final combustion of coal and contributions to greenhouse gas emissions.

These regional and global ecological impacts are considered by the Panel to be relevant ecological issues raised by the public that need to be considered by NCIG and the NSW DoP, even though the Panel recognises that these regional and global impacts fall outside the Director-General's Requirements for the NCIG EA. The Panel understands that these regional and global ecological impacts can not be effectively mitigated within the local Project-scale of the NCIG Project boundaries on Kooragang Island and yet neither can these ecological impacts be ignored by stakeholders.

In order to address the cumulative regional and global ecological impacts that would be contributed to by the proposed NCIG Project, the Panel considers that there is a need for a compensatory mechanism that specifically links the value of increased coal exports from the Port of Newcastle with addressing the regional ecological impacts in the Hunter Valley and the global externalities of climate change that will be contributed to by increased coal exports. The Panel recognises that current mechanisms such as the COAL 21 National Action Plan that are addressing carbon capture and storage and clean coal technology options are useful science, engineering and technology contributions for mitigating the adverse impacts of coal combustion. However, the Panel considers that there is a strong need to enhance and encourage a wider range of adaptive responses to the adverse consequences of increased coal combustion.

Accordingly, the Panel recommends that NSW DoP lead discussions with industry, government and community stakeholders to actively explore the facilitation of sustainability compacts between government and industry as called for in the NSW Greenhouse Plan. As part of these discussions the Panel recommends consideration of the establishment of a charitable trust (Hunter Valley Ethical Coal Trust) to provide an ongoing funding stream derived from new coal exports and an independent governance mechanism to enhance sustainable regional development and low carbon technologies in the Hunter Valley.

Other alternative mechanisms that could be considered during the recommended discussions facilitated by NSW DoP that could achieve the same objectives include the establishment of a Trust similar to the NSW Environmental Trust that is

administered through a government agency, contributions to the Energy Savings Fund as described in the NSW Greenhouse Plan or governance through an existing organisation in the Hunter Valley such as the University of Newcastle or the Hunter Valley Research Foundation.

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1.0 Introduction The Minister has directed that under its terms of reference, the Independent Panel of Experts will consider and advise on:

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Due to the overwhelming number of submissions addressing not just the local impacts in the Terms of Reference (ToR) for the Panel, but the public's perceptions of the regional and global consequences of the coal industry, the Panel, in consultation with NSW Department of Planning (DoP) representatives at the Hearings agreed to listen and respond, where possible within the ToR, to these broader relevant ecological impacts.

The Panel had not formed an opinion at the start of the Hearings about the relevance and relationship of these broader regional and global ecological impacts raised by the public and attributed to the local scale NCIG Project. However, the Panel agreed to attempt to respond to the community's views, once they had been fully heard and duly considered by the Panel, in the Panel's publicly available report.

2.0 Summary of Submissions to the Public Hearings

A brief summary of the key issues of concern expressed by participants at the three days of public hearings held in Newcastle from November 7th-9th 2006 is outlined below. The response of the Panel to the matters raised in the submissions at the public hearings is presented in Sections 3.0, 4.0 and 5.0.

Vicki Brooke – Climate Action Newcastle (CAN)

Ms Brooke commenced by saying that climate change is very topical following the release of the Stern Review. She said that the Department of Planning has focussed on 3 environmental issues but not climate change and she said that the Panel needs to refer to climate change experts to address these climate change issues. Ms Brooke raised Air Quality issues and the high incidence of health problems due to poor air quality in the Newcastle area. She referred to the recent position taken by the Australian Medical Association (AMA) and their concerns over climate change and local air quality.

Ms Brooke said the CAN written submission refers to the inadequacy of the EA with respect to the Coal Export Terminal exporting to Japan and South Korea and ignoring the subsequent combustion of coal. Ms Brooke believed that the Coal Export Terminal must take climate change and overseas coal combustion into

account. In fact, she said that it was 'morally irresponsible' to proceed with new coal exports.

Ms Brooke raised concerns over dredging impacts and the proposed railway embankment crossing Deep Pond as well as the unsuccessful history of relocations of the Green and Golden Bell Frog. She also had concerns over toxic waste management from dredged sediments and whether sediments will be dumped under the London Convention.

She felt that the existing coal loading facilities were already adequate and believed it was unclear why a new Coal Export Terminal was required. She said that the project was 'out-of-sync' with the rest of world and a shift to new low carbon energy sources overseas will limit the future role of the Coal Export Terminal.

Ms Brooke said that CAN want 'an 80Mt/yr cap on coal, not no coal'. Ms Brooke also referred to the Stern Review and the calculated social costs of coal exports on environment, social and economic grounds. She said CAN are calling for a target of 25% renewables by 2020 as a NSW Government policy and she requested that the Panel call upon the Minister to reject the Coal Export Terminal.

Lee Rhiannon – NSW Greens

Ms Rhiannon was concerned about the structuring of the Panel without any recognised climate change expertise. She said that tackling the coal industry is critical to tackling climate change and that if the Coal Export Terminal goes ahead then it will drive coal mine developments in the Upper Hunter and Gunnedah Basin. She said that the \$13B in BHP Billiton profits contrasts with the limited returns to coal region communities. She said that rejecting the Coal Export Terminal would put a break on the coal industry. Ms Rhiannon also acknowledged the historic contribution of the coal industry in the Hunter Valley but now sees that local people must recognise the new problems arising from the coal industry and adapt for the future.

She said that the Stern Review recognises the importance of putting a price on environmental damage and these costs should have been put into the economic analysis of the NCIG EA report. She urged the Panel to review the Stern Review and consider its conclusions with regard to the Coal Export Terminal. She stated that the Coal Export Terminal contributes to a “coal rush” and the Panel can help move NSW to a future low carbon economy. Ms Rhiannon added that the Greens are not trying to end profits but want a substantial shift towards new technologies like solar, wind and tidal power.

The Coal Export Terminal would drive greater coal mine development versus alternative futures with a different vision for the Hunter Valley, for example, clean green industries in a low carbon economy. She said that the economics put forward for the project do not add up.

Ms Rhiannon was sceptical about the EA process saying that in NSW no coal mine has ever been rejected after it has been given an exploration licence. She said there were other viable ideas on a different economy but the political will for change were not in place in NSW. She thought the Stern Review offers a new vision and that the ‘new age of the Stern Review’ requires NCIG to withdraw the Coal Export Terminal project and resubmit in light of the Stern Review. Many people were cynical about the process of recent independent hearings and she sees the Panel and the Minister rubber stamping projects.

Marianne Johnson - Barrington-Gloucester-Stroud (BGS) Preservation Alliance

Ms Johnson said that there were well over 2000km² of coal exploration licences in the Barrington-Gloucester-Stroud (BGS) region. She said that the Coal Export Terminal will affect newcomers to her region who are bringing new investments that support alternative rural futures, for example, the \$74M obtained from tourism this year. Gloucester was advantaged by steady rainfall even during drought. Therefore, the BGS region is important as a water source for other areas in the Hunter Valley and continuing agriculture. Further coal mining will displace these future economies, because of the potential for coal mine expansion. For example, she said the Stratford mine did not close as a boutique mine but

expanded to 'liberate the coal' (Gloucester Coal) for other investors. New people to the BGS region are buying properties without knowledge of future mines. Ms Johnson also discussed other impacts, including the Duralie coal mine expansion affecting the Karuah River. She expressed concerns over future rehabilitation of coal mines not returning the land to an original or better condition.

Ms Johnson also saw a 'direct relationship between the Coal Export Terminal and global climate change'. She felt that if the Coal Export Terminal expands then it will enhance fossil fuel use and therefore increase climate change. Overall, she felt that the export of coal from the Coal Export Terminal would not diminish our responsibility for burning the coal overseas, which could lead to an increase in the number of heat related deaths and the severity of droughts and fires as a consequence of global warming. She also felt that geosequestration was not ready as a technology and would not be connected to old coal powered power stations.

She said that vested commercial interests were put before humanity and the world and that long term needs of communities were being ignored. She said that she sees a conflict of interest between 'mighty coal' and local communities, leading to a problem of wealth distribution, the long term destruction of communities and the problem of intergenerational inequity. Finally, she said costs to the public purse of new infrastructure, health bills and other costs associated with global warming were not taken into account in the EA.

Ken Johnson - Barrington-Gloucester-Stroud (BGS) Preservation Alliance

Mr Johnson said he sees the Panel seemingly up against the limited Terms of Reference (ToR). He said he does not consider the ToR is limited by the geographic location of the Coal Export Terminal but that there is a direct relationship between coal mining in Barrington-Gloucester-Stroud and the Coal Export Terminal. Mr Johnson made comments about the reliable rainfall in BGS and predictions for BGS as a potential denser rural production area when there was likely to be a general drying out of the Hunter Valley due to climate change.

BGS should be seen as a model greenhouse gas alternative community if it is not mined and not enhanced by approval of the Coal Export Terminal. Mr Johnson said he wants the Panel to extend the ToR well beyond Kooragang Island.

Chris Herbert - Hunter Bird Observers Club (HBOC)

In opening, Mr Herbert said that the Hunter Valley was a focal point for migrating and non-migratory shorebirds. From 1950-1990 there had been intense dredging by the Public Works Department for railways, dykes, reclamation and floodgates that had disturbed local hydrology and habitat. There had been complete loss of estuarine habitat on the Kooragang Island industrial platform and dumping of slag and dredged sediments. Yet, he said there has been no effective compensatory habitat offered for loss of habitat caused by Kooragang Island industrial development, particularly over the last 20 years. Despite the loss of habitat due to industrial developments, Kooragang Island was the 'most important wader site on NSW coast'.

He said that Hunter Bird Observers Club (HBOC) wanted to test the feasibility of an alternative alignment for the high capacity rail line across Deep Pond. He said that neighbouring Big Pond has been converted to a 'swardy grassland' from a sand flat since disruption of hydrology and dumping of materials. The NSW Government had allocated \$1.2M for compensatory habitat in 2002 but the money was spent on rehabilitation of existing, but already degraded, habitat in Kooragang Nature Reserve. He said that there had been no new habitat creation for the loss of Big Pond. He said that this was contrary to the statement in the EA regarding the historic development of Big Pond.

Mr Herbert highlighted the greater importance of the Deep Pond habitat, following the removal of Big Pond. He said that Deep Pond was the largest enclosed water body in the Hunter Estuary and there had been a rise in birds over the last six years in Deep Pond, coinciding with the Big Pond decline. He said that compensatory habitat should be developed years in advance of loss of existing habitat. New habitat could be developed in the upper saltmarsh areas and estuaries, however he mentioned that Deep Pond provided more diverse habitat than the estuary. In addition, the suitability of some of the estuarine and salt

marsh areas for compensatory migratory wader habitat was limited given that they currently provide habitat for the Green and Golden Bell Frog (GGBF).

For Pond H he asked to move the railway alignment to the north and to put in a light barrier on the southern railway line near the river. He said the proposed embankment would destroy the southern part of Deep Pond and the 15m embankment would be very exclusionary to bird activity. He mentioned that K Pond West is Australasian Bittern (*Botaurus poiciloptilus*) habitat and that there was no offer in the EA for compensating for K Pond loss. He said the big issue for the HBOC is the northern spur line across Deep Pond because it threatens migratory waders. He said that the waders need a clear line of sight for protection from predators and the line of sight depends on the 'height of the barrier' (as determined by a formula). He said that the intention of the NCIG regarding the proposed northern alignment was unclear.

He expressed concerns over Compensatory Measures and the actual form of financial offers. In particular, he considered the financial offers were superficial and unspecified. He said that the cumulative impacts of habitat loss were not being assessed adequately in the Hunter Valley. As an example he said that Port Botany had \$3.5M for compensations at an 8:1 ratio for only 200 shorebirds; Deep Pond has an estimated 2000 birds. In summary, he called on the NCIG to scrap plans for the northern alignment. If the northern alignment proceeds then the NCIG must compensate adequately for all areas lost to construction.

He said the design goal for Deep Pond should be to act as a habitat reserve that would protect the biodiversity of Kooragang Island through the integration of measures of biodiversity preservation with the industrial design of the Coal Export Terminal. In addition, he called for the compensatory habitat for Big Pond to be created, for the costs of mangrove removal in Area E to be defined, and an ongoing financial commitment for maintenance of rehabilitation works to be established. He then encouraged NCIG to integrate conservation and development in the design of their industrial site. For example, he proposed that NCIG could commit to the construction of an access track to Deep Pond for public

use by bird observers. He finished by saying that a pier structure in Deep Pond, similar to Stockton Bridge, was unlikely to be an accessible flight path for birds.

Kathy Helme - Resident

Ms Helme wished to succinctly state that her concern was that the Coal Export Terminal would enhance climate change with global and local impacts in Newcastle. She said that the Coal Export Terminal would cause the sea level to rise.

Anne Hodgson - Resident

Ms Hodgson said she was not a scientist but someone who has taken time to learn the facts about coal exports and climate change. She said that the EA was not presenting a safe and sustainable project. She thought the Coal Export Terminal threatens the Green and Golden Bell Frog, the rare plant *Zannichellia palustris* and migratory species of birds. She said dust and noise impacts would be increased for neighbouring suburbs. She said the most damaging aspect of the Coal Export Terminal would be climate change and that these aspects were not being considered as the proposal does not neatly fit into the EA specifications. She said the Panel needs to consider climate change and she stressed that the Panel had enormous responsibilities for considering the next generation. Children and intergenerational issues and the impact of climate change on the children of the future were her main focus.

She felt the Coal Export Terminal has world reaching negative implications brought on by burning coal; a process that leads to climate change. She said that we were already seeing the impacts of climate change, including more frequent and severe droughts, record low water levels in reservoirs, dust storms and bush fires. In addition, there were more frequent and severe storms in Australia and elsewhere. She said that destruction of the Great Barrier Reef and rising sea levels were affecting \$155M in tourism. She mentioned that climate change threatened the Kakadu wetlands and was leading to the loss of alpine ski resorts. She said that the Government and Independent Panels have been too focussed on the direct impacts of coal-related projects like the Coal Export Terminal rather

than broader systemic impacts. She said that coal economies bring jobs and wealth at a cost of subsidies. Other negative impacts include the fact that energy must be used for transporting coal and there are spill over environmental impacts on other land uses. In contrast, Ms Hodgson was optimistic about renewable energy and the economics of wind, solar and tidal energy with increased employment opportunities.

Ms Hodgson cited some factors she believes have led to a 'pathological attachment' to coal power generation. These factors included the power of established industries, Government revenue generation, misconceptions about the loss of employment opportunities if coal was to slow down vested industry interests and other Government interests, for example the Kyoto Protocol which is not signed by Australia, the US or India.

Ms Hodgson called on Australia to lead by example and change from being the planet's highest per capita CO₂ producer. Ms Hodgson recognises the present level of personal commitment of people in developing the coal based projects and the difficulties they faced in finding it hard to 'change the map of the future'. She said she understood why they were defending outmoded views of the world. Finally, Ms Hodgson asked the Panel to consider the overall consequences of the project not just noise, dust and local ecological impacts.

Naomi Hodgson - Resident

Ms Hodgson was very dubious about the role of the Panel and their consideration of the project and the scientific constitution of the Panel. She regretted the lack of people's ability to protest the project given limitations imposed by the terms of reference (ToR). She felt Anne Hodgson's presentation would be viewed as being outside the ToR but that the issues addressed by Anne Hodgson are critically important given scientists are saying that there are only 10 years left before irreversible climate change. Ms Hodgson saw the Coal Export Terminal as an example of the regional development of mines causing both adverse local impacts and inducing global change. She saw that the community were starting to

realise the severity of long term climate change impacts but admits they don't know much about the specific implications of the Coal Export Terminal.

Ms Hodgson said that the Department of Planning should be about planning for the future and the Coal Export Terminal was not good for the future. She said there would be local negative impacts in the Hunter Valley on agriculture and horse breeding and that renewable energy jobs would be better than coal (non-renewable) jobs. She said Government should be acting on behalf of the welfare of the people and the Coal Export Terminal was not contributing to it. She felt that the NCIG shareholders should not be supporting the Coal Export Terminal proposal given the global impacts of coal production and combustion, such as climate change.

Stephen Phillips – Rising Tide

Mr Phillips expressed concerns over the scientific constitution of the Panel and the ToR. He said there were more than 700 submissions primarily addressing climate change but it was not explicitly mentioned in the ToR, except as an indirect reference to ecological impacts. Mr Phillips also recognised that there was no expertise on the Panel to address climate change. He said climate change was clearly the communities' major concern and there was 'no fix' to this concern except the rejection of the Coal Export Terminal proposal.

He said the facilitation of more coal mining has not been addressed by the EA or any other planning process. Yet there was industry acknowledgement that the Coal Export Terminal was inextricably linked to the production of new coal in the Hunter Valley and the Gunnedah Basin. He said that the Coal Export Terminal was aimed at removing 'supply chain bottlenecks'. He stated the impacts of the coal supply chain need to be assessed as a whole but 7 new coal mines were currently under assessment or being assessed in the next 2 weeks. He said other EAs were also being prepared and others getting Director-General (DG) requirements. He complained that each of the projects was being addressed separately by NSW Department of Planning, yet they were all going to export coal through the proposed NCIG loader. To this statement, Mr Phillips asked 'Does NCIG dispute that?'. The Company representatives said there was no dispute

over the Coal Export Terminal proposal opening up coal exports through the proposed loader and enhancing development of new mines to meet demand for coal.

Peter Gray – Rising Tide

Mr Gray commenced by saying that the NCIG EA does not address reasonably expected impacts such as new mines in the Hunter Valley. He acknowledged that the Panel facilitates public discussion but doesn't address the main issue of climate change. However he considered the Panel can address the air quality and ecological impacts of climate change under the ToR.

He said that the ToR was too narrow as issued from the Director-General (DG) as were the EA requirements, which were considered far too minimal by Mr Gray. Mr Gray said he had met with the Director-General and specifically asked for combustion of coal to be included in the EA requirements but the Director-General did not include them. Mr Gray was keen to know how the Panel will respond to the ecological impacts of climate change and what advice they will provide to the Minister. He said the Panel should take a 'systems approach' to the Coal Export Terminal. Mr Gray went on to say that the Stakeholder Focus Group (SFG) was asked to address the climate change issue but it was not taken up by the Chair of the group.

He said that the EA needs to be undertaken at a broader level and not necessarily 'humans and their surrounds in NSW' but more globally. Mr Gray stated that 'direct versus indirect' environmental impacts have no legal standing. He stated that available guidelines such as the Greenhouse Gas Protocol from the World Business Council for Sustainable Development and World Resources Institute were not used by NCIG. As an example, he said that no reference was made to slow combustion of coal in stacks or spontaneous combustion of coal in stockpiles (e.g. Scope 2 emissions). Mr Gray said that the greenhouse gas calculations have not been done properly and should be done again. In addition he felt it was infuriating that all regional benefits of employment were counted but not the regional costs of all projects in the socio-economic analysis.

He said that the legal challenge on Anvil Hill sets up NCIG for a similar challenge because NCIG have been made aware of these greenhouse issues before. Mr Gray stated that the Principles of Ecologically Sustainable Development (ESD) were being ignored by the Department of Planning. Mr Gray referred to the full life cycle analysis of coal production and combustion as an example of ESD. Furthermore, he thought Part 3A was effectively being seen as separate from the objects of the EPA Act. He said he saw the Part 3A process as a means to give opportunities to 'cut red tape' while bringing more discretionary power to the Minister. He continued that NCIG did not canvass the 'No Build' option in the EA. He related the fact that just because there is a demand for coal it does not mean it should be automatically supplied without consideration of the global and regional impacts.

Mr Gray stated the climate change issue had been asked for inclusion in the EA process for over a year so under ToR 1c), the EA should be seen by the Panel as inadequate. He felt that the entire greenhouse gas issue has been ignored by both the Director-General and NCIG. He said that NCIG should have responded by calculating the full combustion of coal as a corporate social responsibility issue even if not required by the Director-General's requirements. He said that 100 jobs should be compared to the 170MT/yr CO₂ released during combustion. The scale of the issue will increase with the Port Waratah Coal Services (PWCS) expanding to 120MT/yr of coal exports using their existing site infrastructure. When combined with the proposed NCIG facility there will be 180MT/yr of coal exports equal to 500MT/yr of carbon dioxide equivalents.

Mr Gray said he was granted observer status at SFG but was never given full status. He said that the peer review form letters (Tyler, White) on the Green and Golden Bell Frog are not convincing. He said that members of the SFG were all over 50 years old and not particularly representative or engaged with current issues. Finally, he said dust suppression using 650ML/yr of water required to 'soak' uncovered coal under license from Hunter Water Corporation was not sustainable, especially during periods of drought. Mr Gray concluded by mentioning the problems of foreign invasive marine species introduced into Newcastle Harbour. He said that with an existing 20 ships/week Newcastle would

be a 'port most at risk' of invasive species with 12 extra ships/week. He said this was not addressed by proponents.

Georgina Woods – Hunter Community Environment Centre (HCEC)

Ms Woods commenced by saying that the Hunter Community Environment Centre (HCEC) do not want the Coal Export Terminal approved because of the irreversible damage to climate caused by coal exports. The fundamental issue in the EA requirements is absence of justifications for the project and no development of the 'No Project' case. She said that there was a planning problem of not considering the 'why' and 'should' but only 'how the project should proceed'. She said that the Environmental Risk Assessment was extremely limited. For example, there was no consideration of climate change, dredging, increased shipping and it did not canvas all possible risks. She stated the planning system generally fails to do proper assessment but this cannot be used as an excuse in this project. Ms Woods said she considers climate change as the biggest environmental issue with both local and regional impacts on the environment.

In addition, she said she believes that the socio-economic impacts of this project were not properly addressed. For example, she said such impacts were often used to justify projects, but socio-economic benefits included in projects are often only at a regional scale and do not consider the costs of environmental impacts. She said there was no consideration of long term 'lock in' of coal in the future for Newcastle given climate change and no search for alternatives to coal dependence. She said that encouraging the Coal Export Terminal proposal locks out other alternative energy opportunities. She stated that the Principles of Ecologically Sustainable Development (PESD) were not adequately considered (e.g. investing in a dying coal industry and not considering intergenerational equity or other people in NSW affected by droughts and other climate change impacts).

At a local and regional level, the Green and Golden Bell Frog is a very important species in the Hunter estuary and not well suited to transplants; she felt that ecological offsets were downgrading environmental protection. Ms Woods urged

the Panel to read the NSW Department of Environment and Conservation (DEC) offsets policy, for example the 'avoid impacts in first instance' policy and then compare proposals for Big Pond and Deep Pond. She saw that the DEC's Green and Golden Bell Frog Recovery Plan and the Priority Actions Statements for the Green and Golden Bell Frog from DEC were not followed by the NCIG EA. Furthermore, Ms Woods thinks there is an underestimation of the impact the Coal Export Terminal will have on *Zannichellia palustris* (a rare plant) and that key threatening processes under EPBC Act were not addressed (e.g. urban and industrial development). In addition, Ms Woods was concerned over compensatory habitat practices in the Hunter Valley. She said that the coal industry has been consistently using smaller and smaller remnants to do their compensatory habitats.

Ms Woods said the public sees the local impacts of mines on water quality and quantity and then coal combustion affects climate change and reduces water supply. She said that twelve extra ships per week were directly linked to NCIG and there was no consideration of impacts to local fisheries and no consultation or SFG engagement with local fishers. She stated that dredging was approved separately for the container terminal but was not going ahead and no extra work was done on the Coal Export Terminal project. She considered dredging to be intimately connected to the project and believed it was BHP's responsibility to dredge, clean, cap and contain dredged sediments.

She said that it was 'mind boggling' that Department of Planning were considering all the separate processes of assessing different coal mines and the Coal Export Terminal at the same time. She said that the community had to respond to 7-8 projects with 7-8 different submissions in a short period of time versus developing a clean, sustainable economy. She considers all mine projects and the Coal Export Terminal are interdependent and should be considered together; she said it was totally baseless to not see linkages between these projects.

Rebecca Blunden – Hunter Community Environment Centre (HCEC)

Ms Blunden commenced by saying that the Hunter Estuary has had 200 years of industrial development but it was still an amazing place for biodiversity. Ms

Blunden then questioned how much more industrial development the estuary could cope with. She questioned that 5 out of 11 references in the literature review on vegetation communities were information from past EIS for the site and another 6 references were by the same author. She did not consider this to be representative. She stated that EIS were very rarely objective and other literature should have been considered. As an example she said *Zannichellia palustris* was at the northern distributional limit and valuable for conservation. A vegetation survey was conducted in summer when the plant dies back with no other efforts to address further survey effort during the rest of year. Consequently, NCIG were not able to assess adequately the presence and absence of *Zannichellia palustris*.

Additionally she said that coastal saltmarsh was common but from 1954-1994 there has been a loss of 67% of this community in the Hunter Estuary. This cumulative loss of the coastal saltmarsh habitat had reduced night roosting sites for wader birds. Ms Blunden also linked salinity and water quality effects on coastal saltmarsh habitat with the impacts of coal mine development on the sea level in the area. She said that tidal prism impacts from dredging will increase tidal levels and will affect hydrology and tide level. Ms Blunden saw mangrove invasion as a consequence of increased dredging and tide rise.

She said NCIG must look at the cumulative impacts of removal of 50 ha of freshwater wetlands on coastal floodplains. She said climate change will affect rainfall and freshwater wetlands presence and may contribute to a rise in sea level. She had concerns over the effectiveness of compensatory habitat mechanisms and that this mechanism was being used to excuse the loss of habitat by proponents. She said that while technically feasible, habitat development did not completely compensate for habitat loss. Ms Blunden believes that any success this method has had has been accidental rather than by design.

Ms Blunden said there was a very significant decline of Green and Golden Bell Frog populations on the East Coast of Australia. The Kooragang Island (KI) population is the most robust and likely to survive (see DEC Recovery Plan

2005), thus highlighting the importance of the KI population. She stated that the EA 'talks up' Green and Golden Bell Frog numbers in the Kooragang Nature Reserve (KNR) and off the NCIG site; she felt the EA overstates the amount of KNR influence on Green and Golden Bell Frog numbers. She said that not much stratified survey work to assess Green and Golden Bell Frog numbers have been conducted on the site and the University of Newcastle (UN) has done most of their work outside the fence line. She said the NCIG need to acknowledge that higher numbers of the Green and Golden Bell Frog are on the KI site and in constructed, polluted wetlands. She referred to the DEC Recovery Plan and requested 4 years of surveys for compensatory habitat for the Green and Golden Bell Frog to be conducted by NCIG to justify the Coal Export Terminal project. Finally, Ms Blunden referred to a NPWS report on maintenance and protection of existing wildlife habitat. For example, a DEC 2005 report on the Australasian Bittern says that habitat needs to be protected from any disturbances.

Paul Wynne – Hunter Community Environment Centre (HCEC)

Mr Wynne referred to three issues:

1. Drought in that Hunter Estuary waterfowl habitat was significantly linked to the drying up of waterbird habitat in the Murray-Darling Basin.
 2. Ship movements and impacts on marine benthos were excluded from the EA.
 3. Potential sea level rise over 35 years needs to be taken into account by NCIG.
- He said that the IPCC 4th Assessment is likely to increase the IPCC prediction of sea level rise. He asked if the Department of Planning were issuing risk certificates. He said that potential sea level impacts were already locked in with current rates of carbon dioxide production. He said that a 2m sea level rise was more likely within the life of the project.

Ned Haughton - Resident

Mr Haughton said that people were being ignored when they clearly do not want climate change to occur and it will affect all of us. He questioned the lack of expertise on climate change in the Panel. He said there were inter-linkages between projects in the Hunter Valley and the Gunnedah Basin and the CET would only increase more coal mine development and adverse local and regional impacts.

Jan Davis - (Maitland Greens/Hunter Environment Lobby)

Ms Davis was against the Coal Export Terminal and quotes McLellan J on Principles of Ecologically Sustainable Development. She sees that the NCIG consortium is more than a transport vehicle because they are also miners in the Hunter Valley and Gunnedah Basin. She said she sees the NCIG greenhouse gas calculation approach as 'grossly negligent' and that excluding coal combustion overseas is not a responsible action by big companies.

Wendy White - Resident

Ms White said she was appearing as a private citizen, grandmother and a Greens member. She said the EA was flawed because it doesn't address coal mines in the valley on which it depends. For example, the EA quotes increases in jobs in the Valley but not the impacts on biodiversity, water quality, habitat, fragmentation and agriculture. She said coal burning causes 'irreparable harm' to human health and well being. She said that NCIG cannot use the 'if we don't sell coal then others will' argument. She said it was incredible that the EA uses Principles of Ecologically Sustainable Development (ESD) but then doesn't follow the consequences of coal combustion and increased greenhouse gas.

She said the viability of the Coal Export Terminal was dependent on disturbing thousands of hectares by coal mining in the Hunter Valley. She continued by saying there were problems with dredged sediments and a loss of 50ha of the freshwater wetlands EEC. She said it was not good enough to pay Kooragang Wetlands Rehabilitation Project for compensatory habitat. She said that compensatory habitat should not be used as an excuse for loss of existing habitat. She had a feeling that there is time to do something about climate change but that means doing something about fossil fuels now. She had concerns over the lack of will to do something about climate change by the Government. She said it should not be up to people to keep reminding Government about the Principles of Ecologically Sustainable Development; it should be a Government responsibility.

Oliver Coleman - Resident

Mr Coleman was concerned about climate change and local impacts. He raised concerns about drought impacts on soils, water quality, agricultural production and bushfires, as well as cyclones and sea temperature impacts caused by climate change. He said that we 'were now well beyond the Precautionary Principle' and there was now clear damage being done by climate change. He said that NCIG have acknowledged new coal mines are needed for the Coal Export Terminal. He said coal mine owners do as little environmental management as possible and are not likely to change. He said to the Panel that the ToR is extremely narrow and the Panel does not represent the majority of NSW people. He said the Panel is invalid and that the Panel needs to reflect on moral implications regardless of their professional position. He said he lives in Stockton and noise was not an issue but there are dust impacts on cars, but they are negligible.

James Ryan - Resident in Hunter Valley

Mr Ryan said he wanted to discuss three major points:

1. Climate change
2. Rigour of the overall flora and fauna assessment, and
3. Impacts on the Green and Golden Bell Frog

1. Climate change

He said the coal export terminal will contribute to climate change and the proponent should not escape from assessing climate change impacts at a global level. He saw the failure to address climate change as a shortcoming in the planning regime in NSW. He said that under Part 3A the Minister has so much power that he must address climate change and make the Project accountable in the form of funding for new knowledge or a carbon tax to aid the transition from high carbon to a low carbon economy.

2. Rigour of the overall flora and fauna assessment

He criticised the use of 5 references out of 11 from other EIS being used for the NCIG flora and fauna assessment and 6 other references from the same author (Geoff Winning). He said that the EIS was inevitably biased towards Projects

going ahead and the assessments were coloured by the environmental assessors.

3. The Green and Golden Bell Frog

Mr Ryan shared concerns over the compensatory habitat (CH) approaches and saw KNR was not adequately protecting Green and Golden Bell Frog, under recent habitat compensations. He referred to the Hunter Rare and Threatened Fauna Team who had four draft Recovery Plans under development as a test case for providing guidance to NCIG. He stated that DEC was specifically saying that CH was not the first and most desirable position. He referred to DEC recommendations that CH plans should be tested for two breeding cycles, equivalent to four years, of monitoring and evaluation for effectiveness as CH.

He said the DEC Recovery Plans should be taken seriously and the NCIG CH approach does not follow the DEC Recovery Plans. In his view, the NCIG approach was more about mitigating impacts after construction. He said that NCIG have to make sure that CH actually works and that the Company should put the CH measure in place now as a measure of company goodwill. He said that the KNR was established from BHP funds for the Green and Golden Bell Frog habitat development but ironically the numbers have not increased in KNR.

Christine Phelps – Anvil Hill Project Watch Association (AHPWA)

Ms Phelps main concern was over the global warming impacts of NCIG. She referred to the Anvil Hill Coal Mine and inadequacy of the DG requirements. She said the Independent Panel for the Anvil Hill project didn't have climate change expertise but the NCIG Panel can call upon global warming expertise when they need to. ANPWA are looking for the NCIG Panel to consider climate change and the social cost of carbon as in the Stern Review whereby methodology gives a dollar figure. She said ANPWA will send a climate scientist report to the Panel using \$110/T assessment of the Social Carbon Cost (SCC); based on the Stern Review for 30MT/yr this equals 79,137,000 T/yr of CO₂ equivalent.

She predicted that NCIG will vehemently argue that they are not the producer of the emission and so the NCIG should not have to assess the SCC of the

greenhouse gases. However, Ms Phelps said that NCIG is the enabler, facilitator and realiser of the expansion and greenhouse impacts of the coal industry, both locally and globally. Ms Phelps said she recognises that the ABARE assessment and the NCIG EA were written before release of the Stern Review. However, she said that climate change impacts are now clearly visible with icebergs 250kms south of New Zealand and that the political climate is now different after the Stern Review.

Peggy Svoboda – Kooragang Wetlands Rehabilitation Project (KWRP); Hunter-Central Rivers Catchment Management Authority

Ms Svoboda said Kooragang Wetlands Rehabilitation Project (KWRP) is a neighbour of NCIG. She provided some background to the landscape transition over the last 200 years in the Hunter Valley. She said there was a 'new plug' in the estuary by the consolidation of Kooragang Island from an original 20 islands, with flow through channels separating them, to one large island. She spoke of the initiation of KWRP in 1993 as partial compensation for loss of fish and wildlife habitat prior to 1993. However, she said Ash Island and other areas do not cover the majority of lost wetland habitat.

She spoke about the KWRP rehabilitation focus on making alterations to hydrology, cattle removal, selective ecosystem micromanagement to re-establish ecosystem services and allowing 'self design' of the saltmarsh. For example, the Stockton sand spit lagoon creation was based on removing a fringe of mangroves at the river edge to open up a line of site for waders occupying the sand spit. She said that a part of KWRP was the Kooragang City Farm set up as a demonstration of drought proofing wetland areas and maintaining cattle grazing versus overgrazing using old practices.

Her overall concerns about NCIG were particularly focused on compensatory measures; she was concerned about the lack of commitment to a clear responsibility by NCIG for outcomes versus the clear input of financial resources by NCIG. She said NCIG needs to be responsible for outcomes and not pass them on to KWRP. Ms Svoboda said KWRP needs more consultation about how NCIG would implement the two pond approach at KWRP and to correct

misperceptions in the public about what's going on with the Green and Golden Bell Frog habitat development. She said KWRP wants more early engagement on water management plans and a restoration plan is needed before construction starts; she said early planning would be critical for successful pond construction and achieving habitat compensation outcomes.

She called for an integrated design and construction process so that the restoration goal was integrated into construction works. She said the multiple industrial developments on Kooragang Island require Cumulative Impacts Assessment to identify cumulative impacts (e.g. dredging south arm of river for offsite impacts of the CET; no power line assessment of additional overhead lines; the elevated railway flyover structure would be likely to affect bird movements on the river). She raised the possibility of putting power lines underground instead of overhead lines on site. She also wanted reassurance on shorebirds not being affected by dust deposition from south east winds.

Ms Svoboda said she had problems with the view of using 'vacant land' that's actually already compensatory habitat for past losses. She was looking for a 'true approach' to compensatory habitat not just looking for offsets or management solutions for agencies and companies. She said the Big Pond compensatory habitat at Tomago was not an open and transparent process. She said that overall she was looking for a regional approach to multiple issues. Finally, Ms Svoboda said that there had been 10,000 hrs of voluntary labour at KWRP. She saw that a more open process was possible with NCIG and the KWRP could set a best case scenario approach for NCIG consideration. Ms Svoboda raised concerns about Environmental Accounting and Compensatory Habitat. She said it was unclear about what's being done and for what reasons. She said there was a loss of local corporate memory and few local references were assessed by NCIG.

Daniel Endicott - Bike Ecology Centre

Mr Endicott said that industrial expansion will cause increased numbers of cars and support a car culture that leads to obesity and urban sprawl. He would like to see employees walking or riding to work. He complained about the cumulative

developments of roads with trucks with bull bars killing kangaroos and birds. He said there were massive subsidies for travel using the diesel fuel rebate. He said the 'Government should be subsidising clean, healthy things'. He was looking for 'drastic measures for a 10 year window to fix climate change'. He sees the NCIG development on the wrong track (e.g. fewer lanes would be better than 4 lanes for new roads on Kooragang Island). He said he sees the inter-linkages of energy and material consumption and high paid jobs. He had issues with the effectiveness of tree planting as a carbon offset if they are lost through bushfires.

Gianni (John) Di Gravio - Resident

Mr Di Gravio strongly rejects the CET under Part 5 of the EPA Act. He said his experience in the Stakeholder Focus Group committee was that it set too narrow boundaries for the project in face of existing available information on sea level rise. He had concerns over effective application of Clause 5c on participation (two way) and many problems with the process on the Stakeholder Focus Group. He said there was no reaction from NCIG because they were not required under Director General's Requirements to act.

As an historian, Mr Di Gravio openly recognised the importance of coal from the Hunter Valley; indeed, he said the first profits in NSW were from Newcastle in the 1790's. He said good business practice over the years needs to change in light of new information and new consensus on climate change. He sees multiple indications of climate change warnings that will affect the future of our children. He said mining expansion is excluding other possibilities for tourism in the region. He wants to see the EA addressing combustion of 66MT/yr on global climate and the feed back impacts on Newcastle. He recognises the importance of the Al Gore movie 'An Inconvenient Truth' in increasing public awareness.

He said that everyone is being led badly, including the company, who are investing heavily in the NCIG project (66MT/yr) and another 43 MT/yr planned at PWCS. He wants to see a transition for the coal industry to a future that is sustainable. He said that an EA cannot be set within a 'little bubble' when there are global impacts. He wants to see 'optimistic projects' that are sustainable and don't lead to long term problems. He doesn't want to see the coal industry end up

like the tobacco industry. He said we 'need to work together' in the transition. He wants to see rejection of the proposal and setting of targets for efficient innovative energy providers, not just coal producers. He said that taking the same course is being irresponsible about the future. He said that the EA, with 300MB of information, is a professional job but set within too narrow a focus. Finally, he asked why currently available solutions aren't being put into place instead of the COAL 21 investment of \$300M for geosequestration and other clean coal technologies.

Bev Smiles - Upper Hunter Valley resident

Ms Smiles made some opening comments about the effectiveness of the Wilpinjong IHAP process now that Wilpinjong was up and running with noise and dust problems and the first load of coal. She said that there was concurrently an IHAP for Moolarben happening right now in Mudgee. She complained about the time impost on the Community attending multiple hearings. She said she sees that simultaneous hearings are a NSW Government strategy for fast tracking coal exports from the Hunter Valley and not planning effectively. She talked about the Ulan Coal Mine long wall problems and a lack of effective monitoring. She said that there was a cross-over of coal regulation in the Central West/Upper Hunter with Ulan and Moorlarben regulated out of Bathurst but coal exported out of Newcastle. She said none of the validation of ground water models for Wilpinjong has happened, as put into the Wilpinjong Coal Project development application and set out in the IHAP Recommendations, nor have the cumulative impacts been picked up in the requirements for Moolarben. She sees the upper Hunter Valley (Goulburn River) and lower Hunter being compromised by a series of mine projects and the coal export terminal is a driver of coal mine development. She expressed concerns over the impacts of the coal export terminal on wading birds in the Hunter Estuary system as well as over global warming and rising sea levels impacts on estuary conditions. She said that the cumulative offsets of the loss of Green and Golden Bell Frog habitat cannot continue indefinitely. She stated that increased coal transport will increase dust, noise and vibrations and there was no regional monitoring of coal dust impacts or regional assessments.

Ms Smiles said she is calling for a regional air quality and health impacts study of the coal supply chain and mining impacts at a regional scale, not project by project. She said a regional air quality study is needed before more mine expansion. She said the NSW Government needs to look at fine particulate air pollution impacts on the health of children, particularly increased chest colds (eg Muswellbrook High has one the highest respiratory related absences of students in NSW). She said that people are suffering noise and sleep deprivation problems in Newcastle and elsewhere caused by coal transport and shipping noise.

Ms Smiles said there were continuing problems with monitoring and collection of data to assess environmental impacts. She said there were difficulties and constraints with relying on voluntary efforts for monitoring and it was too time consuming and inadequate to rely on the public. Ms Smiles stated that DEC asks for individual mines to collect data but there is no overall synthesis and the use of dust and noise alerts is inadequate for regional assessment of mine impacts. Ms Smiles said it was hard to identify who's at fault with air quality problems and to get companies (eg Wilpinjong) to put noise data on their websites as required in the development application. In summary, Ms Smiles said that no-one in the State Government is looking at the cumulative impacts of coal mining.

Trevor Simmons - Port Waratah Coal Services (Environmental Advisor)

Mr Simmons explained the basis of the original Port Waratah Coal Services (PWCS) concern with the hydraulic interaction. He said it causes movement of ships at berth and that causes loss of loading ability by the PWCS. He said that Newcastle Ports, PWCS and NCIG have now resolved the issues. He said there were issues of mutual benefit between PWCS and NCIG because they both need a clear separation distance between passing ships and berthed ships.

He reported that NCIG have modelled Newcastle Harbour at the Australian Maritime College in Hobart. He said NCIG and PWCS would be good neighbours with mutual interests to serve the coal industry. He said other industries on KI produce noise and dust and PWCS needs to establish its own noise signature, through the use of calibrated models and regular monitoring. They have 10-12 years of monitoring data of dust in urban areas. He said it has been easy to

distinguish between non-coal dust generators and PWCS but will be much harder to see the difference between NCIG and PWCS because they will be close neighbours on Kooragang Island.

Chris Marsh- Resident of Islington

Ms Marsh said she was opposed to the Coal Export Terminal in Newcastle Harbour and to coal exports elsewhere in the world. She said she was speaking for island nationals who will be affected by climate change and those affected by drought, flood and fires. She said the Government should give funds to clean green jobs not diesel fuel subsidies. She wants to stop coal subsidies and start solar rental assistance. She wants to use solar as a replacement for coal power. She explained that solar rental assistance would allow solar panels to be leased with assistance from Government.

Simon Fane - Resident of Newcastle

Mr Fane said he works in urban water planning and sees first hand the impacts of climate change. He is concerned about climate change and believes that the Coal Export Terminal proposal is taking a 'massive step in the wrong direction'. He said he was on the site tour so he firstly stated that with respect to Deep Pond and the high volume spur line, he would be looking for alleviating the cutting of Deep Pond in two by the railway embankment. He said he hopes that the Panel and the proponent would be looking at a realignment and/or compensatory habitat. He commented that there was an astounding amount of scientific evidence pointing to adverse impacts of CO₂ release and climate change.

He was concerned about impacts on people by 2050 including impacts on his own children. In addition, he was worried about catastrophic impacts on biodiversity. On a personal note, he said that his son 'wants to be like David Attenborough, but it will not be possible if wildlife disappears due to climate change'. He referred to the Stern Review and the NSW Government Greenhouse Plan. He said that scientific assessments are now recognising greater than a 2°C increase over a 30-year period and so approving the Coal Export Terminal will only increase problems. He mentioned public actions such as people gathered on the beach last Saturday to join together to spell out 'Beyond Coal'. He also

referred to the Newcastle City Council decision on capping coal exports and an AC Nielsen survey saying 90% of people are now wanting something done about climate change.

He said he sees the EA as deeply flawed with respect to greenhouse gas emissions and was suspicious of the links of the Coal Export Terminal proponent to the owners/developers of new Hunter Valley coal mines. He said the project needs an appropriate 'system boundary' for assessment of greenhouse gas, globally as is done with socio-economic benefits in the region, but environmental costs have only been assessed at site level. However, he said that scientists are assessing that a 50% reduction in global emissions is needed but release of CO₂ from coal exports from the Coal Export Terminal will be greater than all of NSW sources of CO₂ emissions.

Mr Fane said he had learned from urban water planning (UWP) to accept climate change and massive downgrading of water supplies; he commented on recent publicity about the 1 in 1000 year Murray-Darling Basin event. He said UWP has to make contingency plans for climate change and reductions in water supply and to adapt with a range of alternatives (eg desalination plants). He noted that the impacts on climate change of CO₂ release from a recent desalination proposal was considered by the NSW Government to warrant offsetting. He said there were different requirements on UWP compared to coal mining with respect to climate change. He said he recognises that asking the Panel to take account of climate change and greenhouse gas emissions is somewhat futile and results from the limits set by the Director-General for the EA and the Panel ToR requirements. However, he commented there is no other forum for addressing these issues than the Panel. He said there were unrecognised psychological impacts of the coal export terminal proposal and existing exports.

Annika Dean - Resident

Ms Dean commented that a localised EA may have been adequate in the past but not now. She asked whether the project would still go ahead if a full environmental assessment of climate change had been done. Ms Dean saw an undemocratic process where NCIG can make huge decisions and asked 'why do

you think you have the right to make these huge decisions?’ She said she sees Project approval as irresponsible and unethical in light of climate change. She said that we need to transition away from coal as happened in UK and France. She was also concerned over local issues such as dredging and the Green and Golden Bell Frog.

Graham Clarke - NSW Department of Environment and Conservation (DEC)

Mr Clarke explained that the NSW Department of Environment and Conservation (DEC) is a regulator of the site and approves licenses for new projects, site contamination, rail corridors as well as threatened species, air quality and noise. In terms of air quality, he was comfortable about the way the assessment was done but opened up discussion and opportunities for a more robust monitoring network on Kooragang Island. For example, he suggested high volume and real time monitoring at a scale that links multiple users, particularly Port Waratah Coal Services and Newcastle Coal Infrastructure Group. He said it was not a departmental requirement but a good approach for Kooragang Island users.

He discussed the noise assessment classification of urban (e.g. Mayfield) and suburban (e.g. Fern Hill). He said that NCIG would need to determine appropriate methods for assessing compliance at the boundary. In addition, NCIG would need to allow for new developments within the new and proposed noise climate. He had concerns over determining who will actually be making the noise; for example is it better to use near field assessment of equipment versus more distant boundary/receptor assessment. He said that train noise should be limited by use of Class 90 locos similar to the EA assessment using Class 90 locos. He said any modifications would need new assessment. He again commented that he sees difficulties in separating different noise sources and modelling results will still be confused by multiple sources.

In terms of threatened species, there are very few choices for local offsets so the DEC rationale is to build off existing projects. Importantly, he said that any offsets require ongoing financial commitments for managing an effective offset. Mr Clarke said effective offsets will need adaptive management by a board, trust or other legally enforceable mechanism. He said that effectiveness also requires legal and

secure tenure and access to ongoing resources. He said there were ongoing issues over the success of constructed offsets and use and occupation of the sites by species. He mentioned five offset sites in Fullerton Cove and asked why are some offsets more successful than others? He said that on Kooragang Island, Area E has potential for offsets for mangrove removal. He said there needs to be agreement between DEC and NCIG on the scale and type of projects and ongoing resources before approval of the project by the Minister.

With respect to site contamination and water management, Mr Clarke said that DEC was satisfied with proposed site works and management of contaminants. He said it was the Regional Land Management Corporation responsibility to oversee the capping of the whole site including project-by-project construction and mitigation. He said that DEC was not supportive of the use of potable water for dust suppression. He made a recommendation for assessment of recycled sewage effluent for dust control, but it was up to Hunter Water Corporation to progress the issue with NCIG.

He commented that DEC thinks that more offsets effort is needed on an integrated response to Green and Golden Bell Frog as occurred at Sydney Olympic Park compared to the current fragmented approach. He remarked that Green and Golden Bell Frog are doing well in coal washery reject materials and offset habitat could use similar materials. Mr Clarke said there were ongoing problems with three DEC sites in the Hunter estuary in terms of effective rehabilitation projects that are providing successful compensatory habitat. He said the NCIG proposals for compensatory habitat needs an ongoing Trust to be set up to keep access to ongoing funds to allow for regulatory and management requirements. He said that DEC are not seeing a distinction between threatened species offsets in constructed habitat or natural habitat but it must be ongoing and sustainable because science doesn't tell us why some habitats are more successful than others. He also said that DEC doesn't want to see destruction of water bird habitat in order to create Green and Golden Bell Frog habitat.

With regard to noise, DEC is assuming that unless told otherwise they see 'suburban' as basis for assessment rather than 'urban'. He said that as far as

noise monitoring goes random sampling by responding to complaints was the standard practice; not systematic quarterly monitoring. He said DEC was recommending routine near field assessment on multiple sources e.g. conveyors and port loaders to detect increased noise levels due to mechanical degradation. He was open to recommendations on noise performance monitoring from the Panel. He recognises issues between separating noise from PWCS and NCIG, in terms of noise monitoring.

In summary with regard to Deep Pond, DEC is looking for clarity of NCIG commitment to offsets. To the best of his knowledge he thinks RLMC has no plans at present for Deep Pond but there are no known limitations on industrial development of Deep Pond. He said DEC regulates environmental issues but not development by RLMC who would then need to find offsets and that would be difficult (e.g. Lower Hunter Strategy would require them to find 250ha elsewhere).

Geoff Pettett - Hunter Valley Resident

Mr Pettett recommends that the Panel ask the Minister for inclusion of climate change in an extended ToR. He said he wants to stop the coal export terminal but if not then secure best conditions in the DA. He said he sees the CET as a 'trip point' for new developments (e.g. Anvil Hill) but sees NCIG using new mines as a 'trip point' for justifying the coal export terminal. He referred to the coal supply chain as a symbiotic relationship. He wanted to see a full life cycle analysis of the mining and burning of coal to determine CO₂ equivalents for the coal export terminal project. He said he was motivated by protection of his children and children's children. He said he was not intending to 'spray against the coal industry' but he was concerned for the future.

He saw dredging tied into the coal export terminal and BHP toxic sediments are also linked into the coal export terminal project. He said impacts were similar to the Sydney Harbour toxic sediments but the sediment transport from the Hunter River puts a layer over the toxic sediments. He was looking for design and technology for a cleaner, brighter future rather than communities having to pay the costs of poor management; for example, he said the Kurri Kurri Landcare Group are remediating Anvil Creek instead of the Government and the Company.

In terms of air quality, he wanted NCIG to account for methane releases from stockpiles. He said NCIG needs to also consider new urban subdivisions in the future and mobile air quality monitoring. He said choice modelling should be used for EIS assessment and if so then NCIG would need to take account of opinions and choices of the public. He recommended that NCIG use the wildlife rescue organisation, WIRES, for the Green and Golden Bell Frog and other fauna issues. He urged NCIG to see flora and fauna as an integral part of the project operations.

John Hayes - Throsby Community Forum (TCF) (Assistant Secretary)

Throsby Community Forum (TCF) is one of ten community forums in the Newcastle area and covers the inner city areas. He said expansions by PWCS and NCIG will mean Throsby will experience more shipping, dust and noise. He had concerns about scarce potable water used for dust suppression and fire fighting and it would establish an industrial priority for scarce potable water resources. He said it makes no sense at all to look at the coal loading operations separately when they are co-located and doing exactly the same operations. He said that all ship movements together would mean fifty-two ships per week. He asked why the Panel are being asked to do a service but not see the full picture. He formally requested that the Panel close their books until full PWCS consideration by the Panel.

He referred to Sir David King's estimates of 80cm sea level rise, then 2m, then 7m sea level rises. He questioned NCIG on whether their facility will be above predicted sea level rises of 2m and 7m. He said a 2-7m rise in Newcastle will inundate many areas and will be directly related to decisions taken by the Panel. He requested that the Panel support complete refusal of the coal export terminal proposal. He added that Throsby CF supports the other people who opposed the project. He asked who will be the longer term beneficiaries of the coal industry in Australia. Will global companies walk away from the Hunter Valley once coal is gone and who will take responsibility for long-term rehabilitation success? He requested Newcastle City Council to make a formal submission to the Panel

based on their recent decision to not support the coal export terminal. He made numerous other points about transitions to non-coal futures.

Michael Schien - General Practitioner

Dr Schien was concerned about flow-on impacts of the third coal loader and wants the Government not to go ahead with approval for the coal export terminal until there is a proper impact assessment of global climate change impacts. He recognised the importance of the local planning focus on Kooragang Island but wanted to discuss wider implications. He referred to an article on climate change impacts in the Hunter Valley (e.g. \$550M and a 3000 person wine industry suffering within 20 years) due to declining frost and dry warmer conditions. He described an analogy between individual health and not recognising broader contextual issues that affect health of the individual. He said the same duty-of-care should be applied to the proponents of the coal export terminal for long term health impacts. He approved of the Newcastle City Council capping of coal exports decision even though they had no regulatory approval or authority over coal exports. He said the Government has invested significantly in rail infrastructure development to meet coal expansion at Sandgate as outlined on the ARTC website. He said that decision makers for coal projects need to make themselves accountable for the health impacts of future generations as has the tobacco and asbestos industries. In response to a Panel question he said that dust has gone down in Newcastle but that he had no detailed knowledge of the air quality health impacts. He said he considers increased mine development in the future as a potential health risk.

3.0 Assessment of Key Impacts and Recommendations

3.1 Noise and Vibration

3.1.1 Environmental Assessment

The Noise and Vibration Assessment was undertaken by Heggies Australia Pty Limited and in relation to operational noise followed the requirements of the NSW Department of Environment and Conservation (DEC) Industrial Noise Policy (INP), which we consider is the appropriate document. This organisation has considerable experience from the operation of coal loaders at Kooragang Island, based on their

work undertaken on behalf of Port Waratah Coal Services at both their Kooragang Island and Carrington Terminals. For this reason, Heggies has a significant amount of noise data in the surrounding community compiled over several years.

In relation to construction noise and vibration, standard NSW DEC assessment procedures in Chapter 171 of the *Environmental Noise Control Manual (ENCM)* and the Vibration Guideline were also adopted.

In general, the approach to the noise and vibration assessment is considered comprehensive and marginally conservative in relation to assumptions about numbers of plant items and their locations on site and also the assessment of “amenity”. It considers both construction and operational noise, including all coal handling, rail and ship loading operations on site, but specifically excludes off-site rail noise and ship engines while berthed. It addresses these issues considering both the “intrusiveness” and “amenity” requirements of the INP.

In general, comments on the Noise and Vibration Assessment are most appropriately presented in conjunction with the comments contained in the submissions by the DEC and City of Newcastle, and hence detailed analysis of the Assessment is deferred to Section 3.1.2 of this report. However, some specific issues not addressed in those submissions are addressed in this Section.

3.1.1.1 Operational and Construction Vibration

Given the distances involved to the surrounding residential receivers, operational vibration is unlikely to be an issue in terms of human comfort and potential building damage. Even during the construction phase, vibration is unlikely to be an issue to surrounding residences, and even structures on adjoining sites, although the sensitivity to vibration of any structures on adjoining sites would need to be addressed by the building contractor is selecting their preferred construction methodologies.

No conditions with respect to vibration are required as it is expected the NSW DEC would adopt their standard vibration criteria for operation and construction when they licence the project.

3.1.1.2 Sound Power Levels

Following a tour of the Port Waratah Coal Services (PWCS) Kooragang Island facility, we consider as long as the proponent is committed to minimising noise and the procurement process is properly managed, the source sound power noise levels adopted by Heggies in their assessment of operational noise are appropriate and can be technically achieved, although this may be at a price premium we would still consider this to economically achievable.

3.1.1.3 Off-site Noise

This project will result in additional rail movements to the facility, and also ship movements and ship noise while the ships are berthed at the facility. Both of these increased activities have been previously assessed as part of ARTC operations and the Port of Newcastle's operations, with total rail / ship numbers incorporated in those separate assessments. For this reason the proponent has not considered the need to address them.

Whilst the assessment of cumulative noise impacts has addressed possible future activities on other sites and presumably includes existing rail and ship noise in the existing noise environment, it does not include the noise from additional rail and ship movements, although the proposed facility will assist in increasing these other movements.

To resolve the uncertainty of "double dipping" when assessing cumulative noise we have preferred to set criteria for the CET independently of all the other industrial noise sources, being mindful of the existing noise levels and also the "acceptable" and "maximum" amenity limits.

However, we consider for future projects it is useful for a noise assessment to present the noise levels from these sources, since the community will associate rail and ship movements with the CET rather than ARTC or the Port of Newcastle. This,

for example, is because the CET will be operating while the ships are in berth with their engines running and train noise would continue once the train is beyond the site boundary. This is not really different to the climate change argument to address the “flow on” impacts of your project where the implications would affect the same residents. Even if there is no opportunity to amend previous approvals and the potential cumulative impacts are not sufficient to refuse the proposed project, at least the information about all noise sources should be contained in the one document.

We consider this is a slight weakness in the way that noise is assessed on a project by project basis and consider more specific information for dealing with cumulative noise impacts should be required by the DoP and /or the DEC.

Recommendation N1: *Although the information would not affect the conclusions for this project it is recommended that all potential noise and vibration impacts, both on and off-site, as a result of any proposal should be presented in summary in the Environmental Impact Assessment, even if they are separately assessed elsewhere.*

3.1.2 Relevant Issues Raised in Submissions

A number of submissions made reference to noise by stating that the proposal will generate more noise, but provided no further comment. Submissions at the hearing by two residents living locally (Stockton / Mayfield) specifically indicated that noise was not a concern to them.

The only submissions in relation to noise which require specific consideration in the Panel Review were made by the DEC and the City of Newcastle. They raised a number of concerns which can be summarised as follows:

- Characterisation of a receiver area as suburban or urban
- Background and ambient noise levels
- Setting project specific noise level criteria
- Uncertainty regarding timing and position of noise barriers
- Uncertainty regarding conveyor routing
- Rail noise

- Ship noise
- Cumulative noise
- Use of alarms on-site

All of these issues have been dealt with in the proponents' response to submissions. The adequacy of this response is summarised and assessed in Section 3.1.3 of this report.

3.1.2.1 Noise Sensitive Receivers

Following our site visit, we concur with the view of the DEC and City of Newcastle, supported by the Department of Planning that in the context of the INP the residential areas of Fern Bay and Stockton should be considered as suburban rather than urban. Although the western edge of this residential precinct is visually and acoustically "connected" to the industrial area on the other side of the Hunter River, the expected character of this area is that it should be a quiet suburban area. It is considered that, probably as a result of minimal noise assessment, limited conditions in relation to noise and weak compliance enforcement in the past, noise levels have escalated to such an extent that the current acoustic climate may be described as urban.

It is considered that the assessment of noise using the amenity criterion in the NSW Industrial Noise Policy (INP) should be focused on what the noise climate should be or would ideally be in the future, rather than what it is now.

Recommendation N2: *The application notes to the DEC's NSW Industrial Noise Policy (INP) should be further updated to clarify the preferred approach to selecting the appropriate classification for a receiver area rather than just suggesting the land use manager should be consulted. Guidance to indicate the area classification is about what the noise climate ought to be including some simple examples would be most beneficial to the land use manager as well as the acoustical fraternity*

Fortunately, the suburban or urban classifications have a range of noise levels of 5dBA from the "acceptable" limit to the "maximum" limit such that the "maximum" limit for a suburban area is the same as the "acceptable" limit for an urban area. This

provides some flexibility in setting criteria such that the ultimate noise levels in an area will fall between “acceptable” and “maximum”.

Recommendation N3: *The Panel considers that for the suburban areas of Fern Bay and Stockton, the long-term goal should be to reduce noise levels to meet the “acceptable” limit for suburban areas, with the medium term goal to meet the “maximum” limit, accepting that on the western fringe of those suburbs noise levels currently may marginally exceed the “maximum” limits. This can be achieved by ensuring the CET achieves the noise limits recommended in this report..*

Given their much closer connection with the industrial areas and the proximity of busy roads, we consider that the other residential areas, generally to the south of the Terminal in Carrington, Mayfield and Warabrook areas, are correctly classified as urban.

3.1.2.2 Background and Existing Industrial Noise Levels

The Panel disagrees with the approach of the DEC to adopt lower Rating Background Noise Levels (RBLs) at night time on the basis that lower background noise levels were recorded during either the daytime or evening. This is a departure from their own application notes, which do not adjust the RBL but recommend adjusting the project specific criteria (if they are based on the “intrusiveness” criteria) so that the night is not higher than evening or day and evening is not higher than day. The Panel considers this approach may be valid in rural areas where the source of background noise during the survey may be extraneous and the result of insects (which is alluded to in the application notes), but not in an urban area where real noise levels have been measured over a reasonable period of time.

The Panel considers the DEC’s INP dual assessment approach of using intrusiveness and amenity should readily address these real differences that exist in the measured noise levels as it is likely that in an evening or night time period, if the RBL is higher, that the amenity criterion would dictate the project design and management.

On this basis, there should certainly be no adjustment to the RBL's as these are 'real' numbers generated by a defined process. The DEC in the application notes do recommend adjusting the project specific criteria to consider community expectations, however, as indicated above, the Panel does not consider this is appropriate in this situation where existing background noise levels appear to be a function of existing industry and transport.

We consider the intrusiveness criteria for the project should be those adopted in the EA report and summarised below (Table 1). It should be noted that the intrusiveness criteria are based on a typical worst-case 15-minute period, including those experienced under adverse weather conditions which enhance the propagation of noise.

Table 1 Proposed Intrusiveness Criteria Adopted in the EA Report

Location	Daytime	Evening	Night Time
Fern Bay West	55	47	49
Fern Bay East	45	49	47
Stockton West	47	49	49
Stockton East	46	48	48
Warabrook / Mayfield West	50	51	46
Mayfield	51	52	48
Carrington	47	46	42

With respect to determining amenity criteria, the DEC makes a comment about some uncertainty in how Heggies have estimated existing industrial noise levels in some of the surrounding residential areas based on their logging and attended measurements. The Panel considers that estimating existing noise levels is an extremely difficult and subjective process. However, in the absence of our own data or specific data provided by the DEC, we feel it is necessary to rely on Heggies understanding of the noise levels in the area developed over some time, and the noise modelling information they have generated from both this and other projects in the area, on which basis they have estimated existing industrial noise levels. Having said this, there will always remain some uncertainty with regard to the number and

types of noise sources which would contribute to the total future noise environment. For example, in the cumulative assessment undertaken in the EA, noise from proposed industry includes activities such as the dredging, but does not include the additional noise from ships running while at the berths. It is for these uncertainties that the Panel prefers to set amenity criteria for the proposed CET almost independently of the existing noise levels and the future cumulative noise sources as discussed below.

The amenity criteria established using the strict procedure adopted by Heggies and the DEC are dependent on the accuracy of this estimated existing industrial noise level, and do not fully account for the uncertainty about future industrial activity. An alternative approach which would also apply for this project would be to adopt a consistent criteria for each industrial facility (of which the CET is just one) which ensures that the total noise level from a number of sources heard at any receiver would generally remain within recommended “maximum” level, and preferably within the “acceptable” level, in the future.

Amenity criteria are not intended to relate to short-term annoyance, but are more aligned with long-term planning, and should therefore be based on a worst-case seasonal $L_{Aeq,period}$ level for the representative daytime, evening or night time period. On this basis, it is likely that existing $L_{Aeq,period}$ noise contributions are lower than suggested by Heggies (see Section 3.1.2.3). For this reason, as a sensitivity analysis, the Panel has also considered the implications for setting amenity criteria by assuming existing industrial noise levels are a further 3dBA lower than Heggies estimated. These are shown in Table 2. It must be remembered that the intrusiveness criteria are still able to control short term potential annoyance.

Given that the proposed operation is 24 hours a day, seven days a week, it is the night time amenity criterion which is the most sensitive and will drive the acoustic design of the project. Table 2 shows amenity criteria derived directly from the INP, using Heggies’ estimate of existing industrial noise and using a reduced estimate based on the Panels preference to use a seasonal $L_{Aeq,period}$ value. It also shows revised criteria based on the principle of some degree of sharing noise exposure between the proposed CET and other known or unknown future sources. The

determination of revised criteria assume that of the surrounding residential areas Stockton and Fern Bay are considered suburban areas, with the remaining residences being urban.

Table 2 Variability of Determining Night Time Amenity Criteria

Location	Area	Existing Industrial (Heggies Estimate)	Criterion using INP	Existing Industrial (Heggies Estimate - 3dBA)	Criterion using INP approach	Panel preferred Criterion considering sharing	Comment
Fern Bay	Suburban	48	38	45	35	37	Levels only increase by 1dBA in short term (and possibly remain above “maximum”).
West	Urban	48	38	45	37	-	
Fern Bay	Suburban	43	33	40	32	36	
East	Urban	43	41	40	43	-	When existing noise is reduced will result in levels between acceptable and maximum
Stockton	Suburban	48	38	45	35	37	
West	Urban	48	38	45	37	-	
	Suburban	44	34	41	32	36	
Stockton							
East	Urban	44	39	41	43	-	
Warabrook / Mayfield West	Urban	43	41	40	43	40	Levels allow for future sharing of noise amongst existing and future industry
Mayfield	Urban	44	39	41	43	40	
Carrington	Urban	42	42	39	44	40	

Table 2 shows the large range of different criteria which are determined using the INP approach, depending on which area classification is used and what existing industrial noise is adopted. This is particularly the case in Fern Bay East and Stockton East. The criteria preferred by the Panel consider both the existing noise level, the likelihood of other industrial noise and the ultimate goal of achieving the “acceptable” limit in the future or only marginally exceeding the “acceptable” limit, but remaining below the “maximum” limit. Meeting these criteria, which would be economically achievable, would result in only minor changes in existing noise impacts and would be considered acceptable.

Reviewing the criteria in a similar fashion to above for the day and evening time periods, considering existing noise levels, the likelihood of other developments in the area and the ultimate goal of achieving the “acceptable” levels in the long term we have established a revised set of criteria which should apply to the project.

Although we concur with Heggies assessment of the likelihood of sleep disturbance resulting from on site operations, it is always possible with the tight radius curves on the rail loop that excessive rail related noise may occur from squeal or flanging. For this reason it is suggested that the standard DEC sleep disturbance criteria are applied, such that there is a mechanism to force the proponent to address any unexpected noise generation.

Recommendation N4: *The following criteria should apply to the project noting that the intrusiveness criteria would apply under adverse conditions, with the amenity criteria relating to a seasonal average of the relevant day, evening or night time periods.*

Table 3 Recommended Criteria for the Project

Location	Area	Intrusiveness			Amenity $L_{Aeq,period}$			Sleep Disturbance
		$L_{Aeq,15min}$						$L_{A1,1min}$
		Day	Eve	Night	Day	Eve	Night	Night
Fern Bay West	Suburban	55	47	49	50	40	37	59

Fern Bay East	Suburban	45	49	47	50	40	36	57
Stockton West	Suburban	47	49	49	50	40	37	59
Stockton East	Suburban	46	48	48	50	40	36	58
Warabrook / Mayfield West	Urban	50	51	46	55	45	40	56
Mayfield	Urban	51	52	48	55	45	40	58
Carrington	Urban	47	46	42	55	45	40	52

3.1.2.3 Prediction of CET Noise Levels

The Heggies assessment is conservative in adopting an $L_{Aeq,period}$ level only 3dBA lower than the $L_{Aeq,15min}$ intrusive level. This may be representative of the difference in noise at source, however in terms of amenity the different noise levels over a worst-case season needs to be considered including both downwind and upwind propagation. The Panel consider that existing $L_{Aeq,period}$ levels when determined over a long period are would be between 5-10dBA lower than the $L_{Aeq,15min}$ level presented by Heggies.

On this basis, the amenity noise level predictions in the future are conservatively too high. This very important difference between $L_{Aeq,15min}$ and $L_{Aeq,period}$ for a worst-case season is often overlooked in acoustic assessments and in this case has been conservatively managed by Heggies.

We consider the project as described in the EA, based on the assumed source sound power levels and the mitigation measures proposed, will comply with the criteria outlined above, which would result in an acceptable noise environment. The following further work will be required during the detailed design and construction phase of the project, should it be approved, to consider the development of Noise Management Plans and a preferred procedure for Compliance Monitoring

Recommendation N5: *Operational Noise Management Plans: An Operational Noise Management Plan to the satisfaction of the Director-General should be prepared for the facility which includes the detailed noise control measures listed in Section 4.4 of the Noise Impact Assessment, the procurement process to guarantee*

that equipment noise levels meet the specifications, addresses the timing and triggers for construction of the rail noise barrier and most importantly outlines the proposed compliance monitoring regime.

Although the table in Recommendation N4 indicates intrusive and amenity criteria for daytime, evening and night time, the overriding criteria which dictate the design of the facility are the amenity criteria for the night time period. Given that these are based on a long-term average noise level, they are not readily transferred to a standard compliance monitoring condition.

The DEC has indicated that “at source” sound power level determination may be the simplest and only reliable method of assessing compliance. This requires acceptance of the changes in noise propagation for the various weather conditions which would exist over any season, which we consider is a reasonable approach in this situation. A simple approach to compliance monitoring would be to require noise levels to meet the limits indicated in the EA. However, this does not allow the proponent any flexibility in the sound power levels of some items being marginally higher and some marginally lower.

A preferred solution would be to use the information in the EA to determine an overall sound power level emission level for the whole site, based on the sum of all items included in the noise model. This would be measured by an audit of individual items on an annual basis, or by more sophisticated measurements at the site boundary which can detect noise from the different operations.

Although in some residential receiver areas the contribution from the CET may be small compared with either traffic or other industrial noise it is the cumulative effect of a number of industrial sources which may be a few dBA higher than they could be which results in overall noise levels creeping too high. In a noise environment where it is accepted that noise levels are already too high it is imperative that all new noise sources strictly meet their noise limit at all times, even if their overall contribution is not the most significant. Given the complexity of this total noise environment, the ability to combine real time equivalent on site noise levels and prevailing weather

data to determine compliance with the nominated criteria at the receiver areas identified in the EA is essential.

Recommendation N6: Compliance Monitoring: *The proponent, as part of their Operational Noise Management Plan, should nominate a compliance monitoring protocol to the satisfaction of the Director-General. This, in a similar fashion to air quality, may be a combined system with PWCS. The system as a minimum must allow the proponent to accurately identify their noise contribution in the presence of another coal loading facility, other industrial noise and surrounding traffic noise. This could be by measurement alone or a combination of source level measurement and prediction. If prediction methods are to be used these must be validated on site under the various prevailing meteorological conditions.*

3.1.3 Adequacy of Response to Submissions

The Panel considers the response to submissions has been satisfactory, either as a result of written submissions or information gleaned during the site tour and hearing sessions. Only two submissions require further comment as follows.

3.1.3.1 Locomotive Class

In relation to the proposal to limit the class of locomotives used at the facility, the Panel considers any limit should only relate to a sound power level of the locomotive under various operating conditions rather than a particular locomotive class. However, given the likely variety in the total number of locomotives which could be used at the facility and the noise modelling which is based on the rail sidings being full, we consider it is not practicable to limit all locomotive types to a certain sound power level. We recommend a condition to address this issue should be as follows:

Recommendation N7: *The $L_{Aeq,1min}$ noise level, of at least 95% of all locomotives which arrive at the facility over any season shall be less than ??dBA at high idle (to be agreed in conjunction with Heggies) when measured at 15m from the centre of the track. For the 5% of locomotives which may be louder than the nominated high idle noise level, the allowable increase in level for any individual locomotive shall be no more than 5dBA. The proponent shall provide a test certificate for each locomotive*

type which arrives at the facility and provide a record of the mix of locomotives which have used the facility on a six monthly basis. In addition on a six monthly basis all locomotives which arrive at the CET between 7.00am and 5.00pm on two consecutive days shall be tested at high idle.

3.1.3.2 Construction Noise

In relation to construction noise, the Panel raised one concern about the timing of the proposed 1500m noise bund along the southern side of the stockpile yard which is to provide benefits during the operational phase. In response to submissions, it was confirmed that this mounding would be provided during the construction phase. Our query actually related to the timing of the provision of this mound and we expected some commitment by the proponent that it would be provided as early as practicable during the construction preloading phase to ensure shielding to residences to the south of all later construction activities. Whilst this bunding is not necessary to meet daytime construction noise limits, if there is nil or negligible costs in providing this barrier sooner, lower construction noise levels would occur, which may result in some activities being inaudible rather than audible. This is clearly a desirable outcome and we would expect the proponent to be able to make this commitment or justify why it is not practicable.

Recommendation N8: *No specific conditions with respect to construction noise and vibration are required as it is expected the NSW DEC would adopt their standard construction noise and vibration criteria when they licence the project*

Recommendation N9: *A Construction Noise and Vibration Management Plan should be prepared which as a minimum deals with the justification for timing of the bund and identifies any surrounding structures or buildings which may be sensitive to vibration.*

3.2 Air quality impacts, particularly dust and cumulative dust impacts

3.2.1 Approach to the Air Quality Assessment

Local air quality impacts associated with the proposed facility have been assessed in accordance with the approach outlined in the NSW DEC's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*.

The software utilised by Holmes Air Sciences to predict air quality impacts is AUSPLUME, which is the approved dispersion model for use in most applications in NSW. The model is appropriate for this particular application.

The emissions from all potential onsite dust-generating activities associated with the proposed facility were estimated using standard United States Environmental Protection Agency (US EPA) and National Pollution Inventory (NPI) emissions estimations techniques. This is the accepted practice for estimating dust emissions for use in dispersion modelling.

The meteorological data used for the modelling was sourced from the nearby Steel River weather station. This site is representative of conditions at the proposed coal loading facility. The derived meteorological parameters (*viz.* stability class and mixing height) required by the dispersion model have been estimated using the recommended US EPA and NSW DEC methodologies. These are acceptable to the Panel.

The model has been used to predict particulate matter less than 10 µm (PM₁₀) and total suspended particulate (TSP) concentration and deposition in the vicinity of the proposed facility for the single meteorological year selected for modelling (2001). The use of a single meteorological year for modelling is acceptable practice according to the NSW DEC guidelines as long as the year selected for should adequately describe the expected meteorological patterns at the site.

Accuracy of modelling is highly dependant on *inter alia*, the quality of emissions data and meteorological data. This is especially relevant with respect to dust modelling. No level of confidence was attached to the modelling results presented in the Air Quality Assessment. However, the Panel considers that the uncertainty inherent in

the modelling is of acceptable magnitude in this particular context, and typical of that expected in an impact assessment.

Recommendation A1: *It is recommended that the uncertainties associated with modelling the dust impacts should be addressed by a model validation study to be undertaken once a full year of onsite monitoring becomes available. The model validation study should make use of data collected in accordance with Recommendation A2, and focus on TSP, PM₁₀ and dust deposition.*

3.2.2 Air Quality Impacts

The impacts associated with the proposed coal loading facility have been listed in the EA as being within acceptable limits (*i.e.* within the NSW DEC's Air Quality Goals). Cumulative impacts have been assessed by adding each hour of the modelled concentration to the corresponding hour monitored at Beresfield (approximately 15 km to the northwest). This methodology is in accordance with the approach outlined in the NSW DEC's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*.

The Panel is of the opinion that the local air quality impacts and associated incremental human health risks are acceptable, given the high degree of “buffer” between predicted cumulative concentration and the relevant DEC Air Quality Goals.

3.2.3 Relevant Issues raised in submissions about Air Quality Impacts

The panel believes that the greatest air quality issues of concern directly arising from the Terms of Reference are:

- Establishment of an adequate particulate monitoring program, and
- Regional cumulative impacts of air emissions.

However, the issue of global climate change was raised extensively in submissions, reflecting heightened concern in the community about increased worldwide coal combustion and the role of increased exports through the proposed coal loading facility. This issue will not be discussed here as it is addressed in Section 5.0.

A minor issue is the local impact of air contaminants from soils transported from the site by truck during development of the rail infrastructure corridor (see Recommendation A3).

The establishment of a robust air quality-monitoring program is a critical component of the Air Quality Management Strategy for Kooragang Island. It has been proposed that a network of dust deposition gauges and a high volume air sampler (HVAS) be installed at Stockton. Overall, the proposed monitoring network is adequate. However, the HVAS is limited in that it samples for a 24-hour period every six days. This periodic sampling by the HVAS can easily lead to instances of high particulate concentration not being sampled. The use of a continuous dust monitor will allow for all peaks in particulate concentration to be identified and quantified, and potentially be used for site management. This continuous monitoring data should also be used for model validation purposes (see Recommendation A1).

Recommendation A2: *It is recommended that an integrated air quality-monitoring program be installed as part of the consent condition. The establishment of a joint monitoring program between Newcastle Coal Infrastructure Group and Port Waratah Coal Services is encouraged. The monitoring program should not be restricted to the HVAS and dust deposition gauges proposed in the Environmental Assessment. Continuous monitoring should also be undertaken through use of a Tapered Element Oscillating Microbalance (TEOM) should also be installed as part of the monitoring network. Siting of the TEOM should be based in the closest residential area likely to be affected by dust emissions for the coal loading facilities. Monitoring results should be presented regularly to the community through the Internet and be provided in hard copy on request. The monitoring program should be independently reviewed annually to assess whether further monitoring is warranted.*

Recommendation A3: *It is recommended that the transport of soils (contaminated or otherwise) from the site should be on covered trucks to minimise emissions during the transportation associated with the development of the rail infrastructure corridor. In addition, normal dust suppression methods (typically watering) should be employed to minimise potential emissions from the site and from transported material.*

3.2.4 The adequacy of the proponent's response to the issues raised in submissions.

The proponent's response to issues raised in submissions relevant to air quality is generally adequate. A minor exception is the response to the concerns raised about the potential for release of air contaminants associated with the Kooragang Island Waste Emplacement Facility during development of the rail infrastructure corridor. This has been addressed in Recommendation A3.

Submissions also raised the issue of air emissions from transport sources. In the context of the NCIG proposal, the Panel considers that the absence of any assessment of transport emissions is not a significant problem, but it notes that transport emissions in general are important in urban areas, leading to both local and regional impacts. It would be preferable that transport emissions be considered in future assessments, where their impact on air quality is considered to be potentially significant.

3.2.5 Other Air Quality Issues

The issue of regional air quality impacts was raised during the hearings. In particular, concern was expressed about the "piecemeal" approach to air quality management in the Hunter Valley, with assessments for each facility being conducted in isolation from other sources and associated infrastructure. For example, the NCIG study was limited to impacts of emissions from within the facility boundaries. Emissions from increased shipping, rail and road traffic was not included in the assessment.

Although outside the scope of the current Terms of Reference, the Panel nevertheless considers it sufficiently important to recommend that strong consideration be given to an integrated regional air quality study for the lower Hunter Valley. The study should include, where possible, the modelling of all existing and future sources of TSP, PM₁₀, PM_{2.5} and other identifiable sources within the region. Emissions from mines, industrial facilities, transport routes and port activities should be included in the modelling. Validation of the model result against monitoring data as well as a quantitative health risk assessment should also be undertaken as part of this study.

3.3 Ecological impacts, particularly on amphibian and avian species, endangered ecological communities, and surface water and groundwater dependent ecosystems.

3.3.1 Ecological Impacts

Some Comments by the Panel on the Ecological and Industrial History of the Kooragang Island Industrial Area

According to the NCIG EA, the proposed Coal Export Terminal will be located in an area of Kooragang Island that has been extensively modified by the disposal of dredged sediments, coal washery rejects and industrial slags and waste materials over many decades. The area is currently zoned for industrial land use and further development. On the existing site, modifications caused by landfill operations have raised the surface profile in different locations on the NCIG site by some 2-12m above the original surface level of Kooragang Island. These elevation changes would have resulted in extensive eco-hydrological changes in newly constructed landforms, established suitable conditions for new vegetation patterns and provided opportunistic habitat conditions for colonising species of fauna and flora in the industrial areas of the proposed NCIG Project site.

An account of the vegetation dynamics and habitat changes over three decades on the non-industrial areas of Kooragang Island has been prepared by Buckney (1987), who evaluates two hypotheses for habitat change, namely: (i) man-made changes to the island and the Hunter River catchment and estuary, and (ii) the impacts of long-term climate change since 1946. Buckney (1987) discusses the spread of mangroves into areas occupied by saltmarsh species during periods of above average rainfall since 1946 and the loss of vigour of these mangroves and reappearance of saltmarsh species during periods of drier summers (1978-1983). Buckney (1987) makes the point that these habitat types on Kooragang Island are biologically very distinct from each other and consequently changes in these habitats can be expected to have marked impacts on the fauna, and particularly the avifauna, of the study area.

The Panel reviewed a series of aerial photos that record landfill construction (1954, 1974, 1975, 1979, 1980, 1983, 1984, 1987, 1988, 1989, 1993, 1996, 1997 and 2001). It is clear that the landfill operations have extensively disturbed and reshaped the project site and created a series of constructed habitats in the form of deep relatively freshwater ponds, shallow shorelines, open channels and shallow surface impoundments that did not exist before industrial operations. Over the decades, it appears that these constructed habitats have been colonised by a limited range of exotic and native species of flora and fauna, including an abundance of waterbirds, particularly in Deep Pond. Gosper (1975) anecdotally mentions that an abundance of Green and Golden Bell Frog occurred in Big Pond, presumably during wetter periods in the 1970s. While on the site visit the Panel learned that Big Pond had been further modified by surface drainage works in the last decade and has taken on the character of a grassy sward. These ecological changes have been documented by NCIG in Section F4.3 of the Fauna Assessment in the EA.

These brief comments on the industrial and ecological history of the proposed NCIG Coal Export Terminal site on Kooragang Island recognise the dynamic colonising ability and persistence of populations of fauna and flora species currently occupying constructed habitat now present on the site, particularly Green and Golden Bell Frog. However, the Panel considers the extensive industrial disposal operations, and the significant disruption to the eco-hydrology of the site, to be an important contextual consideration when assessing the ecological impacts of the NCIG Project; in particular for fauna and flora species and endangered ecological communities and their persistence on the proposed NCIG Project site.

3.3.2 Relevant ecological issues identified in the Panel ToR and raised in submissions in regard to ecological impacts

3.3.2.1 Surface Water Dependent Ecosystems and Avifauna

Most of the focus in submissions on surface water dependent ecosystems was centred on the biodiversity value of Deep Pond, particularly for avifauna. The air photos in the EA show that Deep Pond is the largest enclosed water body in the Hunter Estuary and has remained a relatively stable and open fresh-to-brackish water body for at least 20-25 years since initial construction of the railway

embankment. Consequently, it is not surprising that Deep Pond is an important refuge for waterbirds in the Hunter Estuary, particularly during times of drought in inland and coastal NSW. However, the relatively freshwater habitat condition of Deep Pond would appear to be entirely dependent on the maintenance of the weir structure on the southern arm of the Hunter River. Consequently, excluding saltwater intrusion and maintaining flows of freshwater from the use of the pond as a surface water impoundment, as part of the stormwater management of the Kooragang Island industrial area will be critical for maintaining the ecosystem value of Deep Pond. In addition, the long term status of Deep Pond as waterbird habitat is also dependent on whether there will be further industrial development of Deep Pond by the landowner, Regional Land Management Corporation (RLMC), in the future and under what conditions and compensations.

According to the project description in the NCIG EA there will be extensive and irreversible habitat changes to surface water ecosystems in parts of the site such as Big Pond. Habitat changes along the rail access loop will be more confined and mitigated by culverts to manage surface water flows and habitat conditions. Construction of the proposed railway embankment across Deep Pond would result in the development of different habitat conditions than exist at present. Deep Pond would still remain a large water body in the Hunter estuary and continue to provide significant habitat for avifauna. Some changes to shoreline habitat may favour some species of avifauna and disadvantage other species. And there would be reductions in the area of available open water habitat for birds in the southern part of Deep Pond. That said, the southern area of Deep Pond would still be in the order of 200m by 150m and the northern end of Deep Pond would be 300m to 500m in area.

International literature has been accessed by the Panel to review disturbance impacts to birds caused by a range of construction works and human interference (Hockin et al. 1992; Burton et al. 1996; Hill et al. 1997; Gill et al. 2001; Burton et al. 2002; Baldi 2005). Unfortunately, the Panel did not find similar studies for construction impacts and disturbance of birds on Australian wetlands and water bodies, and so the value of European studies needs to be understood within that knowledge constraint. Nonetheless, two of the studies reported on long term monitoring data sets (Burton et al. 2002 for 11 years); Baldi 2005 for 12 years). In

addition, many of the issues that were identified as characteristics of bird disturbance impact and changes in habitat caused by construction would likely be similar for local Newcastle conditions. These include the impacts on the energy balance and nutritional requirements for bird populations subject to frequent human disturbance; the dynamics of bird populations in edge habitats on shorelines where water levels and habitat quality are fluctuating; changes to vegetated margins and edge habitats over time that favour some species of birds over others; and some of the broader climatic influences that would be more pronounced in Australia, such as prolonged drought impacts on bird populations.

Hill et al. (1997) recommended the establishment of a suite of studies at local population scale, regional population scale and flyway scale in order to understand the impacts of cumulative bird disturbance from human interventions. The Panel agrees that this sort of hierarchical approach would be required to understand the dynamics of local bird monitoring data for Deep Pond over a 20 year monitoring period, as called for by DEH. The Panel does not agree with the predictions and assertions in some submissions that avifauna habitat in Deep Pond would be automatically lost if the railway embankment were built. However, the habitat changes could be enhanced through integrated planning and design that incorporates habitat construction considerations into embankment construction. In addition, a well-designed monitoring and evaluation program for Deep Pond would be able to provide very useful before-and-after construction information for designing compensatory habitat and managing construction impacts on avifauna in other sites in the region.

The Panel considers that these construction impacts on Deep Pond, Big Pond and other smaller surface water bodies on Kooragang Island are acceptable and can be mitigated and compensated adequately by the range of measures described in Section F4.3 of the Fauna Assessment and the NCIG Response to Submissions. In addition, the development of an integrated planning and design approach to habitat construction, particularly the development of reed beds, would also be a useful mitigation for the *Australasian Bittern* (*Botaurus poiciloptilus*). This rarely seen species has been sighted within the Project area by HBOC. However, the Panel

does not consider the species threatened by the NCIG Project because of its wide distribution. (McKilligen, 2005)

The Panel also considers that the ongoing value of Deep Pond as waterbird habitat is very dependent upon maintenance of the eco-hydrological conditions provided by the Hunter River weir and surface drainage pathways. These structures would appear to be outside future NCIG control. The Panel considers that any significant off-site changes to the hydrological conditions would be a significant threat to the future value of waterbird habitat in Deep Pond. NCIG would need to maintain open communication with RLMC and DEC to make sure that any future changes to surface hydrology on Kooragang Island are taken into account in terms of maintaining the habitat quality of Deep Pond and NCIG commitments.

3.3.2.2 Groundwater Dependent Ecosystems

Although a consideration listed in the ToR for the Panel, we did not hear of any significant concerns raised by the public about groundwater dependent ecosystems. However, it is clear from the EA and the site visit that construction works will require surcharging of site soils and sediments with a layer of fill material that is intended to compact and consolidate the soft sediments before construction. This will clearly change the surface water hydrology and shallow groundwater conditions on the site in the areas of construction. As pointed out by Buckney (1987) subtle changes in surface hydrology, climate variability and the salinity of soils in saltmarsh and mangrove areas on Kooragang Island would lead to changes in the distribution and extent of these two habitats and their associated fauna.

The Panel concludes that dynamic changes in vegetation patterns and fauna presence and absence are likely to occur as a result of construction works changing the eco-hydrological conditions of surface water and groundwater dependent ecosystems. These sorts of eco-hydrological changes have been observed and documented for Big Pond, as detailed in the Fauna Assessment of the EA. The Panel considers these construction impacts in an existing industrial landscape are acceptable as part of the NCIG Project and that the ecological impacts are adequately compensated by the range of measures outlined in Section F4.3 of the Fauna Assessment in the EA and the NCIG Response to Submissions.

3.3.2.3 Amphibian Species

Many submissions referred to the Green and Golden Bell Frog. This species is well known to occur in coastal New South Wales in locations that have been affected by human disturbances such as sand mining and quarrying where newly constructed habitat has been developed through industrial activity. Pyke and White (1996) visited 74 sites of 155 sites where Green and Golden Bell Frog have been known to occur including 43 sites where the species has been recorded since 1990. They identified a set of physical, hydrological and biological considerations, including the absence of the Mosquitofish (*Gambusia holbrooki*).

The effective planning, design and development of compensatory habitat to offset the impacts of habitat loss can benefit from what has already been learned by biological studies of species that occur across a spectrum of natural, agricultural, urban and industrial sites affected by construction. For example, Pyke and White (1996) suggested that the development and management of artificial breeding habitat could be informed by guidelines based on their habitat observations of the successful breeding sites for Green and Golden Bell Frog.

Subsequently, Hamer et al. (2002a; 2002b) showed the benefits of additional research that can be applied to developing and understanding what's required to develop compensatory habitat. They conducted laboratory studies (Hamer et al. 2002a) on the interactions of Mosquitofish and Green Golden Bell Frog and more densely sampled field investigations on Kooragang Island itself (Hamer et al. 2002b). They found that Mosquitofish had no significant influence on the presence of Green and Golden Bell Frog or its larvae at the 43 waterbodies that they sampled on Kooragang Island. They identified bank vegetation as a key indicator of suitable habitat, particularly the presence of three plant species, *Juncus kraussii*, *Schoenoplectus litoralis* and *Sporobolus virginicus*. They advocated a landscape-based approach to habitat creation and management with an emphasis on siting new Green and Golden Bell Frog habitat in close proximity to existing habitat, encouraging bank vegetation and implementing management measures for controlling potential damage to frog populations caused by Mosquitofish in infested permanent ponds (Hamer et al. 2002b).

The Australian Government Department of Environment and Heritage (DEH) have considered the Green and Golden Bell Frog as part of their determination under the EPBC Act. They list a range of habitat establishment measures that will need to be undertaken during construction and operations that are similar in type and effect to Hamer et al. (2002b) and Pyke and White (1996). The Panel is in general agreement with this DEH advice although there should be flexibility in the requirement to remove Green and Golden Bell Frog found on the site during construction and operation to similar habitat within the Kooragang Nature Reserve. The Panel considers that this DEH requirement for off-site transfer of frogs to Kooragang Nature Reserve would be useful from time to time. However, there will also be useful and convenient opportunities to remove frogs that are threatened by disturbance on one part of the NCIG project area to other parts of the NCIG site that have suitable habitat and no disturbance. In other words, adaptive management should be an inherent part of managing individual frogs from the Green and Golden Bell Frog population on the proposed NCIG Project area.

3.3.2.4 Endangered Ecological Communities

There are two Endangered Ecological Communities (EEC) represented on the NCIG Project site, abbreviated in the EA as Coastal Saltmarsh EEC and the Freshwater Wetlands on Coastal Floodplains EEC.

Approximately 3ha of the Coastal Saltmarsh EEC would be disturbed out of an area of 5700ha that was estimated in NSW in 1985. Coastal Saltmarsh is vulnerable to disturbance and habitat loss through a range of factors including changes to surface hydrology, mangrove incursion, invasive species, urbanisation and agricultural practices (Laegdsgaard, 2006). The 3ha on the NCIG Project site occurs mostly in Big Pond and has been disturbed by industrial activity. There is knowledge available to aid in recovery and restoration of saltmarsh (Laegdsgaard, 2002) and local experience successfully restoring coastal saltmarsh at Ash Island undertaken by the Kooragang Wetland Rehabilitation Project (Laegdsgaard, 2006).

Consequently, the mitigations and compensations described by NCIG in the EA are considered by the Panel to be adequate for the loss of the relict Coastal Saltmarsh

EEC on the project site. In particular, the Panel considers the offer by NCIG to finance the removal of 6ha of mangroves that have invaded saltmarsh habitat on Ash Island is an example of a suitable habitat compensation for Coastal Saltmarsh EEC lost on the project site.

The Freshwater Wetlands on Coastal Floodplains EEC occupies approximately 50ha comprised of 6ha affected by the rail development and 44ha for the coal storage area, covering Big Pond. The EA reports that the NSW Scientific Committee estimated that there were 3,500ha of the Freshwater Wetlands on Coastal Floodplains EEC in the lower Hunter – central Hunter region in the 1990s. The EA indicates that Big Pond was artificially created and manipulated as a constructed wetland providing foraging habitat for shorebirds. The air photos in the EA show the development of the site and Big Pond as an industrial area. The loss of Big Pond has been previously compensated for under other plans proposed by the NSW Government in the BPHOS Report as indicated in the NCIG EA. Therefore the Panel sees that no further compensation is required for the loss of the degraded Freshwater Wetlands on Coastal Floodplains EEC found on the NCIG Project site.

3.3.2.5 *Zannichellia palustris*

The aquatic plant, *Zannichellia palustris* was raised in numerous submissions as an ecological issue, probably because it is listed as an endangered plant in NSW. The Panel has reviewed the information provided in the Flora Assessment in the NCIG EA and is of the opinion that the NCIG project would not have adverse impacts upon the distribution of *Zannichellia palustris*.

However, the recent paper by Greenwood and DuBowy (2005) points out that this plant's primary habitat range would appear to be Western Europe and North America, and its presence in the Southern Hemisphere may be related to trans-national shipping. Sainty and Jacobs (2003) also point out that this plant is a minor weed of irrigation channels in some western districts of the USA. Greenwood and DuBowy (2005) show in laboratory trials that the plant has high fecundity and therefore is not limited in its distribution potential. Germination patterns suggest that cool water, cold stratification and low salinity are optimal germination conditions and that the Hunter estuary would not be optimal habitat for this plant.

Greenwood and DuBow (2005) raise the possibility of an alternative hypothesis to *Zannichellia palustris* being an endangered native plant in NSW. Based on the scientific evidence it may be an exotic plant that has recently arrived in NSW and the River Murray in South Australia.

The Panel considers that this alternative hypothesis raised by Greenwood and DuBow (2005) is worth testing because this plant has now attracted considerable attention and effort on the part of NCIG as part of the environmental assessment and planning processes in NSW because it has been labelled as 'endangered'. A study of the population genetics of the Newcastle populations using DNA techniques and comparing the populations to collections of herbarium material from South Australia, Western Europe, North America and South America would be a very insightful way to test this alternative hypothesis. Such a research project would form a useful Honours level study at a university, such as the University of Newcastle. From a conservation biology perspective, it would contribute to a better understanding of the scientific basis for managing endangered species where there is some question about the actual provenance of the species; in other words, to determine if *Zannichellia palustris* is endangered or exotic.

Recommendation E1: *The Panel recommends that NSW DoP lead discussions with key stakeholders in DEC, NCIG and the University of Newcastle to undertake a research project on the population genetics of Zannichellia palustris in order to determine whether or not it is likely to be a recent exotic introduction. If on the weight of the scientific evidence it is shown to be a recent exotic introduction then DEC would need to address the endangered listing of Zannichellia palustris in NSW.*

3.3.3 Summary of Ecological Impacts and Recommendations

After due consideration the most relevant ecological impacts raised in submissions to the Panel can be best sorted into three scales of interaction, namely local, regional and global ecological impacts.

Local Project-scale Impacts

The Panel considers the following local scale issues would require further comment and commitment by NCIG as part of the EA process, particularly during the development of the Flora and Fauna Management Plan.

Compensatory habitat arrangements remain unclear to key stakeholders.

A series of on-site mitigations of ecological impacts and off-site compensatory habitat measures have been proposed in the NCIG EA and the NCIG Response to Submissions to address the identified ecological impacts. The Panel finds that these mitigations and compensations are technically adequate for amphibians, avifauna and endangered ecological communities.

However, based on verbal submissions the Panel believes that more attention will need to be paid to the process of effective consultation and communication with key stakeholders, such as the Kooragang Wetlands Rehabilitation Project during the implementation of planning, design, construction and maintenance of compensatory habitat. The Panel considers that this effective consultation will need to commence during preparation of the Flora and Fauna Management Plan and subsequent implementation of compensatory habitat construction. In addition, in recognition of the difficulty in planning, designing and developing suitable and sustainable habitat for species such as the Green and Golden Bell Frog it is imperative that NCIG become an active participant and stakeholder in ongoing ecosystem development of the compensatory habitat.

In short, NCIG needs to not only finance but remain responsible for the overall success of their compensatory offsets. In particular, the success of NCIG's compensatory habitat program should not rely on volunteer labour at the Kooragang Wetlands Rehabilitation Project or other sources of voluntary support at the Kooragang Nature Reserve. The Panel considers that these ongoing financial and management commitments need to be locked in as part of the development consent while fully recognising the need for adaptive management of long term ecosystem rehabilitation and habitat creation projects.

NSW Department of Environment and Conservation (DEC) reviewed the NCIG EA and provided their advice on Flora and Fauna and compensatory habitat to the NSW Department of Planning and the Panel as a Submission. The DEC called for careful site selection, planning and design by NCIG of its compensatory habitat and a recognition of the difficulty of achieving viable habitat for vulnerable species such as

the Green and Golden Bell Frog, based on their local experience. In addition, DEC called for a commitment of adequate funding and resources for ‘the ongoing adaptive management and maintenance of the offsets identified in the Environmental Assessment, including the projects already commenced to offset the Big Pond site’. DEC recommended that ‘funding should be managed by a board, trust or other mechanism that provides a sound and legally enforceable means of allocating resources for ongoing adaptive management and review of the performance of the projects’.

The DEC concluded from its review that it can support a project approval for the Coal Export Terminal, subject to a number of appropriate consent conditions which it provided to NSW DoP. The Panel agrees with these assessments and conclusions made by DEC in relation to ecological impacts on the site and particularly endorses the call for a commitment of funds from NCIG for ongoing adaptive management and review of the performance of compensatory habitat projects. In addition to the planning and design of compensatory habitat, the Panel also emphasises the need for careful design of monitoring and evaluation of ecological impacts and compensatory habitat projects.

Recommendation E2: *It is recommended that NCIG, in consultation with DEC and KWRP, clearly identifies and defines the governance structures, mutually agreed long term financial commitments, management arrangements, habitat targets and timelines entered into by NCIG for successfully achieving the compensatory habitat outcomes. This consultation and decision process should be an integral part of the development of the Flora and Fauna Management Plan,*

Proposed railway embankment alignment across Deep Pond will result in the loss of a regionally important bird habitat.

The Australian Government Department of the Environment and Heritage (DEH) considered the NCIG referral in terms of matters of ‘national environmental significance protected by the Australian Government under the EPBC Act.’ DEH found that the action is not a controlled action provided that it is taken in accordance with the manner described in their decision document. In particular, DEH pointed out that NCIG had committed to consult with DEH prior to the construction of the optional

high capacity northern rail spur and rail sidings, if NCIG determined that construction was required in the future. DEH requested that NCIG notify them 'at least 24 months prior to construction, if it proceeds, and provide an assessment of potential impacts and any necessary mitigation measures to avoid significant impacts on listed shorebird habitats within Deep Pond'. DEH flagged the possible requirement for further referral of the northern rail spur component of the project under the EPBC Act if it is not possible to demonstrate that significant impacts can be avoided. DEH called for baseline monitoring of migratory shorebird usage of Deep Pond in order to make an informed decision.

The Panel considers that the DEH requirements for NCIG to consult with DEH and assess impacts before embankment construction provides a useful review process for minimising impacts to avifauna on Deep Pond. However, the Panel considers that the DEH recommendations for bird monitoring will require more work by NCIG during preparations of the Flora and Fauna Management Plan.

Recommendation E3: *That NCIG recognise the regional importance of Deep Pond as a coastal bird refuge, particularly during drought, and continue to explore options to avoid crossing Deep Pond in order to integrate biodiversity conservation as well as engineering and economic considerations into the industrial development. If there are no feasible alternatives then the embankment construction should consider developing shallow wading habitat along the edges of the embankment to enhance habitat diversity for shoreline birds in Deep Pond.*

Monitoring the dynamics of bird populations on Deep Pond.

The Panel considers that an annual report including bird population monitoring data for Deep Pond, as called for by DEH under the EPBC Act, would be useful for understanding the before-and-after impacts of railway embankment construction on bird populations and the importance of Deep Pond as a regional avifauna refuge. There would be significant scientific challenges in designing such a bird monitoring and evaluation program to deliver useful and meaningful results that will contribute to a long term understanding of bird dynamics on Deep Pond and in the Hunter estuary. For example, bird numbers could fluctuate seasonally and annually and are more likely to fluctuate widely depending on regional rainfall events and prolonged drought rather than local impacts before or after embankment construction.

Consequently deciding on what questions are to be asked and need to be answered will be a key requirement in the design of a monitoring and evaluation program for bird populations that will inform environmental impact assessment and aid management decisions. Such a bird monitoring and evaluation program must also account for ecosystem dynamics caused by climate variability and external disturbances within the region. The Panel considers that to be useful the monitoring program needs to be set within a well planned suite of bird ecology studies that address the cross-scale spatial interactions. These interactions include the local level habitat quality of Deep Pond within the habitat availability and suitability of the Hunter estuary and the broader drought characteristics and habitat availability in south-eastern Australia. This form of spatial biodiversity assessment has been identified in a recent review of biodiversity predictions in environmental impact statements for road and railway projects from four European countries by Gontier et al. (2006) as an important area for improving environmental assessments.

The aim of these bird ecology studies would be to conduct well-designed site-specific field surveys, observations and experimental treatments to collect data to determine how birds use different habitat in Deep Pond. The studies would aim to determine the important avifauna habitat components that attract different species of birds to Deep Pond. This information could then be used to design and construct experimental habitats, such as shoreline features of vegetation treatments, and to observe bird interactions in similar habitats in Deep Pond and elsewhere in the Hunter estuary.

The information could be evaluated as part of the annual monitoring requirements under DEH and used to assess impacts that would then aid shoreline habitat design as part of any future embankment construction across Deep Pond. This approach is consistent with the DEH advice that further referral of the railway embankment component may be necessary if it is not possible to demonstrate that significant impacts can be avoided.

Recommendation E4: *It is recommended that in complying with the monitoring conditions set by DEH under the EPBC Act and being able to interpret the results of monitoring data against a background of ecological uncertainty, that NCIG be required to fund the conduct of a series of bird ecology studies in addition to the presence/absence monitoring of bird species on Deep Pond. The reason for this recommendation is that presence/absence data alone will not provide much insight into the habitat quality and ecosystem dynamics of Deep Pond or how birds would actually behave if an embankment were to be constructed in the future. An experimental approach needs to be established to study how birds might change their behaviour if an embankment was to be constructed across Deep Pond in order to identify how habitat quality can be integrated into construction and any adverse impacts can be designed out of future construction.*

3.3.4 The adequacy of the proponent's response to the local Project-scale ecological issues raised in submissions

Despite considerable criticism by the public of the adequacy of the NCIG EA during the submissions, the Panel considers that NCIG has adequately responded to the local Project-scale ecological issues raised in the submissions; provided that NCIG adequately addresses the above local scale recommendations before construction of compensatory habitat and the northern spur line embankment across Deep Pond.

The adequacy of the Proponent's response to regional and global ecological impacts is set out in following sections.

3.4 Regional and Global Ecological Impacts Raised in Submissions

There were regional and global scale ecological issues raised by the public that are considered relevant for assessment by the Panel and connected to the NCIG Project.

For example, the NCIG EA reports the regional and broader socio-economic benefits of the NCIG CET proposal as part of the Hunter Valley coal supply chain. The Panel considers that it is reasonable to expect that the regional and broader ecological costs and benefits will also be recognised and analysed at the same level as the socio-economic benefits in the NCIG Project process.

The Panel recognises that regional issues are difficult and more complex to respond to directly than the local Project-scale requirements for the EA process covering the proposed NCIG project and its industrial operations on Kooragang Island. Addressing regional and global ecological issues and cumulative impacts is also a more complicated process because to address them effectively would require policy development and commitments by the NSW Government and the Federal Government respectively. The Panel recognises that those activities largely fall outside the ability of NCIG to respond to them effectively within this EA process. However, the Panel believes that these regional and global ecological issues can not be dismissed from consideration by the Panel nor NSW DoP or NCIG. Accordingly, the Panel has attempted to address the regional and global ecological issues raised by the public and recognised by the Panel as connected to the NCIG project, in the following sections of the report.

Regional Scale Ecological Issues

There were many issues raised in the submissions that relate to the rapid and recent development of the coal industry in the Hunter Valley. Many submissions also spoke of their concern and uncertainty about the regional impacts of climate change and the role of coal combustion in global warming. The Panel recognises that cumulative impacts raised by the public are almost impossible to deal with at the scale of a local project. Many submissions claimed that the coal supply chain project components, namely mining developments and rail transport and export terminal projects, had only been addressed on a project-by-project basis in the Hunter Valley.

Some of the submissions claimed that there were regional scale cumulative social and ecological impacts from the coal supply chain in the Hunter Valley that have not been assessed in terms of coal mine development and coal transport corridors. In particular, the regional cumulative development impacts of coal mining on other

resource industries, such as agriculture, horse breeding, tourism and the development of renewable energy have not been taken into account in a systematic regional cumulative impact assessment.

The Panel recognises that cumulative impact assessment or analysis of cumulative impacts has been a long term and difficult problem for governments around the world to come to grips with as part of the environmental impact assessment (EIA) process for specific projects. Cooper and Sheate (2002) in a review of 50 EIAs in the UK prepared between 1989 and 2000 found that only 48% mentioned cumulative impact assessment and only 18% undertook any level of analysis and discussion. And this was within a jurisdiction requiring cumulative impacts assessment following a 1988 European Commission directive.

The Panel recognises that the NCIG CET Project is deliberately established to enhance the export of coal from the Hunter Valley. The NCIG Project will handle and export coal that has been transported along the Hunter Valley coal supply chain from the coal mines owned and operated by the same companies as the partners in the NCIG. The Socio-economic Assessment in the EA accounts for the regional and broader socio-economic benefits of the NCIG CET Project. The CET would open up the coal export bottleneck at the Port of Newcastle. Consequently, the Panel sees that the NCIG CET would be an integral part of the Hunter Valley coal supply chain and regards it as an integrated and physical entity. Accordingly, the call for cumulative social and ecological impact assessment is supported by the Panel although the Panel considers that this recommendation needs to be initiated by NSW DoP outside the NCIG Project assessment as part of a broader set of discussions within the NSW Government and interested stakeholders.

Recommendation E5: *That NSW Department of Planning, lead discussions with other State Government agencies and interested stakeholders, to establish a regional cumulative impact assessment study of the overall social, ecological and economic costs and benefits of the coal mining industry and coal supply chain in the Hunter Valley. This study would then be able to inform long term regional development strategies as well as greenhouse mitigation and energy policies in the Hunter Valley.*

The Panel noted that funding mechanisms are not likely to be available, or adequate at present levels, to rapidly enhance the necessary innovation for developing renewable low carbon technologies and for implementing energy-efficiency measures for housing and building stocks in the Hunter Valley as recommended and called for by many submissions. The NSW Greenhouse Plan (2005) was assessed by the Panel. It is a comprehensive document that presents a wide range of feasible and innovative funding and technology mechanisms for adapting to and mitigating the local and regional impacts of global climate change. Enabling the NSW Greenhouse Plan in the Hunter Valley would be one of a number of suitable approaches to meeting the regional and global externalities raised by many members of the public about the NCIG CET proposal, providing that sufficient funding is available to implement the NSW Greenhouse Plan.

Recommendation E6: *The Panel recommends that the NSW Department of Planning lead discussions with other NSW Government agencies, in particular with the NSW Greenhouse Office, to consider how to rapidly develop and implement the range of innovative funding and technology mechanisms in the NSW Greenhouse Plan. The primary aim would be to focus on how to remove barriers and enhance the uptake of energy efficiency and renewable technologies in order to better prepare the people and communities of the Hunter Valley to actively adapt to the pace of climate change. The Panel considers that NCIG should be party to these discussions because of its key facilitating role in the enhanced export of coal from Newcastle.*

Global Scale Ecological Issues

The Panel recognised that the overwhelming majority of submissions were concerned with the social, ecological and economic consequences of the carbon dioxide released from the final combustion of coal exported through the NCIG facility. There were many claims that these impacts had not been calculated and assessed by NCIG even though greenhouse gas emissions were not part of the Director-General's Requirements for the EA. NCIG had calculated the local scale contribution of greenhouse gas emissions from the NCIG Project proposal on Kooragang Island in the EA even though it was not a requirement for the EA. Subsequent to the hearings in Newcastle, NCIG prepared an assessment of the greenhouse gas

emissions from the NCIG Project, including calculations of the carbon dioxide released from the final combustion of the total proposed amount of exported coal (NCIG, December 2006) even though NCIG stated that there was no requirement for the EA to provide such an assessment. NCIG based their greenhouse report on the methodologies outlined in the World Business Council for Sustainable Development and World Resources Institute *Greenhouse Gas Protocol*. NCIG also considered the Australian Greenhouse Office Workbook, the Draft NSW EIA Guidelines on *Energy and Greenhouse in EIA*.

It is the Panel's view that NCIG have adequately responded at the local-project scale to the submissions by the public calling for undertaking a greenhouse gas assessment by using the first three scopes of emissions approach as outlined by the World Business Council for Sustainable Development and World Resources Institute *Greenhouse Gas Protocol*. The three Scopes are summarised as:

Scope 1: Direct Energy Use or GHG Emissions related to Project-scale Operations

Scope 2: Indirect Energy Use or GHG Emissions from Import and Exports of Electricity, Heat or Steam

Scope 3: Other Indirect Energy Use of GHG Emissions, including Off-site Coal Combustion

The Panel does not consider that NCIG has adequately analysed its position and responsibility under Scope 4 at a regional and global scale.

Scope 4: GHG Emission Abatement from Offset Opportunities including carbon sequestration performed by the proponents and community based energy use or emission reduction initiatives and mechanisms under the Kyoto Protocol

While this greenhouse gas emissions assessment was not one of the original requirements for the EA, the Panel considers that the December 2006 assessment is a useful contribution to the public debate and information for the EA because it clearly indicates the NCIG perspective on these matters. However, the Panel considers that it would have been more open and transparent, as well as informative for NCIG, the Government and the public, to have not only calculated the carbon dioxide released on final combustion of the coal overseas in the original EA, but to have calculated the Scope 4 requirements to mitigate the total amount of carbon

dioxide released by final combustion of exported coal. For example, NCIG could have calculated what mix of technologies and approaches outlined in the NSW Greenhouse Plan (2005) and by Pacala and Socolow (2004) and Socolow and Pacala (2006) that would be required to sequester or offset the carbon dioxide released from final combustion of the exported coal. This approach would recognise the role that NCIG would be playing along the coal supply chain in the release of carbon dioxide to the atmosphere and what would be required to mitigate the greenhouse gas emissions and climate change impacts.

This type of scientific framing of the overall problem of coal combustion is entirely consistent with innovations in science, engineering and technology thinking over the last decade. For example, industrial innovation along the lines of product stewardship, life cycle analysis, sustainability and industrial ecology (Socolow et al. 1994; Graedel 1994; 1996; Graedel and Klee 2002) are now well established approaches. Industrial ecology is an ensemble concept for the systematic analysis of the interactions between industrial systems and the environment and the design of services, products and government policy to bring about sustainable development (Graedel 1994). These industrial ecology ideas have now been widely adopted by leading edge companies in the petroleum, chemical and manufacturing industries and are now influencing sustainable business practices and industrial transformations around the world (Hawken 1994; Hawken et al. 1999). Notably, there was no reference in the NCIG December 2006 Response to Submissions on greenhouse gas emissions about the science of ecologically sustainable development.

Clearly, the public submissions on this matter have overwhelmingly called for a broader and more open consideration of the export of coal, overseas coal combustion and climate change. There is no doubt that the communication of information about climate change through the Stern Review and also the Al Gore movie, *An Inconvenient Truth*, have figured strongly in raising the public's awareness of the enhanced greenhouse effect and links to fossil fuel combustion.

Recommendation E7: *The Panel recommends that NSW DoP should lead discussions with interested stakeholders to consider how the scale of carbon dioxide*

emissions from final combustion of coal exported through the NCIG CET could be offset in NSW using a portfolio of approaches outlined in the NSW Greenhouse Plan. This would require the calculation of the total amount of carbon dioxide that would be released from combustion of the coal overseas, as has been done by NCIG, and Scope 4 calculations of what technologies, mechanisms and approaches would be required to be developed to offset the total amount of these annual carbon dioxide emissions in NSW, and specifically what could be achieved in the Hunter Valley. It is recommended that this Scope 4 analysis use a portfolio of technologies and mechanisms outlined in the NSW Greenhouse Plan and Socolow and Pacala (2006). The Panel recommends that this information be placed on the NSW DoP website as part of the public discussion on the ecological implications of increased coal exports from the Port of Newcastle.

4.0 Addressing the Regional and Global Externalities Associated with the Coal Industry

The Panel recognised from listening to the submissions that there is a pressing need in the Hunter Valley to develop an innovative response to the Principles of Ecologically Sustainable Development; one that recognises a more broadly considered role for coal in the future sustainable development of the Hunter Valley and one that directly responds to the challenges of climate change.

After the hearings in Newcastle the Panel met with several CSIRO climate and energy experts to better understand the complex range of issues around climate science, climate change, greenhouse economics and policy, and the availability and feasibility of energy technologies for transitioning to a global future that addresses the climate change concerns raised by the public. In attempting to come to grips with the complexity of the global-scale climate change challenges raised during the public hearings, the Panel considered the CSIRO expert opinions in the context of the NCIG proposal.

The Panel also undertook some critical readings on how society could respond to the challenges of climate change from an economic perspective (Stern, 2006); from a behavioural perspective in terms of the different values and ethics that influence economic motivation and a societal response to the enhanced greenhouse effect

(Spash, 2002); and from the perspective of what is needed to motivate a technological response to the immense scale of technology innovation that will be needed to make the transition to a lower carbon future that effectively responds to climate change (Pacala and Socolow, 2004; Socolow and Pacala 2006).

The Panel also recognised the relevance of recent studies into the phenomena of collective learning about complex systems problems such as ‘understanding the risks posed by anthropogenic climate change and possible societal responses to those risks’ (Norgaard and Baer, 2004). These studies address the need for plural approaches to improve the basis for collective learning and decision making. The public hearings demonstrated to the Panel that any form of consensus about the nature of complex problems such as climate change and sustainable development can only be reached by incorporating multiple views from scientific disciplines, legal and planning processes, economics and other sources of knowledge into a shared understanding of the problematic situation and an agreed way forward that potentially embraces multiple stakeholder views, values and ethics.

In taking account of the written and spoken submissions of the public and interested community organisations the Panel was asked by many people making submissions to respond to the regional and global externalities, such as greenhouse gas emissions associated with the coal industry. In essence, many members of the public and community organisations who made submissions wanted the Panel to respond by making a threshold decision about whether to support increased coal exports from the Hunter Valley or not, and if so under what conditions. The Panel does not agree with the sentiment expressed by many submissions about whether the Panel is supporting or opposing the Project. The Panel sees its role as addressing the ecological impacts of the NCIG Project and forming an opinion as to whether there is an adequate response by NCIG to those ecological impacts.

The Panel recognises the historic value of the coal industry in generating wealth and stimulating regional development. However, the scale of the coal industry development in the Hunter Valley, and the efficiency of the coal supply chain and export of coal through the NCIG CET in the Port of Newcastle, now has the potential to introduce adverse externalities at the regional and global scale that can not be

readily addressed at the local NCIG project scale on Kooragang Island. The Panel believes that mechanisms such as those outlined in the NSW Greenhouse Plan need to be implemented to reduce the potential adverse impacts such as those related to the enhanced greenhouse emissions and climate change contributed to by the NCIG Project.

The sustainable development approach recommended by the Panel is to design and develop a governance mechanism that meets the goals of the NSW Greenhouse Plan, as quoted by NCIG in their December 2006 greenhouse gas emissions submission (page 15), namely to 'promote climate change partnerships through cooperative approaches by Government, individuals, industry, business and community groups' and to 'promote understanding of the likely impacts on NSW, and identify strategies for adaptation to environmental, social and economic impacts of climate change'. The basis for the Panel's sustainable development approach would be one that:

- responds creatively and actively to the challenge of climate change
- recognises increased coal exports could be important to the sustainable future of the Hunter Valley, NSW and Australia
- is based on a product stewardship focus, whereby the coal industry accepts that it has a corporate social responsibility for the ecological consequences of coal production along the coal supply chain, from the mining and transport of coal through to the impacts of the final combustion of coal.
- is additional to the carbon pricing signals that would form part of an emissions trading scheme currently under active review by the Federal Government.
- is complementary with existing government-industry schemes such as the COAL 21 initiative for motivating clean coal technology developments, and
- addresses the regional and global externalities associated with the coal industry in the Hunter Valley.

In order to address the cumulative regional and global ecological impacts that would be contributed to by the proposed NCIG Project, the Panel considers that there is a need for some form of compensatory mechanism. This mechanism would specifically link the value of increased coal exports from the Port of Newcastle with

addressing the regional ecological impacts in the Hunter Valley and the global ecological impacts of climate change contributed to by increased coal exports. The Panel recognises that current mechanisms such as the \$300 million COAL 21 National Action Plan, that are addressing carbon capture and storage and clean coal technology options, are useful science, engineering and technology contributions for mitigating the adverse impacts of coal combustion. However, the Panel considers that there is a strong need to enhance and encourage a wider range of adaptive responses to the adverse consequences of increased coal combustion, such as contributing to carbon dioxide build up in the atmosphere and climate change as has been highlighted by the Stern Review (2006) and by Socolow and Pacala (2006).

The Panel considers that the scale of the investment would need to be in the same order as the COAL 21 National Action Plan, an investment of approximately \$60 million annually, in order to deal with the scale of technology and innovation required to mitigate climate change impacts caused by carbon dioxide emissions. Socolow and Pacala (2006) have identified 15 ways to stabilise carbon emissions at sustainable levels over 50 years if we start now by implementing currently available technologies and the concept of a portfolio of 'stabilisation wedges'. These stabilisation wedges are technology options for carbon emissions reductions. They are grouped into five broad technology categories and include:

1. End-User Efficiency and Conservation
2. Power Generation
3. Carbon Capture and Storage
4. Alternative Energy Sources, and
5. Agriculture and Forestry

Accordingly, the Panel recommends that NSW DoP lead discussions with industry, government and community stakeholders to actively explore the facilitation of sustainability compacts between government and industry as outlined in the NSW Greenhouse Plan. As part of these discussions the Panel recommends consideration of the establishment by NCIG of a charitable trust (Hunter Valley Ethical Coal Trust) to provide an ongoing funding stream derived from new coal exports and an independent governance mechanism to enhance sustainable regional development

initiatives that introduce low carbon emission technologies in the Hunter Valley that compensate for greenhouse gas emissions resulting from coal exports through the NCIG CET.

Other alternative mechanisms that could be considered during the recommended discussions facilitated by NSW DoP to achieve the same objectives include the establishment of a Trust similar to the NSW Environmental Trust that is administered through a government agency such as DEC, contributions to the Energy Savings Fund under the NSW Greenhouse Plan or governance through an existing organisation in the Hunter Valley such as the University of Newcastle or the Hunter Valley Research Foundation.

Recommendation E8: *It is recommended that NSW DoP lead discussions with NCIG to establish a compensatory mechanism called the Hunter Valley Ethical Coal Trust in order to:*

- 1. develop a covenant setting up a charitable trust with a skills-based board made up of community and industry representatives and a broad written mandate for initiating sustainable development activities in the Hunter Valley that mitigate greenhouse gas emissions*
- 2. establish the objectives of the Trust to broadly pursue ethical investment of the Trust's funds in sustainable regional development and local activities that address concerns over the contribution of the coal industry to the ecological impacts of human induced climate change.*
- 3. self-impose a levy to be paid into a charitable trust based on coal exports through the NCIG CET*
- 4. collect a minimum levy of \$1/ton (with provisions for CPI increases) on all new coal exports, additional to the existing level of coal exports from Newcastle Harbour*

Some examples of the future activities of the Hunter Valley Ethical Coal Trust would include:

- a) enabling energy efficiency improvements in houses and buildings in the Hunter Valley

- b) stimulating innovative enterprises that collect and distribute regional sustainable energy and environment information
- c) aiding the design and development of new low carbon and energy efficient technologies, for use locally and for export
- d) providing philanthropic and rental assistance mechanisms for low income home owners to acquire home insulation and solar technologies that address climate change impacts
- e) enhancing the value of revegetation and carbon capture in the Hunter Valley through improved land management practices,
- f) providing demonstration projects that would exemplify energy conservation measures that improve the energy efficiency and eco-effectiveness of the future housing stock in rapidly urbanising areas of the Hunter Valley, and
- g) conducting a series of regional studies such as an integrated regional air quality study for the lower Hunter Valley and a regional health impact assessment study.

It is important to recognise that the Hunter Valley Ethical Coal Trust is different from a royalty payment or tax associated with natural resource extraction. It would not be set up to mitigate the local project impacts of the NCIG coal export terminal, nor fund or manage the compensatory habitat projects, nor fund clean coal technology projects. It is an adaptive governance mechanism that brings community, industry and government bodies together to make the best of a small portion of the regional coal wealth in helping the people of the Hunter Valley innovatively prepare for the social, environmental and economic challenges of the future.

5.0 Main Findings

5.1 Noise and Vibration

In summary we find the noise and vibration assessment to be comprehensive, albeit we have recommended the areas of Fern Bay and Stockton should, in the context of the NSW DEC Industrial Noise Policy, be considered as suburban rather than urban. We have recommended noise criteria to address both short term “intrusiveness” issues and longer term “amenity” issues in the surrounding residential areas which are slightly different to those nominated by either the proponent or the DEC. Our justification for these revised criteria are provided in Section 3.1. We consider the

proposed project can achieve the revised criteria on the basis that the source noise levels from all equipment and plant comply with the noise levels used in the EA for prediction purposes (and can be maintained at those levels) and the noise mitigation measures discussed in the EA are adopted.

We recommend the proponent will need to establish manufacturers' performance guarantees during tendering and undertake monitoring / auditing during the commissioning phase and ongoing operational phases.

We consider an Operational Noise Management Plan should be prepared to the satisfaction of the Director-General which summarises the specifying and procurement of plant and equipment and the proposed noise mitigation measures and more importantly describes in detail the proposed compliance monitoring regime which will allow the proponent to accurately identify their noise contribution in the presence of another coal loading facility, other industrial noise and surrounding traffic noise.

Given the complexity of this total noise environment, the ability to combine real time equivalent on site noise levels and prevailing weather data to determine compliance at the receiver areas identified in the EA is essential.

5.2 Air Quality

In terms of air quality impacts, particularly dust and cumulative dust impacts, the Panel found that the assessment adequately addresses the local scale issues associated with the project and complies with the NSW DEC's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. We recommend that an integrated air quality-monitoring program should be installed as part of the consent condition. Once a full year of local monitoring becomes available, the uncertainties associated with modelling the dust impacts should be addressed by a model validation study.

An issue raised in the public hearings was the piecemeal approach to air quality over the Hunter Valley. Although this issue is not directly associated with the Terms of reference and not of direct concern to the NCIG assessment, the Panel recommends

that strong consideration be given to an integrated regional air quality modelling and/or monitoring study for the lower Hunter Valley, including a quantitative health risk assessment.

5.3 Ecological Impacts

Despite considerable criticism by the public about the adequacy of the NCIG EA, as heard many times by the Panel during the submissions, the Panel considers that NCIG has adequately responded to the local Project-scale ecological issues raised in the submissions.

That said, the Panel finds that NCIG will need to apply more effort to adequately address the recommendations for construction of compensatory habitat and the northern spur line embankment across Deep Pond during preparation of the Flora and Fauna Management Plan. In particular, careful consultation with stakeholders, integrated planning and design of restoration outcomes before commencing design and construction of compensatory habitat works, and effective monitoring and evaluation of ecological changes at the species, population and community level. The Panel considers that if these participatory engagement processes are undertaken then there is a sound platform for achieving habitat restoration outcomes for Green and Golden Bell Frog, avifauna and other species.

However, the main issues raised by the public hearings at the hearings and in written submissions were concerned with coal combustion of exported coal and climate change. The Panel's response to these issues recognises that NCIG has adequately accounted for the greenhouse gas generation from within the proposed NCIG project boundaries on Kooragang Island. NCIG has also calculated the total amount of carbon dioxide emissions from the exported coal as part of its response to submissions in December 2006. However, in the opinion of the Panel the NCIG December 2006 response did not adequately recognise the concerns of the public raised in their submissions and consider the ecological consequences of greenhouse gas emissions that will result from the combustion of coal exported by NCIG.

The Panel recognises that the public have identified numerous regional and global externalities of the coal industry that need deeper consideration by all stakeholders in

the Hunter Valley. Consideration of regional and global externalities was not an explicit part of the ToR for the Panel. However, due to overwhelming public interest in discussing these relevant issues the Panel, in consultation with the Department of Planning, agreed to listen to and consider the public's views. The Panel needed to consult additional expertise in CSIRO on climate change, greenhouse impacts and energy technology in order to formulate a governance and funding mechanism that responds to the concerns expressed to the Panel about climate change and energy security in the future.

The Panel recommends that NSW DoP lead discussions with NCIG and interested stakeholders to establish a governance mechanism to enhance adaptive responses to greenhouse gas emissions and climate change that are largely identified in the NSW Greenhouse Plan. The Panel's preferred approach would be the establishment of a charitable trust (Hunter Valley Ethical Coal Trust) to provide an ongoing funding stream derived from new coal exports. The Trust would have an independent governance mechanism, and the goal of sustainable regional development through implementing low emission carbon and energy efficient technologies in the Hunter Valley. This mechanism would be an innovative response to mitigating the carbon dioxide emissions and climate change contribution that would arise from the export of coal through the NCIG CET Project.

Appendix 1.

LIST OF ADDITIONAL SUBMISSIONS AT PUBLIC HEARINGS

1. Vicki Brooke – Climate Action Newcastle (CAN)
2. Lee Rhiannon – NSW Greens
3. Marianne Johnson - Barrington-Gloucester-Stroud (BGS) Preservation Alliance
4. Ken Johnson - Barrington-Gloucester-Stroud Preservation Alliance
5. Chris Herbert - Hunter Bird Observers Club (HBOC)
6. Kathy Helme - Resident
7. Anne Hodgson - Resident
8. Naomi Hodgson - Resident
9. Stephen Phillips – Rising Tide
10. Peter Gray – Rising Tide
11. Georgina Woods – Hunter Community Environment Centre (HCEC)
12. Rebecca Blunden – Hunter Community Environment Centre (HCEC)
13. Paul Wynne – Hunter Community Environment Centre (HCEC)
14. Ned Haughton - Resident
15. Jan Davis - (Maitland Greens/Hunter Environment Lobby)
16. Wendy White - Resident
17. Oliver Coleman - Resident
18. James Ryan - Resident in Hunter Valley
19. Christine Phelps – Anvil Hill (AH) Project Watch Association (AHPWA)
20. Peggy Svoboda – Kooragang Wetlands Rehabilitation Project (KWRP) and the Hunter-Central Rivers Catchment Management Authority
21. Daniel Endicott - Bike Ecology Centre
22. Gianni (John) Di Gravio - Resident
23. Bev Smiles - Upper Hunter Valley resident
24. Trevor Simmons - Port Waratah Coal Services (Environmental Advisor)
25. Chris Marsh- Resident of Islington
26. Simon Fane - Resident of Newcastle
27. Annika Dean - Resident
28. Graham Clarke - NSW Department of Environment and Conservation (DEC)
29. Geoff Pettett - Hunter Valley Resident
30. John Hayes - Throsby Community Forum (TCF) (Assistant Secretary)
31. Michael Schien - General Practitioner

Appendix 2. List of Information Relied Upon by the Panel

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Appendix 3

Summary of Recommendations

In each category recommendations have been split into those specifically relating to this project and those which we consider will assist in the assessment of future projects.

Noise and Vibration

General Recommendations

Recommendation N1: *Although the information would not affect the conclusions for this project it is recommended that all potential noise and vibration impacts, both on and off-site, as a result of any proposal should be presented in summary in the Environmental Impact Assessment, even if they are separately assessed elsewhere.*

Recommendation N2: *The application notes to the DEC's NSW Industrial Noise Policy (INP) should be further updated to clarify the preferred approach to selecting the appropriate classification for a receiver area rather than just suggesting the land use manager should be consulted. Guidance to indicate the area classification is about what the noise climate ought to be including some simple examples would be most beneficial to the land use manager as well as the acoustical fraternity.*

Project Specific Recommendations

Recommendation N3: *The Panel considers that for the suburban areas of Fern Bay and Stockton, the long-term goal should be to reduce noise levels to meet the "acceptable" limit for suburban areas, with the medium term goal to meet the "maximum" limit, accepting that on the western fringe of those suburbs noise levels currently may marginally exceed the "maximum" limits. This can be achieved by ensuring the CET achieves the noise limits recommended in this report..*

Recommendation N4: *The following criteria should apply to the project noting that the intrusiveness criteria would apply under adverse conditions, with the amenity criteria relating to a seasonal average of the relevant day, evening or night time periods.*

Table 3 Recommended Criteria for the Project

Location	Area	Intrusiveness			Amenity $L_{Aeq,period}$			Sleep Disturbance
		$L_{Aeq,15min}$						$L_{A1,1min}$
		Day	Eve	Night	Day	Eve	Night	Night
Fern Bay West	Suburban	55	47	49	50	40	37	59
Fern Bay East	Suburban	45	49	47	50	40	36	57
Stockton West	Suburban	47	49	49	50	40	37	59
Stockton East	Suburban	46	48	48	50	40	36	58
Warabrook / Mayfield West	Urban	50	51	46	55	45	40	56
Mayfield	Urban	51	52	48	55	45	40	58
Carrington	Urban	47	46	42	55	45	40	52

Recommendation N5: *Operational Noise Management Plans: An Operational Noise Management Plan to the satisfaction of the Director-General should be prepared for the facility which includes the detailed noise control measures listed in Section 4.4 of the Noise Impact Assessment, the procurement process to guarantee that equipment noise levels meet the specifications, addresses the timing and triggers for construction of the rail noise barrier and most importantly outlines the proposed compliance monitoring regime.*

Recommendation N6: *Compliance Monitoring: The proponent, as part of their Operational Noise Management Plan, should nominate a compliance monitoring protocol to the satisfaction of the Director-General. This, in a similar fashion to air quality, may be a combined system with PWCS. The system as a minimum must allow the proponent to accurately identify their noise contribution in the presence of another coal loading facility, other industrial noise and surrounding traffic noise. This could be by measurement alone or a combination of source level measurement and prediction. If prediction methods are to be used these must be validated on site under the various prevailing meteorological conditions.*

Recommendation N7: *The $L_{Aeq,1min}$ noise level, of at least 95% of all locomotives which arrive at the facility over any season shall be less than ??dBA at high idle (to be agreed in conjunction with Heggies) when measured at 15m from the centre of the track. For the 5% of locomotives which may be louder than the nominated high idle noise level, the allowable increase in level for any individual locomotive shall be no more than 5dBA. The proponent shall provide a test certificate for each locomotive type which arrives at the facility and provide a record of the mix of locomotives which have used the facility on a six monthly basis. In addition on a six monthly basis all locomotives which arrive at the CET between 7.00am and 5.00pm on two consecutive days shall be tested at high idle.*

Recommendation N8: *No specific conditions with respect to construction noise and vibration are required as it is expected the NSW DEC would adopt their standard construction noise and vibration criteria when they licence the project*

Recommendation N9: *A Construction Noise and Vibration Management Plan should be prepared which as a minimum deals with the justification for timing of the bund and identifies any surrounding structures or buildings which may be sensitive to vibration.*

Air Quality

Recommendation A1: *It is recommended that the uncertainties associated with modelling the dust impacts should be addressed by a model validation study to be undertaken once a full year of onsite monitoring becomes available. The model validation study should make use of data collected in accordance with Recommendation A2, and focus on TSP, PM_{10} and dust deposition.*

Recommendation A2: *It is recommended that an integrated air quality-monitoring program be installed as part of the consent condition. The establishment of a joint monitoring program between Newcastle Coal Infrastructure Group and Port Waratah Coal Services is encouraged. The monitoring program should not be restricted to the*

HVAS and dust deposition gauges proposed in the Environmental Assessment. Continuous monitoring should also be undertaken through use of a Tapered Element Oscillating Microbalance (TEOM) should also be installed as part of the monitoring network. Siting of the TEOM should be based in the closest residential area likely to be affected by dust emissions for the coal loading facilities. Monitoring results should be presented regularly to the community through the Internet and be provided in hard copy on request. The monitoring program should be independently reviewed annually to assess whether further monitoring is warranted.

Recommendation A3: *It is recommended that the transport of soils (contaminated or otherwise) from the site should be on covered trucks to minimise emissions during the transportation associated with the development of the rail infrastructure corridor. In addition, normal dust suppression methods (typically watering) should be employed to minimise potential emissions from the site and from transported material.*

Ecological Impacts

Recommendation E1: *The Panel recommends that NSW DoP lead discussions with key stakeholders in DEC, NCIG and the University of Newcastle to undertake a research project on the population genetics of *Zannichellia palustris* in order to determine whether or not it is likely to be a recent exotic introduction. If on the weight of the scientific evidence it is shown to be a recent exotic introduction then DEC would need to address the endangered listing of *Zannichellia palustris* in NSW.*

Recommendation E2: *It is recommended that NCIG, in consultation with DEC and KWRP, clearly identifies and defines the governance structures, mutually agreed long term financial commitments, management arrangements, habitat targets and timelines entered into by NCIG for successfully achieving the compensatory habitat outcomes. This consultation and decision process should be an integral part of the development of the Flora and Fauna Management Plan,*

Recommendation E3: That NCIG recognise the regional importance of Deep Pond as a coastal bird refuge, particularly during drought, and continue to explore options to avoid crossing Deep Pond in order to integrate biodiversity conservation as well as engineering and economic considerations into the industrial development. If there are no feasible alternatives then the embankment construction should consider developing shallow wading habitat along the edges of the embankment to enhance habitat diversity for shoreline birds in Deep Pond.

Recommendation E4: It is recommended that in complying with the monitoring conditions set by DEH under the EPBC Act and being able to interpret the results of monitoring data against a background of ecological uncertainty, that NCIG be required to fund the conduct of a series of bird ecology studies in addition to the presence/absence monitoring of bird species on Deep Pond. The reason for this recommendation is that presence/absence data alone will not provide much insight into the habitat quality and ecosystem dynamics of Deep Pond or how birds would actually behave if an embankment were to be constructed in the future. An experimental approach needs to be established to study how birds might change their behaviour if an embankment was to be constructed across Deep Pond in order to identify how habitat quality can be integrated into construction and any adverse effects can be designed out of future construction.

Recommendation E5: That NSW Department of Planning, lead discussions with other State Government agencies and interested stakeholders, to establish a regional cumulative impact assessment study of the overall social, ecological and economic costs and benefits of the coal mining industry and coal supply chain in the Hunter Valley. This study would then be able to inform long term regional development strategies and energy policies in the Hunter Valley.

Recommendation E6: The Panel recommends that the NSW Department of Planning lead discussions with other NSW Government agencies, in particular with the NSW Greenhouse Office, to consider how to rapidly develop and implement the range of innovative funding and technology mechanisms in the NSW Greenhouse Plan. The primary aim would be to focus on how to remove barriers and enhance the uptake of energy efficiency and renewable technologies in order to better prepare the

people and communities of the Hunter Valley to actively adapt to the pace of climate change. The Panel considers that NCIG should be party to these discussions because of its key facilitating role in the enhanced export of coal from Newcastle.

Recommendation E7: The Panel recommends that NSW DoP should lead discussions with interested stakeholders to consider how the scale of carbon dioxide emissions from final combustion of coal exported through the NCIG CET could be offset in NSW using a portfolio of approaches outlined in the NSW Greenhouse Plan. This would require the calculation of the total amount of carbon dioxide that would be released from combustion of the coal overseas, as has been done by NCIG, and Scope 4 calculations of what technologies, mechanisms and approaches would be required to be developed to offset the total amount of these annual carbon dioxide emissions in NSW, and specifically what could be achieved in the Hunter Valley, using a portfolio of technologies and mechanisms outlined in the NSW Greenhouse Plan and Socolow and Pacala (2006). The Panel recommends that this information be placed on the NSW DoP website as part of the public discussion on the ecological implications of increased coal export from the Port of Newcastle.

Recommendation E8: It is recommended that NSW DoP lead discussions with NCIG to establish a compensatory mechanism called the Hunter Valley Ethical Coal Trust in order to:

1. develop a covenant setting up a charitable trust with a skills-based board made up of community and industry representatives and a broad written mandate for initiating sustainable development activities in the Hunter Valley
2. establish the objectives of the Trust to broadly pursue ethical investment of the Trust's funds in sustainable regional development and local activities that address concerns over the contribution of the coal industry to the ecological impacts of human induced climate change.
3. self-impose a levy to be paid into a charitable trust based on coal exports through the NCIG CET
4. collect a minimum levy of \$1/ton (with provisions for CPI increases) on all new coal exports, additional to the existing level of coal exports from Newcastle Harbour