EnergyAustralia
Proposed Sydney CBD & Inner Suburbs 132kV Cable Project

Director-General's Report
Section 115C of the Environmental Planning and Assessment Act

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DISCLAIMER

FOREWORD

EnergyAustralia is proposing to construct a 132 kV electricity cable from the Haymarket to Surry Hills. The cable will be located within a 1.3 km long tunnel. It forms part of a scheme to upgrade electricity supply to the Sydney central business district (CBD) and Inner Suburbs, together with a proposal by TransGrid to construct a 330 kV underground cable from Picnic Point to the Haymarket. An environmental impact statement was exhibited for public comment in June and July, 2001.

The proposal is subject to Division 4, Part 5 of the *Environmental Planning and Assessment (EP&A) Act,* and requires the Minister's approval.

This report has been prepared in accordance with Section 115C of the EP&A Act, which requires that the Minister obtain a report from the Director-General of Planning prior to making a decision. The report assesses the environmental impact statement, the issues raised in the representations made in response to its exhibition, the submission from EnergyAustralia in response to the representations, and other relevant matters pertaining to the potential environmental impacts of the proposal.

The Department's assessment found that the proposal will increase the security and reliability of electricity supply to Sydney's CBD and inner suburbs. This will assist in maintaining and enhancing Sydney's role as a global city. The Department concludes that the proposal is justified from a strategic viewpoint. The Department recognises, however, that there are concerns about the increased use of electricity and its implications for additional greenhouse gas emissions. Therefore, the Department recommends that a number of demand management and energy efficiency offset measures be introduced as an integral part of implementing this project. This is consistent with the Department's objectives of sustainable development. These measures are recommended as conditions of approval. In particular, a $10 million fund will be established. It will underwrite a programme of activities to offset the environmental and social impacts of providing additional electricity supply, by investigating and implementing demand management opportunities.

The assessment also found that construction will have a number of temporary local impacts, and that operational stage impacts are likely to be minimal. With appropriate management, these impacts are controllable to acceptable levels. The Department recommends a number of conditions, and particularly the development of environmental management plans and community consultation. Independent environmental auditing is also recommended.

In recommending approval (subject to conditions) for the EnergyAustralia proposal, it is recognised that the proposal is closely linked to TransGrid's proposed Picnic Point to Haymarket 330 kV electricity cable. The assessment of that project is being undertaken separately, and will be determined on its merits.

Sue Holliday
Director-General
Department of Planning

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GLOSSARY OF TERMS

ACCC	Australian Consumer and Competition Commission
ASS	Acid Sulphate Soils
CBD	Central business district
CLG	Community Liaison Group
Department, the	Department of Planning (nswPlanning)
Director-General, the	Director-General of the Department of Planning or delegate
Director-General's Report	The report of the Director-General of the Department of Planning, prepared under section 115C of the EP&A Act
DLWC	Department of Land and Water Conservation
EIS	'*Proposed Sydney CBD and Inner Suburbs 132kV Cable Project - Environmental Impact Statement*' prepared for EnergyAustralia by Gutteridge Haskins & Davey Pty Ltd and dated May 2001
EMF	Electric and Magnetic Fields
EMP	Environmental Management Plan
EMR	Environmental Management Representative
ENCM	Environmental Noise Control Manual
EP& A Act	Environmental Planning and Assessment Act 1979
EPA	Environment Protection Authority
ESD	Ecologically Sustainable Development
IPART	Independent Pricing and Regulatory Tribunal of NSW
kV	kilovolts
LALC	Local Aboriginal Land Council
L_{10}	The noise level for which is exceeded for 10 percent of the time and is approximately the average of maximum noise levels
RBL	Rating Background Level
L_{10} 15 minutes 5dB(A)	For construction periods greater than twenty-six (26) weeks the EPA noise criteria is that L_{10} 15 minutes construction noise should not exceed the RBL by more than 5dB(A).
mG	MilliGauss - Magnetic fields are commonly measured in Gauss (G)/milligauss (mG) or tesla (T)/micro T (μT). As the EIS refers to mG, this report will generally use this measurement. Note: 1 μT = 10mG.
Minister, the	Minister for Planning
NEM	National Electricity Market
Proponent	EnergyAustralia
Relevant Councils	Any one or more of the following Councils as applicable: South Sydney City Council and Council of the City of Sydney
Representations Report	*Proposed Sydney CBD and Inner Suburbs 132kV Cable Project* '*Representations Report*' prepared for EnergyAustralia by Gutteridge Haskins & Davey Pty Ltd and dated October 2001
RIC	Rail Infrastructure Corporation
RTA	Roads and Traffic Authority

EXECUTIVE SUMMARY

Background to the Proposal

The proposal forms part of a scheme to upgrade the electricity supply to the Sydney CBD and Inner Suburbs, together with TransGrid's Picnic Point to Haymarket 330kV underground cable proposal.

The aim of the scheme is to provide electricity to meet the growing demands of the region and to ensure that a satisfactory reliability standard is achieved. The scheme was developed through a joint planning process undertaken by EnergyAustralia and TransGrid in accordance with National Electricity Code requirements.

The proposal is subject to division 4, Part 5 of the Environmental Planning and Assessment Act and requires the approval of the Minister for Planning.

Need and Justification for the Proposal

EnergyAustralia forecasted that the average growth rate for inner Sydney of the summer maximum demand from 1998/99 to 2013 /2014 would be about 1.9% per annum. From this, EnergyAustralia and TransGrid predicted that from summer 2003/4, the growth in demand for electricity would mean that the supply system in the CBD and inner suburbs would not meet adopted reliability standards. Hence, the risk of supply interruptions from system failures would increase year by year if the demand growth continued unabated.

The growth in demand during summer in the CBD and inner suburbs is attributed both to natural growth in commercial and residential developments and increased demand by existing customers. The increased use of air conditioning, and especially in computerised and commercial buildings, is considered to be particularly significant in that regard. Independent reports commissioned for the ACCC and IPART found that augmentation of the electricity supply to the CBD and inner suburbs was therefore warranted.

TransGrid and EnergyAustralia consider that a reliability standard higher than the minimum is necessary for the Sydney CBD, because of the sophisticated commercial operations that rely on an uninterrupted supply for business efficiency. They argued that the system should be able to sustain the failure of a 330/132 kV transformer, or a simultaneous outage of a 330kV cable plus any 132 kV feeder. It should also continue to supply electricity if any section of a 132 kV busbar were to fail. This higher standard is argued as being appropriate because:

- a loss of electricity supply to Sydney's CBD could have a very high economic cost because of the high value-added tertiary sector industries that are concentrated in this area
- TransGrid and EnergyAustralia could be susceptible to legal action should supply disruption occur
- with increasing demand, the risk of supply interruptions increase year by year from 2003/2004. The higher demand would cut into the built-in design redundancy that currently enables supply to be maintained with one element out of service. Further insurance is offered by providing a higher standard of reliability.

In view of the above, TransGrid and EnergyAustralia concluded that a 'do nothing' option is not acceptable and that network augmentation is required.

The Proposal

EnergyAustralia is seeking the approval of the Minister for Planning for a proposal to upgrade the electricity supply to Sydney's Central Business District (CBD) and inner suburbs, by constructing a 132kV cable within a tunnel from TransGrid's proposed Haymarket substation to EnergyAustralia's

Surry Hills substation at Ann Street. The cable will also connect to the existing City South (Roden Cutler House) substation and to a new substation at Campbell Street, Surry Hills. The proposed cable tunnel is 1300 m long, will be at a depth of 12-30m below ground level and will be below public roads.

The 132 kV cable proposal is part of an augmentation of the existing electricity supply system to Sydney's CBD and inner suburbs, being undertaken jointly by TransGrid and EnergyAustralia. The proposal is located in the Sydney City and South Sydney City Council areas. The proposal is shown in Figure 3.1

EIS Exhibition

The EIS was exhibited from 18th June to 20th July, 2001 inclusive.

Seven representations were made on the exhibited EIS. There were no outright objections to the proposal. The representations from residents and Sydney City Council raised some concerns about potential local impacts, including traffic, noise, construction hours, air quality and business impacts. One representation also raised concerns about the potential for the proposal to increase electricity use and greenhouse gas emissions.

The main issues raised by State agencies included the level of assessment undertaken, particularly in relation to potential noise impacts and the need to manage impacts on buses.

Request for Approval

EnergyAustralia sought the approval of the Minister for the project in a letter dated 25th October, 2001.

EnergyAustralia has identified a number of modifications to the exhibited proposal. The main modifications include a change to the size of the tunnel, with its cross section increasing from 3.2m x 3.2m to 4.4m x 3.6m, and an increased extraction rate. The net result will be an increase in spoil generation, but reduced excavation period. There will also be an increase in truck numbers. Other changes include revised location of an air inlet point; vertical (but not horizontal) alignment revision, to avoid the proposed MetroPitt railway line – the EnergyAustralia tunnel will now be deeper; and, changes to construction timing (shorter) and Campbell Street partial closure time (8 months, instead of 3-6 months).

A Preferred Activity Report was prepared for the proposal and placed on public exhibition for a month from 31st October, 2001.

Key Issues

Section 4 of this report identifies the issues raised in representations. The key issues raised included demand management and greenhouse gas issues; traffic issues and spoil disposal; noise and vibration management; air quality; groundwater management; property impacts and geotechnical issues.

The Department's overall consideration of the proposal is contained in sections 6 and 7 of this report.

Conclusions and Recommendations

The proposal will increase the security and reliability of electricity supply to Sydney's central business district (CBD) and inner suburbs. This will assist in maintaining and enhancing Sydney's role as a global city. The Department concludes that the proposal is therefore justified from a strategic viewpoint. The Department recognises that there are concerns about the increased use of electricity and its implications for additional greenhouse gas emissions. Therefore, the Department recommends that a number of demand management and efficiency offset conditions be applied to the proposal.

The key condition will require the establishment of a special purpose fund, in partnership with TransGrid, to underwrite a programme of activities to offset the environmental and social impacts of providing additional electricity supply, by investigating and implementing demand management opportunities. The fund will receive a total injection of $10 million over 5 years, with contributions split equally between EnergyAustralia and TransGrid. A report on the fund's activities and its administration will be prepared annually and made publicly available.

Construction will have a number of temporary local impacts, including noise, air quality, traffic and business impacts. With appropriate management, these impacts are controllable to acceptable levels.

Any operational stage impacts are likely to be minimal, and are controllable. They principally relate to the operation of the tunnel's ventilation system.

It is recommended that the proposal as described in the EIS and as modified in the Representations Report and by subsequent advice provided to the Department, proceed subject to a number of recommended conditions. These conditions would ensure that the construction and operation of the proposed 132 kV transmission line would occur with a greater surety of environmental acceptability.

The recommended conditions relate to:

- Demand management and energy efficiency offsets, particularly the establishment of a $10 million fund to investigate and implement demand management opportunities;
- environmental monitoring and reporting requirements;
- independent auditing;
- preparation of construction and operation stage EMPs – covering issues such as noise, air, water, spoil, and traffic;
- community liaison and consultation;
- property impacts.

These conditions ensure that unavoidable adverse environmental impacts of the proposal would be mitigated within an appropriate environmental management framework.

It is considered that these impacts could be managed on the basis of the safeguards and mitigation measures identified in the EIS and the associated documentation, and the Recommended Conditions of Approval.

In recommending approval (subject to conditions) for the EnergyAustralia proposal, the Department recognises that the proposal is closely linked to TransGrid's proposed Picnic Point to Haymarket 330 kV electricity cable. The assessment of that project is being undertaken separately, and will be determined on its merits.

1 INTRODUCTION

1.1 Purpose of the Report

The purpose of this report is to review EnergyAustralia's environmental impact statement (EIS) for the proposed Sydney CBD & Inner Suburbs 132kV Cable Project, the issues raised in representations made in response to the exhibition of the EIS, EnergyAustralia's consideration of these representations and other matters pertinent to the potential environmental impact of the proposal.

This report has been prepared in accordance with Section 115C of the *Environmental Planning and Assessment Act 1979* (*EP&A Act*) which requires the Director-General of the Department of Planning (Director-General) to assess and report to the Minister for Planning on the proposal. The report documents the outcome of an independent environmental impact assessment by the Department accounting for all issues raised in representations to the EIS.

1.2 Nature of the Proposal

EnergyAustralia is seeking the approval of the Minister for Planning for a proposal to upgrade the electricity supply to Sydney's Central Business District (CBD) and inner suburbs, by constructing a 132kV cable within a tunnel from TransGrid's proposed Haymarket substation to EnergyAustralia's Surry Hills substation at Ann Street. The cable will also connect to the existing City South (Roden Cutler House) substation and to a new substation at Campbell Street, Surry Hills. The proposed cable tunnel is 1300 m long, will be at a depth of 12-30m below ground level and will be below public roads.

Other works associated with the proposal include constructing a 330-132kV substation at Haymarket, a new 132-11kV zone substation at Surry Hills and TransGrid's 330kV underground cable from Sydney South substation at Picnic Point to the Haymarket. The substations are subject to Council approval, while the TransGrid 330kV proposal is subject to a separate assessment and determination by the Minister under division 4, Part 5 of the EP&A Act.

The 132 kV cable proposal is part of an augmentation of the existing electricity supply system to Sydney's CBD and inner suburbs, being undertaken jointly by TransGrid and EnergyAustralia. The proposal is located in the Sydney City and South Sydney City Council areas. The proposal is shown in Figure 3.1

The cost of the EnergyAustralia proposal is estimated at approximately $55 million[1].

1.3 Statutory Provisions

EnergyAustralia is the proponent of the proposal to install the 132kV electricity cable tunnel between the Haymarket and Surry Hills. EnergyAustralia is a State-owned corporation and public authority, responsible for the distribution and retailing of electricity.

Development proposals by EnergyAustralia are subject to the requirements of the EP&A Act.

State Environmental Planning Policy (SEPP) No 69, which was gazetted on Friday 27th July 2001, applies to the proposal. It makes the proposal subject to Part 5 of the EP&A Act. As an EIS has been prepared, division 4 of Part 5 applies. As such, the approval of the Minister for Planning is required before EnergyAustralia can undertake the works.

[1] As stated in the Representations Report. The EIS stated the cost would be $40.5 million.

The Director-General of the Department of Planning must prepare an assessment report for the proposal before the Minister may make a decision. This report, and the Minister's decision, is to be made public. The proposal may also require approvals from other agencies such as a Trade Waste Agreement from Sydney Water Corporation.

According to the EIS, the proposal does not require approval from the Commonwealth Environment Minister under the provisions of the *Environment Protection and Biodiversity Conservation Act*.

1.4 Preparation and Exhibition of the Environmental Impact Statement

An EIS was prepared in accordance with Section 112 of the Act. In a letter dated 31st January, 2001, EnergyAustralia's consultants wrote to the Director-General of the Department seeking advice on requirements for the form and content for an EIS for the proposal. The Director-General's requirements were issued in a letter dated 7th March, 2001.

The EIS was exhibited from 18th June to 20th July, 2001 inclusive.

Copies of all representations made to EnergyAustralia were forwarded to the Department. On 12th October, 2001 EnergyAustralia forwarded a report (hereafter referred to as 'the Representations Report') to the Department addressing the issues raised in representations from the public exhibition of the EIS.

1.5 Request for the Approval of the Minister for Planning

EnergyAustralia sought the approval of the Minister for the project in a letter dated 25th October, 2001.

EnergyAustralia has identified a number of modifications to the exhibited proposal. The main modifications include a change to the size of the tunnel, with its cross section increasing from 3.2m x 3.2m to 4.4m x 3.6m, and an increased extraction rate. The net result will be an increase in spoil generation, but reduced excavation period. There will also be an increase in truck numbers. Other changes include revised location of an air inlet point; vertical (but not horizontal) alignment revision, to avoid the proposed MetroPitt railway line – the EnergyAustralia tunnel will now be deeper; and, changes to construction timing (shorter) and Campbell Street partial closure time (8 months, instead of 3-6 months). The modifications are discussed in section 5.

A Preferred Activity Report was prepared for the proposal and placed on public exhibition for a month from 31st October, 2001.

2 STRATEGIC JUSTIFICATION FOR THE PROJECT

2.1 Introduction

A key influence in determining the strategic justification for the application by EnergyAustralia is the relative roles of TransGrid and EnergyAustralia in supplying electricity to inner Sydney. TransGrid operates the high voltage transmission lines that link power stations and interstate grids with energy distributors, and does not deal directly with end users. Energy Australia is one of the energy distributors in NSW, and provides electricity to retail clients in the inner Sydney region (as well as to other areas).

This report addresses EnergyAustralia's 132 kV electricity cable from TransGrid's (proposed) Haymarket substation to its City South and Surry Hills substations, as well as to its (proposed), Surry Hills substation in Campbell Street. TransGrid is proposing a 330 kV electricity cable from Picnic Point to the Haymarket. The TransGrid proposal was subject to an EIS, and the Minister's approval has also been sought under Division 4, Part 5 of the EP&A Act. A separate Director-General's report has been prepared for this proposal.

The TransGrid and EnergyAustralia proposals collectively form the CBD electricity supply upgrade project and they are inextricably linked. Therefore, in considering the strategic justification for the project, reference will be made to both proposals wherever appropriate.

The proposed upgrade of the supply of electricity to the Sydney CBD and inner suburbs was identified and assessed through a joint planning study undertaken by TransGrid and EnergyAustralia from 1998-2000. This process was prescribed by requirements that TransGrid must meet as a participant in the National Electricity Market (NEM).

Section 4 of this report summarises the various issues raised in representations to the exhibited EIS. There was little argument in these representations against upgrading the electricity supply to the CBD and inner suburbs. However, one representation, while accepting the need for the proposal, considered that inadequate consideration had been given to demand management alternatives and stated that more emphasis should be placed on this in the future. Other submissions to the Department questioned the potential impacts on greenhouse gas emissions and the need for alternatives to be pursued. These issues are considered in section 2.3.

2.2 The proponent's justification for the augmentation

EnergyAustralia stated that it had conducted an extensive review of the need for the project as part of the economic tests that proponents of projects must meet to satisfy the requirements of the electricity industry regulators. The Department considered that it was appropriate for it to examine the nature of this process to establish to its satisfaction that a suitable case had been made for the augmentation to proceed. This is discussed below.

The electricity supply industry in Australia was re-structured following the Council of Australian Governments' (COAG) endorsement, in 1991, of the introduction of a national electricity grid. The grid would be subject to a Code of Conduct overseen by the Australian Competition and Consumer Commission (ACCC). The resulting structure, the National Electricity Market (NEM), commenced in 1998. The NEM is a wholesale market for the supply and purchase of electricity, combined with an open access regime for the use of transmission and distribution networks in the participating jurisdictions, which includes New South Wales. TransGrid and EnergyAustralia are participants in the NEM.

The National Electricity Code contains the market rules, and as participants in the NEM, TransGrid and EnergyAustralia are bound by it. It specifies two performance targets that a proposal for an augmentation must meet, namely, it must represent the least expensive option (ignoring externalities

such as environmental costs), and it must comply with the prescribed reliability standards for supply. The Code sets out the minimum reliability standards to be used in planning, designing, maintaining and operating the transmission and distribution networks, but higher standards can be adopted if warranted by the size and economic importance of customer groups.

The ACCC scrutinises the implementation of the Code through the provisions of the Commonwealth Trade Practices Act, and electricity prices through the Prices Surveillance Act. The ACCC regulates the operations and pricing regime of TransGrid as a transmission entity, while NSW distribution providers are regulated under the NSW Electricity Supply Act 1995 administered by the Independent Pricing and Regulatory Tribunal of NSW (IPART).

In its submission to the industry regulators, EnergyAustralia forecasted that the average growth rate for inner Sydney of the summer maximum demand from 1998/99 to 2013 /2014 would be about 1.9% per annum[2]. From this, EnergyAustralia and TransGrid predicted that from summer 2003/4, the growth in demand for electricity would mean that the supply system in the CBD and inner suburbs would not meet adopted reliability standards. Hence, the risk of supply interruptions from system failures would increase year by year if the demand growth continued unabated.

The growth in demand during summer in the CBD and inner suburbs is attributed both to natural growth in commercial and residential developments and increased demand by existing customers. The increased use of air conditioning, and especially in computerised and commercial buildings, is considered to be particularly important. Independent reports commissioned for the ACCC and IPART found that augmentation of the electricity supply to the CBD and inner suburbs was therefore warranted.

As part of the process of developing solutions, 14 options were identified for detailed consideration and subjected to an independent economic analysis by National Economic Research Associates (NERA) in 1998. These encompassed a range of generation, network and bundled schemes (ie network, generation plus demand side management). The assessment concluded that the option including a new 330 kV transmission line from Picnic Point to the Haymarket, with staged demand side management from 2009/10, was preferred on cost-effectiveness criteria.

TransGrid and EnergyAustralia consider that a reliability standard higher than the minimum is necessary for the Sydney CBD, because of the sophisticated commercial operations that rely on an uninterrupted supply for business efficiency. They argued that the system should be able to sustain the failure of a 330/132 kV transformer, or a simultaneous outage of a 330kV cable plus any 132 kV feeder. It should also continue to supply electricity if any section of a 132 kV busbar were to fail. This is of a quality approaching the higher "n-2" standard[3] in the NEM Code and is argued as being appropriate because:

- a loss of electricity supply to Sydney's CBD could have a very high economic cost because of the high value-added tertiary sector industries that are concentrated in this area
- TransGrid and EnergyAustralia could be susceptible to legal action should supply disruption occur
- with increasing demand, the risk of supply interruptions increase year by year from 2003/2004. The higher demand would cut into the built-in design redundancy that currently enables supply to be maintained with one element out of service. Further insurance is offered by providing a higher standard of reliability.

[2] Independent load forecasts were prepared by the National Institute for Economic and Industrial Research, who predicted a higher growth rate of 2.9%.

[3] Traditionally, network planning in the electricity industry is based on criteria such as the "n-1" criterion. In this approach, the "n" is the number of network elements supplying the relevant area of the network. The "n-1" standard would require that supply be available to all loads, even with one of those elements out of service. N-2 would provide a higher standard of reliability.

In view of the above, TransGrid and EnergyAustralia concluded that a 'do nothing' option is not acceptable and that network augmentation is required.

2.3 The Department's assessment of the strategic justification

2.3.1 Introduction

The Department acknowledged the argument made by the proponent that it is essential that Sydney has a reliable electricity supply that meets the needs of a global financial centre. It was aware however, of the substantial concerns expressed that an augmentation that provided a capacity greater than the immediate need for electricity may itself create a further increase in usage. In turn, this could have negative environmental impacts such as the potential to increase greenhouse gas emissions. Consistent with its approach to sustainability, the Department seeks to ensure that the energy demand is appropriately managed to maximise opportunities for conservation and efficient utilisation.

The Department also noted EnergyAustralia's argument that the proposal is merely responding to an existing need from natural demand growth, while the environmental issues raised relate largely to the *generation* of electricity and only partially to its transmission (eg through transmission losses etc). Nevertheless, the Department accepted that an investment at this stage in a major new supply capability could have implications for the energy infrastructure in Sydney for the next one to two decades. It was therefore critical for the assessment to include a thorough review of the strategic justification.

In conducting its assessment, the Department did not re-model the cost benefit studies conducted for the application to NEM regulator. It noted however, that the regulator had accepted the argument that there was an increasing demand for electricity in the inner part of Sydney and that this was a summer phenomenon. Nevertheless, the Department was of the view that the latter was unfettered because there appeared to be little demand management practised nor any substantial moves towards reliance on renewable energy sources in the inner Sydney CBD area. These therefore became the key issues considered in the assessment and are discussed below in some detail.

The Department was also aware that there is the potential for further and substantial changes to the supply of electricity in the future from the progressive development of the national electricity grid. On the one hand, this is a macroeconomic issue that is broader than the matters being considered in this proposal, but on the other it could change the competitive framework and hence the pricing structure applying in the retail electricity market in Sydney.

The Department did not pursue the implications of the national grid. Firstly, it did not have access to the modelling being done to predict how, where and when electricity flows would occur across State borders or within regions, nor their impact on electricity prices. Secondly, it accepted that the primary impact of the new grid might be more relevant to the scale and location of future generation capacity than to localised transmission or distribution facilities.

From discussions with stakeholders and noting the submissions made on the EIS, the Department considered that there were two strategic issues that needed to be satisfactorily addressed before it could form a view on the acceptability of EnergyAustralia's proposal. These were the relevance of the emerging renewable energy market; and the potential for demand management for electricity to be encouraged - and sufficiently so to eliminate the need for the augmentation.
Each issue is discussed below.

2.3.2 Renewable energy alternatives

Some stakeholders argued that there have been enormous improvements in alternative technologies employed for generating electricity over the past decade, to the extent that some options are becoming economically competitive with coal fired electricity. Options of interest include solar energy; wind power

and co-generation activities employing methane from waste. Each has its own cost structure and technological strengths and weaknesses.

However, it was agreed that the question of whether or not alternative energy sources were viable for the Sydney CBD rested largely on whether it was possible to establish suitable electricity generating facilities within the zone of the CBD itself. To locate these elsewhere would not eliminate the need for a major new transmission system, be it from Picnic Point to Haymarket or elsewhere; nor for the conduit of electricity throughout the CBD. In addition, to be suitable, any alternative would not only need to provide sufficient energy to meet the expected quantum of demand, but would also need to surpass the supply-security level identified by EnergyAustralia (ie the 'n-2'goal).

The systems mentioned above did not pass these tests. For example, those involving the burning of methane from biological systems were not considered appropriate because there were no sites suitable in the densely populated inner city area that could absorb the negative environmental impacts they create. These can include the air pollution likely to be caused in the immediate locality of the operation; the noise associated with either the operation itself or the activities that service it; or the need to store large volumes of feedstock (gases or solids) that may be required to guarantee the security of supply expected. Consideration would also need to be given to the heat created by the generation system, noting that the expected demand peaks were most likely to occur in summer.

Some of these concerns apply equally to turbines driven by piped natural gas, but the Department considers that this option warrants further consideration for other reasons. For example, methane burns with six times the efficiency of coal, so there are significant Greenhouse gas savings that could influence the costs and benefits of their employment. Unfortunately, there was no data available to the Department to describe how these could best be utilised in the inner Sydney area, so they are not evaluated further in this report. However, a Condition of Approval is proposed to address this shortcoming.

The most suitable options were therefore wind and solar power. Wind power was not appropriate in the intensely urbanised area involved because of the space they demand to be effective and the noise that they can generate. Solar systems lacked the negative features of both of its competitors, but would be limited mainly to placement on rooftops. The currently available technology lacks the capacity to meet the demands of most of the commercial buildings in the area, but these systems are admirably able to supplement the network supply if the building design offers the opportunity for their fitment. The Department noted however, that both systems are currently the subject of intensive research globally, so it is highly likely that the cost-effectiveness of their implementation could improve dramatically over the next 5-10 years.

An obvious question was also whether or not alternative sources such as these could be called upon to augment the existing supply during times of peak load demands, since one justification for the augmentation was to address potential system failures at peak-usage times. However, this was not addressed by the proponent, nor does the data needed to answer the question appear to be available to the Department. The question also arises if the capital investment in a renewable energy system that is used only part of the time would result in a very high cost/unit of electricity generated. If so, their use may not be pursued in the marketplace in the absence of financial incentives or other forms of support.

2.3.3 Demand management

Some stakeholders questioned if strategies could be put in place to reduce the total demand for electricity by the CBD to remove the need for the augmentation of the supply. They argued that there is sufficient discretion available for end-users to make significant changes to their consumption patterns, so that it was imperative that this be explored as an option before the new cable was approved.

The Department did not dispute this perception, and referred to its own internal data that showed that building designs can have a marked influence on the energy requirements of either business or residential electricity users, and that many buildings are poorly designed from this perspective. On the

other hand, the Department noted EnergyAustralia's argument that their predictions of the increased demand come from the extrapolation of data on the operation of buildings and computer facilities that are already in place, so their request for the augmentation is to address an existing security threat.

The Department agreed that it is unlikely that retrofitting of the existing energy-hungry infrastructure would be possible in the limited time before the expected outages start to occur. EnergyAustralia also argued that any demand strategy would need to be sufficient to reduce demand below the threshold level that will create the need for the augmentation, since partial achievement of the goal would be unhelpful. Again, noting that the issue is one of peak-load consumption, successful demand strategies would also need to be effective during certain specific times of the day, but there was no data available on how this could be addressed within the daily business cycle, nor what the effects on business would be.

A further issue raised by stakeholders is the nature of the price increase that would be required for the electricity supplied to the CBD to discourage the increasing consumption. To be effective, it is possible that a pricing strategy would need to employ a severely demarcated tariff structure that penalised peak usage in preference for use at other times of the day. Arguably, it should target inner Sydney users only, since it is their consumption patterns that are driving the need for the augmentation.

A critical variable needed to answer this question is the price-elasticity-of demand (ped) applying to the subset of Sydney electricity consumers driving the demand for future supplies. In other words, the question arises about what is the price that would need to be charged to this particular and local group of consumers at peak times to encourage them to alter their usage patterns. The Department had no data at all available to it to make any assumptions about the use of the pricing tool in this manner. It is possible for instance, that in the CBD's finance industry where large volumes of capital are handled daily, the electricity charges are irrelevant to business profitability, so that demand is highly inelastic. Alternatively, where the total cost of operating a multistorey building influences its competitiveness in the property rental market, a hike in electricity charges may have a significant influence on how willing a building manager is to make structural changes that require a significant capital investment in energy efficiency measures.

Again, from the Department's perspective, the question is one of timing, since it is unclear how quickly any net positive effect of a well analysed pricing change would take effect. The Department was also aware that the broader pricing question is likely to be addressed in the Inquiry being conducted by the NSW Independent Pricing and Revenue Tribunal (IPART), and that they are expected to make a recommendation to the Government in 2002.

As part of its review, the Department consulted the firm of *Next Energy*, which advises on energy conservation strategies, and asked it to assist in assessing the extent to which alternative energy supply strategies may be applicable.

Next Energy gave the following advice:

1) Australian and international experience indicates that there are likely to be extensive but under-utilised commercially sound opportunities for sustainable energy in the CBD. These include existing standby generators, interruptible loads, power factor correction, energy efficiency, and the development of new sustainable generation (primarily gas-fired co-generation).

2) Properly pursued, these could likely make a significant contribution to CBD supply reliability.

3) Sustainable energy options could also make a significant contribution to further network augmentation needs identified by the proponents (which is understood to total about $750

million over the next five years).

4) However, given the lack of effort and limited experience to date with the large-scale rollout in Australia of the sustainable energy options listed above, there are significant uncertainties about the magnitude, cost and timing of their potential contribution.

5) Further, given that the level of reliability in the CBD is already low (ie. failing to meet an n-2 criterion), using sustainable energy options to achieve deferral or elimination of the proposed cable would be a highly ambitious (and risky) undertaking.

6) Rather, an objective that may better support the Government's sustainability objectives is to utilise CBD sustainable energy opportunities to:

   a) enhance CBD reliability in the short-term prior to completion of the proposed cable;
   b) gain extensive experience applicable to the CBD in advance of future needs to augment supply; and
   c) gain experience applicable to other areas in NSW.

7) Given the institutional incentives, expertise, and competing commercial priorities of the projects' proponents, it is unlikely that they would be well positioned to fully deliver on the sustainable energy options outlined above.

8) The 2001 revisions to the Demand Management for Electricity Code of Practice (NSW) significantly enhance the prospects for better utilisation of sustainable energy opportunities in the future. However, they are of themselves unlikely to overcome the challenges noted in (7) above.

9) 'Next Energy' also provided several examples relevant to the CBD augmentation project, including the following two. First, the State of California has prepared a detailed database of standby generation owned by customers that identifies over 3000 MW of capacity that could be used to enhance reliability. This database could be used as a model for a similar effort in the Sydney CBD. Second, 'Next Energy' brought to the Department's attention a funding proposal to the Commonwealth by the City of Sydney (in cooperation with Energy Australia and others) a practical strategy for upgrading the majority of existing commercial buildings in the CBD to higher energy efficiency. That proposal is an example of the type of groundwork that could be called upon to expedite large scale sustainable energy implementation efforts in the Sydney CBD.

As mentioned earlier, the Department accepted EnergyAustralia's position that it was now too late for the changes that would be needed to reduce demand in the time available to come into effect before the initial electricity shortfalls predicted by EnergyAustralia for 2003/2004 occur. The Department considers however, that measures to reduce electricity demand must be substantially progressed now to obviate the need for future augmentations elsewhere in the Sydney urban region. This report therefore recommends Conditions of Approval to progress this agenda.

Conclusion by the Department about the strategic justification

The Department has relied on EnergyAustralia's assertion that electricity outages were probable in the inner Sydney area in the next few years. The Department also agreed that if this prediction were correct, the supply failures could create a raft of unacceptable economic and social problems for the city and NSW as a whole. It noted that the finance and communications industry sectors are more concentrated in the Sydney CBD than anywhere else in Australia, so a threat to their operations and to the reliable linkages with their global networks would challenge the objective of the NSW Government in positioning Sydney as a competitive regional financial centre.

The Department was also acutely aware during its assessment of the strength of the concerns held by many stakeholders that an approval to augment the electricity supply to the Sydney CBD would raise a number of policy issues. In particular, it could conflict with moves at both the State and Federal level to reduce the generation of Greenhouse gases, and at the same time impede the fostering of a renewable energy industry in NSW that may eventually be a credible competitor to coal fired generation.

The Department considered, however, that there was insufficient evidence to suggest that the implementation of demand management strategies or the creation of mechanisms to increase the utilisation of alternative energy sources, would eliminate the threats to the supply of electricity to the CBD in the short timeframe outlined. These measures did not therefore preclude the need for the proposed cable to augment the supply.

However, the Department agreed with the arguments mounted by the stakeholders opposing the augmentation that the proper pursuit of alternatives must occur before any *future* large scale changes to the electricity network are planned for Sydney. It is expected that the IPART review will address various aspects of the debate. In the interim, the Department considered it is appropriate for the electricity industry to put in place measures which will ensure that the relevant environmental goals receive early and priority attention in future planning processes.

Accordingly, the Department recommends that any approval for the project be conditioned to require EnergyAustralia, as a representative of the industry supplying electricity to the Sydney region, to take immediate steps to ensure that the energy conservation objectives discussed are progressed substantially before they embark upon future large scale augmentation projects. Conditions are therefore recommended that require EnergyAustralia to contribute financially to the development of best practice arrangements for reducing electricity demand.

The Department considered that it would be appropriate for EnergyAustralia, as a representative of the industry supplying electricity to the Sydney region, to provide offsets for the expected environmental impacts associated with the augmentation, but particularly those derived from the potential increase in Greenhouse gas release. As a result of the negotiations over the Conditions, EnergyAustralia volunteered to contribute to a fund that is to be established by the Director-General to support studies into how greater efficiencies in electricity utilisation can be achieved, and how significant improvements in the levels of demand management practiced by consumers could be facilitated. The Conditions embody this agreement to enable the fund to be established with a legal basis, and to allow the industry to take immediate steps to ensure that the energy conservation objectives discussed are progressed substantially before they embark upon future large scale augmentation projects.

3 OVERVIEW OF THE PROPOSAL AS DESCRIBED IN THE EIS

This section provides a background to the proposal and a description of the project as outlined in the EIS. The current proposal for which EnergyAustralia is seeking the Minister's approval is described in section 5.

3.1 Background

The proposal forms part of a scheme to upgrade the electricity supply to the Sydney CBD and Inner Suburbs, together with TransGrid's Picnic Point to Haymarket 330kV underground cable proposal.

The aim of the scheme is to provide electricity to meet the growing demands of the region and to ensure that a satisfactory reliability standard is achieved. The scheme was developed through a joint planning process undertaken by EnergyAustralia and TransGrid in accordance with National Electricity Code requirements. Refer to section 2 for more information.

3.2 Project Description

The key features of the project, as described in the EIS, include:

- A 1300 m long cable tunnel linking TransGrid's (proposed) Haymarket substation, with EnergyAustralia's existing substations at Sydney South (Roden Cutler House) and Ann Street, Surry Hills and its proposed substation at Campbell Street, Surry Hills. The route is shown in Figure 3.1;
- The tunnel would be at a depth of 12-30 m, and be below public roads. It would have minimum internal dimensions of 3.2 by 3.2 m. It would be lined with shotcrete, with structural support as necessary;
- The tunnel would be constructed by road headers. The EIS estimated that about 20,000 m^3 of rock and soil would be removed in the excavation process. The excavation phase would extend over 18 months;
- The tunnel would contain eight separate 132kV circuits, two separate pilot trays, and services and operational facilities (such as communications);
- The main construction site would be in the Sydney Police Centre car park, with a possible secondary construction site (and adit) at Castlereagh Street, between Hay and Campbell Streets. The latter would only be required if it were necessary to 'increase the speed of the project'. If used, Castlereagh Street would need to be closed in this location, for about 6 months. The Police Centre site would be required for about 18 months;
- Access shafts will need to be constructed adjacent to existing EnergyAustralia substations at City South and Ann Street, Surry Hills. A partial closure of Campbell Street (for 3-6 months) will be required for the City South site, while partial closures of Little Albion Street and Crawford Place and a full closure of Wade Place (for 6 months) will be required at the Ann Street site;
- Permanent access locations to the tunnel will be provided at the four substation sites;
- Groundwater seepage from the tunnel will be collected, treated in a package treatment plant to EPA standards and discharged to the road drainage system;
- A tunnel ventilation system, which will operate intermittently to meet temperature criteria, air quality and maintenance requirements. It is expected that for much of the time the system will operate at a reduced capacity or be switched off. The ventilation system will comprise:
  - One inlet, on the existing facade of the City South substation (Roden Cutler House), at 25 m above street level. Fans will be located at this site;
  - Three outlets – Haymarket substation; Ann Street, Surry Hills substation, initially with a ground level discharge located adjacent to Wade Place during construction, and then a permanent

facility within an existing building; new Campbell Street substation.

The total construction period would be about three years. However, there would be some staging and the section connecting the Haymarket and City South substations would be commissioned at an earlier date (about 18 months construction period).

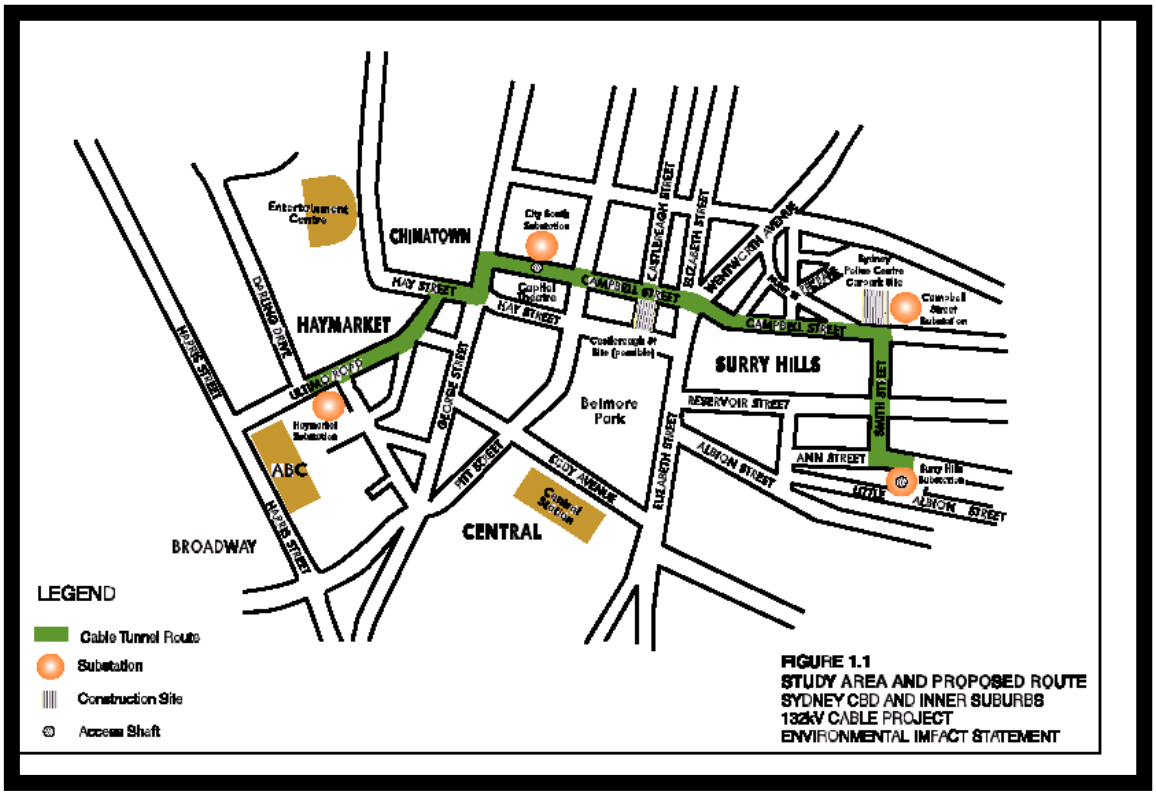


Figure 3.1 (from EIS figure 1.1)

3.3 Alternatives

A number of strategic level alternatives to the proposed scheme were identified through National Electricity Code processes – refer to section 2.

The EIS identified alternative construction techniques and alternative construction sites, and stated that alternative routes had been considered.

3.3.1 Alternative construction techniques

Five options were identified:

- Pit and duct – involves trenching and installation of conduits;
- Direct burial – involves trenching;
- Tunnel;
- Directional drilling;
- Overhead cables.

A range of advantages and disadvantages for each option were considered. The EIS stated that the disadvantages of the direct burial and overhead options were considered to outweigh any advantages

and they were not considered further. The remaining options were considered in the context of route selection.

3.3.2 Route selection

The EIS did not identify alternative routes to the chosen option. However, EnergyAustralia subsequently advised in correspondence to the Department and in the Representations Report that 11 routes were considered (involving varying construction techniques).

The three remaining construction options (see section 3.3.1) were each assessed within three geographically discrete sections[4] and against a range of criteria (including technical, commercial, social and environmental matters).

The tunnel option was selected on the basis that it would have less overall impact on existing land uses, and other factors such as transport, noise and vibration and water and air quality.

3.3.3 Construction site options

The EIS stated that four construction sites were considered:

- Sydney Square car park;
- Belmore Park;
- Sydney Police Centre car park;
- Castlereagh Street (between Campbell and Hay Streets).

The Police Centre site was selected as the main construction site because, according to the EIS, it does not have the environmental issues associated with the other sites. Castlereagh Street was identified as a secondary site.

[4] Section 1 – between Haymarket and City South substations; section 2 – between sections 1 and 3; section 3 – between Campbell Street and Surry Hills substations.

4 SUMMARY OF REPRESENTATIONS

4.1 Categories of Representations Received

The Representations Report stated that 8 representations were received on the proposal. This included preliminary issues raised by the Department.

The sources of the other 7 representations are categorised below:

Representation Type	**Number of Representations**
Individual Residents	3
Local Government	1
Government Agencies	3
Total	**7**

4.2 Overview of Issues Raised in Representations

4.2.1 Agency comments

- EPA:
  - Concerned about the lack of detail in the EIS and deferral of impact assessment regarding noise/vibration, air emissions, potential acid sulphate soils and water quality management;
  - Principal concerns relate to construction stage noise and management of stormwater and groundwater;
  - The EIS did not identify sensitive receivers likely to be affected by noise from the project, and did not quantify the magnitude and duration of predicted noise impacts on individual receivers.
- State Transit:
  - Partial closure of Campbell Street (Roden Cutler House) should not affect bus services, if Castlereagh Street is not closed. Need to maintain access for Pitt Street services;
  - It would be undesirable to close Castlereagh Street but, if necessary, adequate notice, route testing and (possibly) traffic light rephasing may be required;
  - Works at the Police Centre construction site may have a minor impact on bus services. If truck numbers increase, they should be confined to off peak periods. The bus stop in this location should be maintained. Adequate notice must be given of any proposed relocation.
- NSW Fire Brigades: need for emergency lighting in the tunnel.

4.2.2 Council comments

Sydney City Council made a number of comments, including:

- Use of the Police Centre car park is subject to an Agreement and must be complied with, together with additional controls to ensure safe use of the car park;
- Campbell Street partial closure can be tolerated, but a fee must be paid to Council. Need to maintain access to Royal Garden Hotel carpark and pedestrian access to businesses in this area;
- Full closure of Castlereagh Street would have adverse impacts, and should not be closed until Council has considered/approved a traffic and pedestrian management plan;

- Council needs to be advised of the location of connection points for tunnel drainage. Water needs to be adequately treated and monitoring results provided to Council;
- Street trees should be protected, and an audit undertaken of all significant trees;
- Footpath damage needs to be rectified at EnergyAustralia's cost;
- Tunnel route in the proposed Surry Hills Park must be consistent with already negotiated easements and new easements should avoid conflict with Park perimeter tree planting;
- A traffic management plan, spoil disposal routes and bus route diversions must be referred to the Sydney Traffic Committee;
- Advertising under section 116 of the Roads Act should be undertaken, and EnergyAustralia should notify businesses and residents of works;
- Construction programme needs to recognise December moratorium on such activities;
- Council requires details of the ventilation system impacts and design.

The proposal is also partly within the South Sydney Council area. Council did not submit a representation.

4.2.3 Private representations

The main concerns/issues raised in private representations included:

- Cable represents a failure to achieve strategic opportunities for more sustainable energy use (by encouraging continued reliance on coal fired electricity). However, there is little alternative to an approval given the urgent need to secure supply. Any approval should be conditional on the implementation of a properly funded demand management and embedded generation programme;
- EIS did not consider greenhouse gas implications (of more coal use);
- The EIS did not adequately consider alternatives(demand management /embedded generation) nor ESD;
- Lack of independence in assessing the options;
- Buses - trucks should not impede bus movements, location of temporary bus stops;
- Wade Place is an important pedestrian and cyclist thoroughfare and should not be acquired;
- EIS did not consider cyclist needs;
- Complaints/contact person should be nominated (both for contractor and regulator);
- Who has ultimate responsibility;
- Noise - compliance with Environmental Noise Control Manual not demonstrated; potential effects of road headers on sleep;
- Hours – all works should be confined to week days – no weekend work should be allowed; no out of hours work should be allowed; rock breakers – should only be used for shorter periods;
- Air quality – gas dispersion methods; vent locations and air quality impacts; need to use alternative (to diesel) fuels; responsibility for cleaning buildings affected by dust;
- Groundwater – controls that will be applied;
- Dilapidation surveys – process involved, liability and responsibility, compensation;
- Cumulative impacts with other construction activity.

4.3 Community Working Group

The Representations Report also stated that a Community Working Group had been established. The Report did not identify any issues raised by Group members. EnergyAustralia (via its consultants – GHD) subsequently advised the Department, in response to questions it raised, that one of the private representations was made by a Group member and this covered issues raised by the Group. The issues for the Group included: noise and vibration, and impacts on residential amenity and structures. The operation of the main construction site, and especially the hours of operation, was the key issue.

5 CURRENT PROPOSAL

5.1 Introduction

The Representations Report stated that a number of changes have been made to the exhibited proposal. A number of other changes have also been identified by EnergyAustralia, subsequent to the submission of the Representations Report. Therefore, the proposal for which EnergyAustralia is seeking approval for is that described in the EIS (and summarised in section 3.2) as amended by the changes discussed below. The changes affect:

- Tunnelling rate and extraction volumes;
- Truck numbers;
- Ventilation system;
- Vertical tunnel alignment;
- Timing.

5.2 Alterations to Tunnelling Rate and Extraction Volumes

The Representations Report states that the average rate of extraction is likely to be faster than that stated in the EIS ie average of 8m per day compared to 5m per day. It also states that the tunnel cross section would increase from 3.2m x 3.2m to 4.4m x 3.6m, but the tunnel would continue to be located under roads.

The net result is that:

- The length of time required to construct the tunnel would be reduced to 7 months. The EIS stated that excavation would take place over an 18 month period;
- The amount of spoil to be excavated would increase to 23, 000m^3 from 20, 000m^3, and would equate to about 38, 000m^3 when bulked up.

5.3 Truck Numbers

The increased amount of spoil and the increased extraction rate means that the average number of daily truck loads will increase. The Representations Report estimates that there will be an average of 21 truck loads per day (42 movements) during the excavation period. This compares with 8 truck loads (16 movements) outlined in the EIS.

5.4 Ventilation System

The EIS identified that the inlet at the City South substation would be constructed about 25m above street level. It is now proposed that it be constructed at a minimum of 3m above street level.

5.5 Tunnel Alignment – Proposed MetroPitt Rail Tunnel

To avoid a potential conflict with Rail Infrastructure Corporation's (RIC) proposed MetroPitt rail tunnel, EnergyAustralia now proposes to increase the depth of the tunnel by 4m at the point where it would cross the proposed railway, resulting in the vertical grade changing from 6.3% to 8%. There will be no change to the horizontal alignment or tunnel dimensions, as a consequence of this variation.

The revised alignment is in accordance with an agreement reached between EnergyAustralia and RIC.

5.6 Other Matters

Although not stated as changes in the Representations Report, EnergyAustralia has (via its consultant – GHD) subsequently identified a number of other changes. These include:

- City South Substation – it is now anticipated that Campbell Street will be partially closed for 8 months (the EIS assumed 3-6 months);
- Timing – it is now anticipated that the Haymarket to City South Substation section should be commissioned within about 15 months (EIS stated about 18 months), and about 21 months for the whole project (EIS stated about 3 years).

6 ASSESSMENT OF KEY ISSUES

This section outlines the Department's consideration of issues (other than those discussed in the next section) relating to the current proposal having regard to information presented in the EIS, representations received in response to its exhibition and other additional information obtained by the Department.
EnergyAustralia has also provided the Department with its assessment of the issues raised in representations. The Department has reviewed this and, where required, further information has been sought and obtained.

6.1 Traffic and Access

6.1.1 Background

The proposal will have a number of traffic and access implications. According to the EIS and Representations Report these include:

- Road closures – Wade Place will be closed for 6 months, Little Albion Street and Crawford Place will be partially closed for 3 month periods although not concurrently, Campbell Street will be partially closed for 8 months, and Castlereagh Street may be closed;
- Access restrictions:
  - Campbell Street – northern half of the road will be closed. Some disruption to pedestrian movement will occur. Alternative pedestrian access will need to be provided to ensure access to businesses (including Café Sips), and vehicle access will need to be maintained for the adjacent Royal Garden Hotel car park, as there are no alternative entrances;
  - Wade Place – this will be fully closed. This serves pedestrian and cycle traffic only. Alternative route are available;
  - Little Albion Street and Crawford Place – The EIS states that partial closure is preferable to full closure. No details are provided on likely traffic implications. It does state that pedestrian and vehicle access will need to be maintained;
  - Castlereagh Street – EnergyAustralia has advised the Department that it is unlikely that this site would be required. However, if required, it would result in the full closure of Castlereagh Street between Campbell and Hay Streets. Pedestrian access for the adjacent building would be retained. Traffic would be diverted to Campbell and Pitt Streets;
- Parking spaces – the EIS states that the southern part of the Police Centre car park would be used, but the Police Service intend to build an 82 space car park to off set the loss. It also states that about 4 parking spaces would be lost at Campbell Street and about 10 at Castlereagh Street (if this site is required);
- Traffic generation and spoil disposal routes – the EIS states that traffic generation would be limited to the construction sites and to the construction phase. It states that these impacts would be related to the need for vehicle movements to deliver equipment and materials and remove spoil generated by tunnelling. As indicated in section 5.3, the Representations Report states that there would be an average 21 spoil trucks (42 movements) a day during the excavation period (at the Police Centre site). The EIS identifies potential spoil truck routes (Figure 6.1). The EIS states that routes should generally be restricted to State or Regional roads, and should be restricted to the City Fringe area.

  In addition, EnergyAustralia's consultant has advised that the maximum employee and other vehicle operation would be 33 movements per day at the Police Centre site and 10 movements per day at the Roden Cutler House site.
- Bus and traffic implications – There are a number of bus routes and bus stops in the vicinity of construction works. The EIS specifically identified bus routes on Commonwealth Street (near

Campbell Street) and a bus stop adjacent to the Campbell Street substation site; and bus route and stops along Hay Street. Buses travel south along Castlereagh Street and, if this site is used, they will need to be diverted via Campbell and Pitt Streets and a temporary bus stop established.

The EIS states that the Campbell Street closure can be effectively managed due to it being a one way street and traffic impacts are expected to be minimal (with two through lanes being maintained). If the Castlereagh Street site is used, west bound traffic will need to be diverted via Campbell and Pitt Streets, with consequent impacts on the Campbell/Pitt and Pitt/Hay intersections, and east bound traffic diverted to Campbell Street, with consequences for the Campbell/Elizabeth intersection. The EIS concludes that impacts will be 'minor, although evident'. Some rephasing of traffic lights will be required.

The EIS proposes that a Traffic Management Plan be prepared as part of the Environmental Management Plan.

6.1.2 Key Issues

The main issues raised in representations included:

- Need to minimise impacts on bus services;
- Need to maintain access to the Royal Garden Hotel and other businesses in the vicinity of Campbell Street;
- Effects of the Wade Place closure on pedestrians and cyclists;
- Lack of consideration of impacts on cyclists;
- Need to rectify footpath damage;
- Full closure of Castlereagh Street could have adverse impacts, and management plan required before any closure;
- Need to ensure safe use of the Police Centre car park;
- Need for a traffic management plan (including spoil disposal).

6.1.3 Consideration

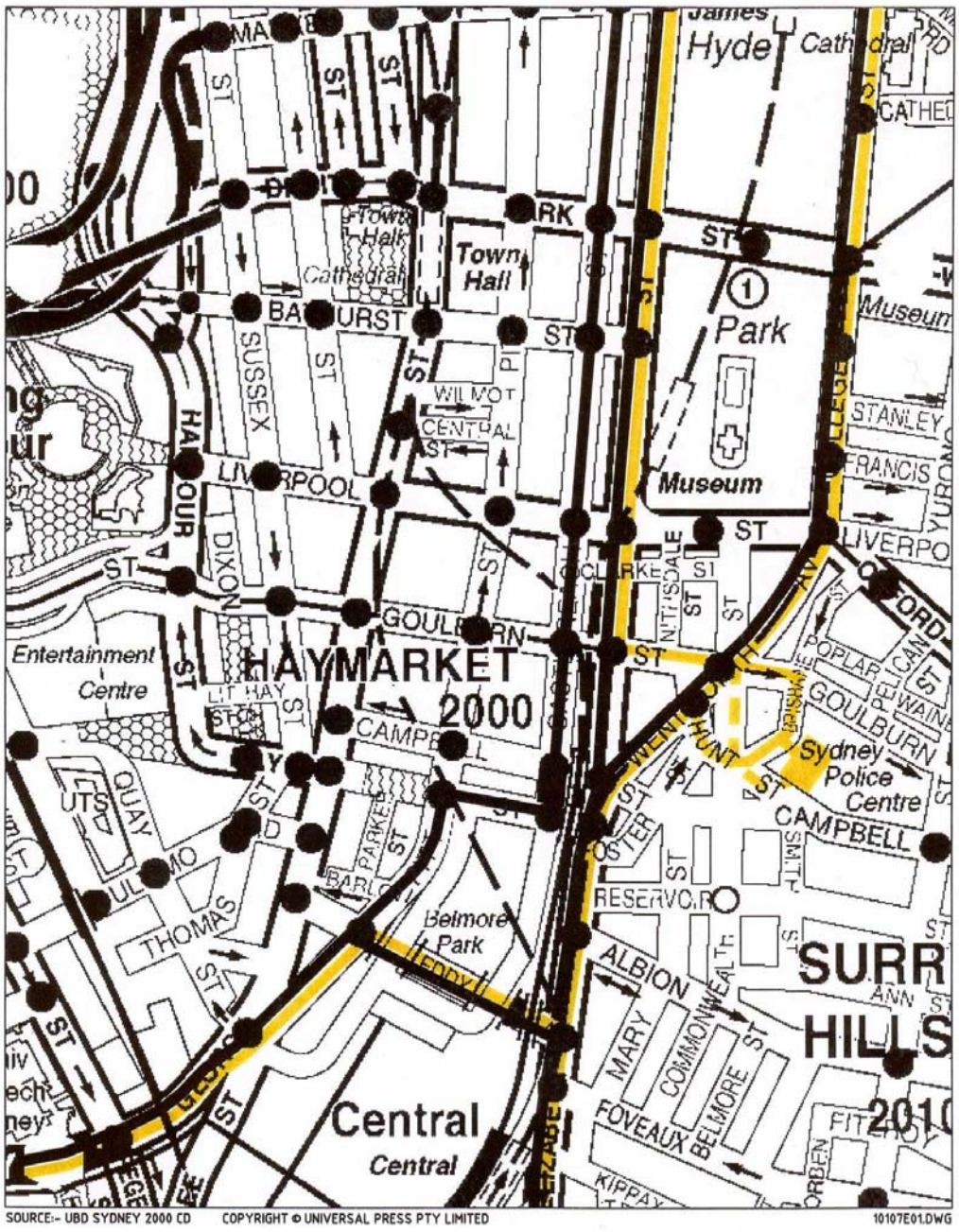
There was only limited traffic data provided in the EIS on traffic matters. For example, no data was provided on existing traffic flows, intersection performance, or pedestrian numbers. Nevertheless, it is clear that there will be some disruption and inconvenience experienced by users, residents and businesses of the affected areas. However, the Department considers that given the location of the works, that the impacts will be temporary, that they will affect relatively small areas and that the total traffic generation is not especially high, the impacts should be manageable without excessive disruption. To ensure that this is achieved, the Department recommends that a Construction Traffic Management and Access Sub Plan be prepared in consultation with relevant Councils, the State Transit Authority, the RTA, other relevant parties and the Community Working Group – Condition 46**.**

<u>Bus services</u>

The State Transit Authority (STA) raised some issues, as did local residents.

The STA indicated that the closure of the northern half of Campbell Street should have little or no effect on its services, providing Castlereagh Street is not closed. The closure of Castlereagh Street would be undesirable. If required, the STA would require at least 3 weeks notice to be able to re route buses and advise passengers.

The closure of Castlereagh Street is discussed below. The Department's recommended Condition 47, will require STA to be fully involved prior to any closure.



LEGEND

ROUTES
CONSTRUCTION SITES
CASTLEREAGH STREET SITE
SYDNEY POLICE CENTRE SITE (PREFERRED)
SYDNEY POLICE CENTRE SITE (OPTIONAL)

Figure 6.1
PROPOSED HAUL ROUTES
SYDNEY CBD AND INNER SUBURBS
132kV CABLE PROJECT
ENVIRONMENTAL IMPACT STATEMENT

The STA commented that, based on the EIS, the number of spoil trucks operating from the Police Centre site is acceptable and should not cause significant delays for buses. However, STA advised that if truck numbers increased (as is now proposed – see section 5.3) movements should occur during off peak periods to minimise impacts on buses, if possible. The Representations Report has rejected this suggestion stating that it would have a significant effect on the project. It suggests that procedures would be established to ensure that trucks accessing/departing the construction site be required to give way to buses.

The Department considers this a detailed management issue, which can be resolved through an agreed protocol. The STA will have input into the recommended Construction Traffic Management and Access Sub Plan. In addition, the Department recommends that a Spoil Management Sub Plan be prepared (Condition 92). This Sub Plan will require timing and management of truck movements to be addressed. The Department has also held discussions with the STA. It has advised that it is satisfied with EnergyAustralia's responses in the Representations Report.

The STA has also advised that a bus stop at the northern end of Campbell Street (Police Centre) be retained, or adequate notice given of the need for relocation. This can be addressed through the recommended Construction Traffic Management and Access Sub Plan.

Business Access – Campbell Street

The Department considers that it is likely that there will be some impact on business activities in this locality. However, the Department notes that no objections or concerns were raised by potentially affected parties to the exhibited EIS. Potential impacts can be minimised by good management and liaison with affected parties.

The Representations Report states that vehicle access to the Royal Garden Hotel will be maintained along with pedestrian access to other businesses in this area. This is consistent with the request made in Sydney City Council's submission.

The loss of parking spaces is low and should not have a significant impact.

The Department proposes that the recommended Construction Traffic Management and Access Sub Plan address access issues in this locality, in consultation with local businesses. The Department also recommends that a Signage Plan be developed, to minimise construction impacts on business activities (Condition 45).

Wade Place closure

Some residents expressed concern about EnergyAustralia's proposal to acquire Wade Place. They also referred to the lane's importance for providing 'permeability' for pedestrians and cyclists.

The Representations Report stated that EnergyAustralia already own this land. The Department's observations indicate that there are alternative routes close by and that Wade Place does not appear to be particularly well used. In any event, the closure will be temporary and the site will be made available for public use once construction is complete.

No concerns were expressed about the partial closures of Little Albion Street and Crawford Place. Partial closure of these streets will have little impact on traffic movement. However, there could be some loss of parking spaces, and there will be a need to maintain access to properties fronting these streets. The recommended Construction Traffic Management and Access Sub Plan will be required to address these matters.

Cyclists

Some residents expressed concern that the EIS had not addressed impacts on bicycle movements nor provide alternatives.

The Representations Report stated that the proposal would not impact on dedicated bicycle paths. It added that the 'only' impacts on bicycles would be because of altered traffic arrangements resulting from construction sites.

The Department considers that while dedicated bicycle paths may not be affected, it is still important that the special needs of cyclists, as a more vulnerable form of road user, be recognised in the management of traffic impacts. The recommended Construction Traffic Management and Access Sub Plan will include a requirement to address safe cyclist movement.

Footpath damage

The Representations Report states that the contractor will be required to repair any damage. The Department recommends Condition 48, which will require a road dilapidation report to be prepared prior to construction and obligate EnergyAustralia to repair any road and footpath damage (fair tear and wear excluded) at its expense.

Castlereagh Street closure

The EIS concluded that the closure of Castlereagh Street would only have a minor impact on traffic movement. However, Sydney City Council and the STA have both expressed concerns about the proposal. The Representations Report simply states that a management plan would be prepared and submitted to Council for approval.

There was no quantitative data provided in either the EIS or the Representations Report to support the contention that impacts will be minor. The Department's qualitative observation of traffic movement in the area concludes that the impacts may be manageable, if effective measures are put in place, but further details would be required.

In subsequent advice provided to the Department, EnergyAustralia's consultant stated that the contractor would not require the Castlereagh Street site.

However, in the event that EnergyAustralia decides that this site is required the Department recommends that a detailed set of procedures specific to the Castlereagh Street site be developed in consultation with the Council and STA. These procedures will need to be developed prior to any proposed closure, and will need to be approved by the Minister. The condition will also require that EnergyAustralia justify to the Minister's satisfaction that the use of the Castlereagh Street site is essential for the completion of the project within a reasonable time frame.

Police Centre car park

Council stated that appropriate signage and controls should be provided to ensure safe use of the car park. EnergyAustralia has agreed to this, and the recommended Construction Traffic Management and Access Sub Plan will apply.

Spoil disposal

The EIS and Representations Report provide details on spoil truck generation from the Police Centre site and proposed routes from both the Police Centre and Castlereagh Street sites. (No data was provided on traffic generation from the possible Castlereagh Street site).

The total number of truck movements from the Police Centre site would equate to less than 4 an hour[5]. This is low in comparison to the large number of vehicles handled by major roads in the area. Local streets will generally be avoided, and the EIS also proposes that use of roads passing through the centre of the CBD will be avoided.

The Department considers that the impacts will be acceptable. The Department recommends that a Spoil Management Sub Plan be prepared (Condition 92). This Sub Plan will need to address a range of traffic management issues, consistent with the Construction Traffic Management and Access Sub Plan. It will also need to address a range of other non traffic management issues such as dust/stockpile control and reuse/recycling (see section 7.6).

Other traffic and parking issues

In addition to spoil truck movements, there will be employee and other vehicle movements (see section 6.1.1).

These movements are considered to be manageable within the context of the surrounding city environment ie they are low numbers within a heavily trafficked area.

EnergyAustralia's consultant has advised that all contractors and employees will use parking facilities located within site compounds. This means that extra demands will not be placed on the local parking space supply.

The recommended Construction Traffic Management and Access Sub Plan will apply to these issues. This includes a requirement to minimise worker car use.

6.2 Noise and Vibration

6.2.1 Background

EnergyAustralia addressed the noise and vibration issue through the EIS and the Representations Report.

The EIS indicated that a Noise and Vibration Assessment was undertaken by a consultant (contained in appendix E to the EIS), and a separate consultant study prepared for the Sydney Police Centre site was also used.

The studies identified background noise levels (L_{A90} and Rating Background Level) and average noise levels (L_{Aeq}) for 5 locations in the vicinity of the construction sites (Police Centre – 3 sites; Surry Hills substation; and City South substation), covering day, evening and night periods.

Construction noise goals, based on EPA criteria were identified, together with vibration goals (based on both human annoyance {EPA Environmental Noise Control Manual} and structural damage {German Standard DIN 4150} goals) and regenerated noise goals (Australian Standard 2107).

During the operational phase, noise will be generated by permanent mechanical ventilation at the City South, Surry Hills (Campbell Street) and Surry Hills (Wade Place) substations. The EIS identified noise goals for these sites, based on intrusive and amenity goals.

The EIS states that the main impacts will be at the construction stage, with the only operational stage impacts coming from the intermittent use of the ventilation system.

[5] This assumes 42 movements a day, over an eleven hour day.

The EIS states that surface construction activities will occur between 7am and 6pm (Monday – Friday) and 7am to 1pm on Saturdays, with no work on Sundays or Public Holidays. Some weekend or night time work may be necessary. Underground tunnelling activities would take place 24 hours a day (with some surface movements, such as shift changes). Material excavated outside normal surface hours would be stockpiled underground, for removal during normal working hours.

The Representations Report states that no blasting will be permitted.

The EIS predicted noise levels from a range of activities at the construction sites, at distances of up to 100 m from the source. It found that noise levels during the site establishment and spoil removal phases would exceed medium and long term goals. However, no indication was given of impacts on individual receivers.

The EIS found that construction traffic noise is expected to have minimal impacts because of the limited hours of operation and that predicted traffic noise levels are less than existing noise levels. Note that the number of spoil trucks has increased since the EIS assessment – the Representations Report stated that this change could give rise to traffic noise which exceeds EPA goals by 4 dB(A).

Rock breakers were found to be the main source of vibration for surface activities. The EIS found that assessment goals could be achieved, if the right equipment (smaller rock breakers) were used. It found that rock breakers could result in audible regenerated noise at up to 100m from the source, and recommended that they not be used at night.

The EIS found that predicted surface vibration levels generated by underground works would achieve recommended goals for structural damage. Vibration levels could cause annoyance to any residents living directly above the tunnel, but as there are no dwellings in this location, impacts should be minimal. The Representations Report stated that the change in excavation rate should not have much impact on noise and vibration levels.

Few details were provided on operation noise levels. The EIS stated that 'it is anticipated that the ventilation system can be designed to ensure compliance with noise requirements set by the NSW Environment Protection Authority..'

The EIS identified a number of safeguards. This included noise and vibration monitoring, dilapidation surveys, use of noise barriers, positioning of plant, equipment selection, community consultation and personnel training programme.

6.2.2 Key Issues

Noise and vibration issues were one of the main concerns raised in private representations. Concerns included the need to comply with noise goals, limit noisy equipment such as rock breakers, and not work on weekends. Structural damage was also a concern.

The EPA was particularly critical of the noise assessment. It concerns and issues included:

- Failure to identify types and numbers of sensitive receivers that would be adversely affected by construction noise, and what the impacts would be;
- Assessment of actual construction activities needs to be undertaken (including road traffic noise);
- Use of EMPs is encouraged, but EPA will not evaluate them;
- Public consultation is essential;
- Need to assess the predicted impacts of the ventilation system at real locations;
- Community consultation particularly important regarding the use of rock breakers, and effects of 24 hour tunnelling. Respite periods may need to be negotiated;

- Vibration monitoring should be undertaken at vibration sensitive sites.

6.2.3 Consideration

Energy Australia responded to the various issues raised, in its Representations Report. It emphasised that rock breakers would only be used for about 5 weeks (in daylight hours) at the Police Centre site, that the proposed hours were consistent with EPA guidelines, that mitigation measures would be applied, that monitoring would be carried out and work practices modified if necessary (eg regarding 24 hour use of road headers).

The Department has discussed the issue further with the EPA. The EPA remains concerned about the level of assessment undertaken. It has emphasised that EnergyAustralia has not yet undertaken a comprehensive assessment of the project on potentially affected receivers.

The Department concurs with the EPA that it would have been preferable if additional information, specific to the likely impacts of the proposal, had been provided. The Department also acknowledges the EPA's views that undertaking noise assessment under post approval management plans is a sub-optimal means of dealing with this issue.

The available evidence suggests that there will be some adverse impacts on the local community. However, the scale of this is difficult to predict given the limited information provided.

Most of the impacts will result from construction activities and will therefore be temporary. With strong and effective management of noise sources, and close involvement of the community (including quick and sensitive responses from EnergyAustralia and its contractors to community concerns), it should be possible to control impacts within acceptable boundaries. In some situations, this may mean limiting working hours of certain types of equipment.

To address this issue, the Department proposes a number of detailed conditions. These conditions have been developed in consultation with the EPA. Again, the Department emphasises some of these issues should have been dealt with at the EIS stage, but accepts that they can be dealt with as management issues.

The key issues that the proposed conditions will address include:

- Dilapidation survey;
- Community consultation;
- Monitoring;
- Detailed pre-construction noise assessment;
- Construction Noise and Vibration Management Plan;
- Construction Noise Impact Statements – dealing with site specific management of noise impacts;
- Construction hours – Saturday morning work will be permitted, but may not commence until 8 am;
- Construction noise criteria and noise management mitigation measures;
- Regenerated noise criteria;
- Vibration criteria and management;
- Operational Noise Management Sub Plan, and operation management issues including monitoring and rectification of exceedances.

6.3 Air Quality

6.3.1 Background

EnergyAustralia addressed air quality issues through the EIS and the Representations Report.

The EIS indicated that an Air Quality Assessment was undertaken by a consultant (contained in appendix F to the EIS).

Two types of air quality issues were identified:

- Dust emissions at the construction sites, especially the Police Centre car park;
- Emissions from the tunnel ventilation exhaust.

The EIS identified ambient levels of pollutants at a number of sites in the CBD area. It found that the air quality across the CBD is highly variable both in space and time, with some exceedances of air quality goals. It stated that the air intake points and exhaust points for the cable tunnel are in areas where it would be expected on occasions pollutant levels would be close to air quality goals.

Dust would be generated from various construction activities, such as earthworks, stockpiles and transport of spoil. Impacts will depend on local meteorology and management. EnergyAustralia proposes that an Air Quality Management Plan be developed to deal with the issue. A range of mitigation measures were identified, including equipment selection, use of dust suppression techniques, sealing exposed areas, silt removal, stockpile management and control of smoky vehicles.

The presence of silica (crystalline quartz) in excavated sandstone was identified as an occupational health issue, but was not considered to present an off site environmental problem, as most of the emissions would be underground.

There is also a potential for gas to accumulate during the tunnelling process.

Possible sources of pollutants in air emitted from the ventilation system included:

- Inlet – a range of pollutants are likely including carbon monoxide, oxides of nitrogen, particulate matter, air toxics. The EIS states that these pollutants are present in air throughout the CBD, and there would be nothing unusual in this. Once emitted from the vents, the air would disperse and it is unlikely that the pollutants would be at higher levels than at many other locations in the CBD. The EIS stresses that the vents should not be directed towards windows or air intakes in surrounding buildings;
- Tunnel pollutants (normal operating conditions) – the EIS states that there are no known major sources of pollutants in the tunnel. There could be minor sources of volatile organic compounds and dust. Any emissions would be minor;
- Tunnel pollutants (maintenance) – some emissions may be generated from diesel generators and welding activities, but would be minor (in terms of emissions being vented from the tunnel);
- Tunnel pollutants (unusual situations – eg fire, gas leaks, chemical spills) – considered to be unlikely, but would be dealt with as part of risk management. Appropriate siting of vents would minimise community risk.

The Representations Report states that the vents will be directed away from windows and building air intakes. It also states that the system will operate intermittently – ie during periods of peak energy demand, 'which are rare and only occur during extreme weather conditions'.

6.3.2 Key Issues

A number of issues were raised in representations to the EIS.

Private representations raised concerns about the vent locations and air quality impacts; about gas dispersion; dust impacts and greenhouse issues.

Sydney City Council sought more details on the ventilation system.

The EPA had a concern about the lack of assessment of the ventilation system's impacts eg no indication of vent locations. The EPA noted that while pollutant levels may be low, it is essential that EnergyAustralia take account of community sensitivity to vents. EnergyAustralia should also examine the need for any mitigative measures to be applied.

6.3.3 Consideration

The Representations Report provided only a limited response to the air quality issues raised. It essentially restated that the operation of the ventilation system is not expected to impact on air quality, and there are opportunities for community comment.

The Department considers that EnergyAustralia's response does not fully deal with the issues raised. However, the Department has discussed the issue further with the EPA. The EPA has not indicated that it has any major concerns with the potential air quality impacts of the proposal. The Department also notes that the system is essentially transferring air from one part of the CBD to other parts and will only do so on an intermittent basis.

The Department's conclusions are that the air quality impacts of the proposal can be managed, if appropriate controls are put in place.

The Department therefore recommends that a number of conditions be applied to the proposal. These proposed conditions include:

- Preparation of a Construction Stage Air Quality Sub Plan. This will address dust, tunnel gas, energy conservation/construction stage greenhouse gas generation, and personnel training;
- Maintenance of construction vehicles;
- Operation stage air emissions to be addressed through the Operation EMP, including consideration of air quality control measures and monitoring.

Strategic level greenhouse issues are discussed in section 2.3. Risk issues are discussed in section 7.8.

6.4 Water Quality

6.4.1 Background

The bulk of the proposal falls within the Darling Harbour catchment area.

The EIS stated that most water quality impacts are likely to occur at the construction stage as a result of erosion, sedimentation, and contamination.

Potential surface water quality impacts could occur at adit and shaft sites, resulting from erosion of spoil stockpiles. Material could be transported by stormwater or by vehicles, resulting in degradation of water quality. A detailed erosion and sedimentation control plan is proposed.

It is expected that groundwater and rainwater could collect in adit and shaft excavations. This would be pumped out and treated.

Groundwater is likely to flow into the tunnel during both construction and operation stages. EnergyAustralia proposes that the groundwater will be treated and then discharged to the stormwater

system. The aim is to treat the water to meet EPA standards. EnergyAustralia has also stated it will use techniques such as grouting to minimise groundwater inflows during the operation stage.

Groundwater could be heated during the operational phase because of heat dissipated from the cables. However, the EIS states that water temperature rises would be controlled by the ventilation system, collection system and the treatment system.

Acid sulphate soils are discussed in section 7.10.

6.4.2 Key Issues

Sydney City Council stated that discharge water needs to be adequately treated and monitoring results provided to Council.

The EPA raised a number of concerns. The main points made by the EPA included:

- Need to comply with the Protection of the Environment Operations Act;
- The need to minimise groundwater inflow (lining, grouting);
- Alternatives to discharge to the stormwater system should be considered eg sewer, reuse (dust suppression) – receiving waters at Darling Harbour are poorly flushed;
- If the stormwater system is used, need to control temperature, avoid excessive freshwater discharges and be aware that some coagulants and flocculants can harm aquatic life;
- Need to be aware that groundwater and tunnel water quality may differ;
- Need to consider potential for spills and leaks eg from cable coolant and fuel;
- Erosion and sedimentation control plan is supported. It must be properly implemented.

6.4.3 Consideration

The main points made in the Representations Report included:

- Lining will be used to minimise inflows;
- Alternatives to stormwater system discharge were examined, but considered to be impractical (eg irrigation, return to aquifer). No mention was made of the use of the sewer;
- Discharged water would meet EPA guidelines;
- No cable coolant will be used. Measures will be employed to manage chemical and fuel spills.

The Department has discussed the matter further with the EPA and understands that the EPA considers that the potential impacts are manageable if adequate controls are put in place.

The Department recommends that a number of conditions be imposed on the proposal to ensure that the impacts are adequately managed. These conditions include a requirement to prepare a Soil and Water Quality Management Sub Plan and a Groundwater Management Sub Plan. These plans will apply to both the construction and operation stages, require monitoring and will also require EnergyAustralia to further consider alternatives to the use of the stormwater system for disposal, and to employ methods to minimise groundwater inflows.

The risks of spills are addressed in section 7.8.

6.5 Geotechnical Issues

6.5.1 Background

A geotechnical assessment was undertaken as part of the EIS, and incorporated as Appendix C.

The key features are:

- The tunnel will generally be located in Hawkesbury sandstone;
- There are a number of dykes (notably the Great Sydney Dyke), faults and joints which intersect the route;
- The tunnel will be below the water table;
- The rock is generally of low permeability with low seepage potential, but there are some exceptions;
- Access shafts will pass through weathered rock, residual soils and fill which overlie the Hawkesbury sandstone.

Grouting and lining will be required in some areas to reduce water inflow. Pumps will be installed for dewatering purposes. Structural support will also be required in some locations. Further detailed assessment is proposed during the design/excavation stage to identify specific rock support requirements.

A geochemical assessment was also undertaken as part of the EIS and included in Appendix D.

This indicated that hydrogeological conditions are likely to impact on construction because the tunnel will be located below the water table. Discharge of groundwater will be impacted by the presence of contaminants and potential acid sulphate soils, which have the potential to reduce the quality of the receiving environment. Refer to sections 6.4 (water quality) and 7.10 (acid sulphate soils).

Hydrogeological impacts during operation are likely to be limited to groundwater ingress, and its disposal (refer to section 6.4). The geochemical assessment also stated that the heat generated by the cables would reduce groundwater flows – the heat would have the effect of drying the tunnel walls and surrounding rock.

6.5.2 Key Issues and Consideration

Few concerns were raised about geotechnical issues, although some private representations did raise concerns about the potential for property damage.

Damage can occur through direct slumping of rock as the result of the creation of a cavity (ie the tunnel space) or through changes in ground water levels. (Damage can also occur as a result of vibration resulting from construction activities).

The location of the tunnel under public property should minimise the risk of damage to private property. As discussed in section 6.6, a dilapidation survey is proposed (and a condition to this effect is recommended).

The location of the tunnel within generally sound sandstone should minimise the risk of slumping. The need to provide structural support in more vulnerable locations has been recognised by EnergyAustralia. The Department recommends a condition that will require the structural integrity of the tunnel to be certified by a suitably qualified structural engineer.

Most of the route is located in areas of low permeability. However, the tunnel is located below the water table, and there are some areas of high permeability. EnergyAustralia has recognised the need to protect the tunnel from groundwater inflow (as well as the need to deal with groundwater that does enter the tunnel). The Department recommends that a detailed Groundwater Management Sub Plan be prepared as part of the construction and operation stage EMPs to ensure that the issue is properly managed.

6.6 Property and Land Use Impacts

6.6.1 Background

The EIS stated that the cable tunnel (including rock bolts/anchors) will pass under public land, and therefore the development potential of adjacent private land should not be constrained. However, a dilapidation survey will be undertaken, to identify whether construction works cause any damage to properties.

The EIS acknowledged that there would be some construction stage impacts on property use, resulting from noise, air and traffic effects. In particular, it indicated that there could be some adverse effects on business activity in the vicinity of the Roden Cutler House construction site.

6.6.2 Key Issues

Some concerns were raised in private representations about construction stage impacts on amenity (resulting from noise, air quality and traffic effects). There were also some concerns raised about the need to ensure that property damage is avoided during construction.

Sydney City Council identified that business access would need to be maintained.

The Rail Infrastructure Corporation (RIC) identified a potential conflict with its proposed underground MetroPitt railway line.

6.6.3 Consideration

Issues such as noise and traffic impacts are considered elsewhere in this report (particularly sections 6.1, 6.2 and 6.3).

The Department acknowledges that the tunnel does not impinge on private property and therefore any restrictions on future development should be minimal. However, as a precautionary measure, the Department proposes that conditions dealing with rock anchors/bolts be imposed. These conditions will require that adverse impacts on properties be avoided.

The Department supports EnergyAustralia's proposal to undertake dilapidation surveys. The Department proposes that a condition be imposed requiring that the surveys be carried out, and that any damage be fully rectified at EnergyAustralia's expense. This will address the concerns raised by residents about the potential for property damage and compensation.

The number of businesses that will be affected is relatively small and temporary, but it is inevitable there will be some disruption.

The Department agrees with the Council about the need to maintain access to businesses. Business impact has been partly dealt with in section 6.1.3, in terms of access. In addition, the Department proposes a number of other conditions, including liaison with affected landowners and a Signage Plan for businesses. With these measures in place, the Department considers that the impacts and disruptions to businesses can be kept to a minimum. The Department notes that no objections were received from business operators.

Other property impacts can be managed and minimised through good management of noise, air quality and traffic effects. These matters are discussed in sections 6.1, 6.2 and 6.3.

As discussed in section 5.5, EnergyAustralia has reached an agreement with the RIC over the MetroPitt railway proposal. The tunnel will also cross the route of existing railway lines. No objections were raised

by RIC. The Department recommends a condition be imposed requiring any crossing of railway lines to be in accordance with RIC requirements.

7 ASSESSMENT OF OTHER ISSUES

This section outlines the Department's consideration of issues (other than those discussed in the previous section) relating to the current proposal. Again, recommendations are made for conditions of approval, where appropriate, in order for particular issues to be satisfactorily addressed during construction and/or operation.

7.1 Electric and Magnetic Fields

7.1.1 Background

The EIS stated that operation of the cable will create electric and magnetic fields. It also stated that the strength of the electric field will be negligible because such fields are effectively shielded by most materials, in particular by the insulation and earth metal sheath that surround the cables. Consequently, the EIS gave no further consideration to electric fields.

The EIS acknowledged that the magnetic field would be measurable external to the cable. It also stated that magnetic field strength would fall rapidly with distance from the cable. Expected magnetic field levels resulting from the cable were identified in the EIS, as shown in Figure 7.1

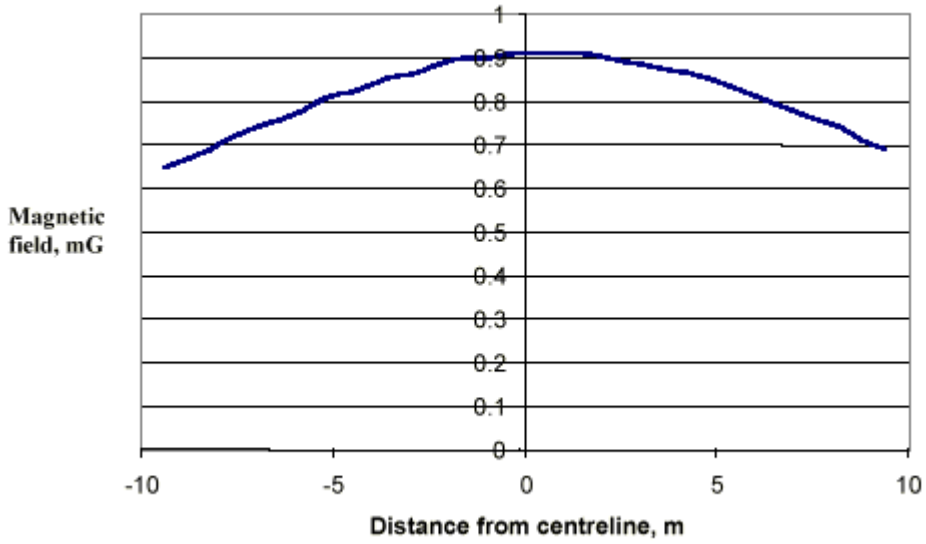


Figure 7.1 – Magnetic Fields Associated with the Project (from Figure 7.2 of EIS)

(Note: the Figure is calculated on normal operating loads, at 1m above ground, assuming the tunnel is located 12 m below the surface).

The EIS concluded that the current broad consensus of scientific opinion is that adverse health effects have not been established, and the risk to human health (if any) is likely to be small. However, the EIS stated that EnergyAustralia continues to take a cautious approach to the issues, and has applied a policy of 'prudent avoidance'. In the case of this proposal, this includes locating the tunnel 12-30 m below ground; installing the cables in a 'trefoil' arrangement (this reduces field strength); and locating the tunnel route within road reserves.

7.1.2 Key Issues and Consideration

No concerns were raised about electric and magnetic fields in representations made to the exhibited EIS.

The NSW Health Department provided advice to the Department on magnetic fields in relation to the TransGrid portion of the CBD electricity supply upgrade proposal (see section 1.2). Health advised that it is not currently appropriate to set a standard or guideline for community exposure to low level magnetic fields. However, it noted that recent scientific reviews[6] agree that long term average exposure above a level of 4 milliGauss (mG) is associated with a doubling in the risk of childhood leukaemia. Health suggested that this level could be used as a benchmark against which the TransGrid proposal could be tested.

The magnetic field level predicted to be generated by the EnergyAustralia proposal is well below the 4 mG level. As stated in Figure 7.1, the level will be below 1 mG, above the cable at its shallowest point. At other locations, the levels will be lower.

The Department considers that it would be desirable for magnetic field levels to be monitored, to ensure that levels stay low. It is recommended that the operation stage environmental management plan be required to address this issue.

7.2 Alternative Routes

7.2.1 Background

The EIS identified the following considerations in the selection of the proposed cable tunnel route.

A feasibility study evaluated the route options by considering:
- The most direct route/s;
- Geographical conditions and existing service congestion;
- Traffic, pedestrian, customer and business impact;
- Environmental issues; and
- Property and legal issues.

The selection criteria utilised included the following:
- Systems security and capacity;
- Technical achievability of the engineering solution – cabling;
- Community/stakeholder relations impact;
- Environmental impact;
- Technical achievability of the engineering solution – civil engineering;
- Program achievability risk; and
- Commercial opportunities.

The proposed route was broken up into three stages:
- Haymarket to City South;
- City South to Campbell Street; and
- Campbell Street to Surry Hills.

[6] This includes the 'Doll Report' (United Kingdom National Radiological Protection Board) and a recent report by the International Agency for Research on Cancer (IARC – a part of the World Health Organization).

7.2.2 Key Issues and Consideration

The Department recognises that EnergyAustralia's proposal is an extension of TransGrid's proposal (330 kV cable from Picnic Point to Haymarket). EnergyAustralia's proposal commences at Haymarket and links up four substations throughout the lower Sydney City area: Haymarket, City South, Campbell Street and Sydney City (Surry Hills).

The EIS did not identify other routes that were investigated, although EnergyAustralia subsequently provided the Department with some information indicating that 11 options had been considered. The route was selected by conducting a feasibility study based on the considerations stated above. The EIS did identify that the route selection process took into consideration the various methods of construction.

The preferred option was selected based on the advantages of having a tunnel that could be constructed and maintained with minimal interruptions to the function of the surrounding environment. EnergyAustralia stated that the impacts during construction and operational phases would be limited to the access points and would not degrade any areas of environmental significance.

While information provided on alternatives was limited, the Department notes that no objections or concerns were raised about the preferred route or construction technique. It considers that the route selected is a practicable solution to connecting the four substations following the criteria that have been identified. The Department considers that the environmental impacts are manageable.

The selected route is relatively direct and, by following roads avoids private property impacts. The use of a tunnel means that impacts on surface impacts such as traffic and business activities are minimised, as are long term concerns such as magnetic fields that might result from a cable near the surface.

The Department concludes that the chosen alternative is a reasonable choice and there are no obviously better routes.

7.3 Heritage

7.3.1 Background

Heritage consultants, Casey and Lowe Associates, prepared a heritage assessment as part of the EIS. The EIS stated that the proposed cable tunnel route was inspected for heritage items and various planning instruments were consulted for listed items most likely to be affected by the proposal.

The EIS identified four sites likely to contain archaeological remains, which are as follows:

- Site 1: Campbell Street Substation (Police Centre Carpark)
  - archaeological remains (footings) of St Simons and St Jude's Anglican Church;
- Site 2: Campbell Street in front of the existing City South Substation (Roden Cutler House)
  - expected archaeological evidence within the street should be of earlier road surfaces, water mains, and other services; and
  - pottery remains from former pottery manufacturing sites;
- Site 3: Wade Place adjacent to the existing Surry Hills substation
  - may contain remnants of early housing and later brickfield activities; and
- Site 4: Castlereagh Street, roadway and eastern and part of western footpaths between Campbell Street and Hay Street
  - remnants of the brickfield site and the Cattle Market. The remains would include a yard, fencing, bricks and pottery.

The EIS also identified that previous studies have been conducted for Site 1: the Campbell Street Substation (Sydney Police Centre Carpark). The detailed investigation and published document,

Archaeological Assessment and Research Design, Campbell Street substation, was completed for Enerserve EnergyAustralia, March 2001.

The EIS identified numerous heritage items in the vicinity of the proposed tunnel, and their significance. The heritage items that have been identified date back to the early nineteenth century. Their significance is linked to the sites and the activities that were undertaken. Some of the significant remains that have been identified are lead-glazed earthenware, stoneware, glass, pottery, footprints of earlier buildings, cart marks and marks of horses' hooves.

The EIS stated that due to the degree of previous disturbance in the study area, the impacts of the project on Aboriginal Archaeology are likely to be minimal.

Any impacts on heritage and archaeology would be limited to the construction sites and workplaces required for the project.

7.3.2 Key Issues

The NSW Heritage Office was concerned about the level of assessment of heritage items and sites along the proposed cable tunnel route.

The concerns have been addressed in regards to the following issues:
- Indigenous heritage; and
- Non-Indigenous heritage.

7.3.3 Consideration of Key Issues

Indigenous Heritage

The EIS identified that the potential impacts on indigenous heritage items are minimal, due to the degree of previous disturbance in the study area. The NSW Heritage Office stated that provisions should be made to deal with the potential unearthing of previously unidentified items/areas of potential indigenous archaeology. There were no issues raised by the NPWS.

The Department recommends that management of indigenous archaeological finds during construction be detailed in an Indigenous Heritage Management Sub Plan, as part of the Construction EMP. The Sub Plan must require work to be stopped and NPWS and the Metropolitan LALC to be contacted should items of indigenous heritage significance be unearthed.

Non-Indigenous Heritage

The NSW Heritage Office raised concerns in regards to the excavation works that have been proposed at the following sites:
- Sydney Police Centre Car Park;
- Roden Cutler House;
- Wade Place; and
- Castlereagh Street.

The concerns that were raised by the NSW Heritage Office were as follows:
- That archaeological testing has not been conducted even though an excavation permit was issued, for the proposal in the vicinity of Campbell Street substation, by the Heritage Council under delegated authority in April 2001,
- That the Proponent must apply for further permits to conduct excavations at works sites;
- That the Proponent is responsible for briefing all workmen and all contractors as to the heritage issues prior to commencement of works;

- That work schedules should be adjusted to accommodate the archaeological excavation works;
- That general bulk excavation of sites should not commence prior to compliance with the conditions and requirements of any excavation permit required; and
- That should any unexpected historical relics be encountered, work is to cease immediately.

The Department recognises that EnergyAustralia has conducted an archaeological assessment for the proposal but that further assessment may be required in consultation with the NSW Heritage Office. The Department recommends that a Non-Indigenous Heritage Management Sub Plan be prepared as part of the Construction EMP. The Sub Plan is to be developed in consultation with the NSW Heritage Office and relevant councils.

As a precautionary measure, the Department recommends a condition that will limit vibration levels in the vicinity of heritage items and other sensitive structures. This will reduce the potential for damage to such buildings.

7.4 Community Liaison

7.4.1 Background

The EIS indicated that, due to limited timeframes, it was not possible to provide the community with an opportunity to comment on the proposal during the EIS preparation period. Community consultation focused on the EIS exhibition stage. This included:

- Distribution of an information brochure;
- Public display and advertising of the EIS;
- Use of EnergyAustralia's website;
- Convening meetings with interested stakeholders to discuss the project and any issues and concerns – a community working group was established;
- Establishment of a toll free 24 hour contact telephone number.

Prior to the publication of the EIS a Planning Focus Meeting (PFM) was held on 15 February 2001. This involved a number of agencies, including the relevant local councils.

EnergyAustralia has stated in the Representations Report that regular newsletters will be issued to properties around the Police Centre and along the tunnel route, meetings with the community working group will continue, and the toll free number will be maintained. The EIS has also identified that, as part of the design and construct contract, the successful contractor would be required to develop and maintain a community involvement plan throughout the duration of the contract in consultation with EnergyAustralia.

7.4.2 Key Issues and Consideration

There was only one individual representation made in regards to community liaison. It referred to the means of making complaints and who should be contacted. EnergyAustralia responded in the Representations Report by stating that a Customer Liaison Officer would be available to take calls 24-hours a day on a toll free number. The representation also raised concern that there was a lack of community consultation. EnergyAustralia responded by stating that it was committed to community consultation and had exceeded statutory requirements. As discussed in section 4.3, EnergyAustralia has established a Community Working Group.

To ensure that EnergyAustralia meet its responsibilities to consult the community on a regular basis, the Department recommends a condition that will retain the community working group and require the proponent to take account of the group's concerns.

The Department also recommends a number of other conditions to ensure community concerns can be addressed. These include the need to have a 24 hour contact number, to have a complaints register (with prompt response times) and the need to advertise activities.

7.5 Visual Impacts and Urban Design

7.5.1 Background

The cable tunnel proposal is to be located underground from Haymarket to Surry Hills, in the lower Sydney CBD area. The area is bound by multi-storey commercial, residential and mixed-use properties. The Surry Hills end from the Sydney Police Centre Car Park to the Surry Hills Substation consists of predominantly residential dwellings. There are numerous street trees along the proposed cable tunnel route.

The EIS conducted a visual impact assessment, which identified the effects of the proposal on the existing visual amenity. The EIS identified some mitigation measures that the proponent might implement, such as the use of hoardings and consultation on preservation of trees by an arborist. The visual assessment identified or gave weighting to the visual impacts based on two components: urban design and landscape qualities. The EIS identifies that the visual amenity and landscape impacts associated with the project would be limited to the construction phase and focused on the work sites.

7.5.2 Key Issues and Considerations

The Department recognises that the visual amenity and landscape impacts along the proposed route will be minimal and of a low to medium level. It also recognises that the impacts will be limited to the construction phase and specifically at construction sites.

Construction Sites and Hoardings

The EIS states that the Sydney Police Centre Car Park has low to medium landscape and visual qualities but is located in a prominent area. The EIS also identifies that Wade Place is of little amenity value aside from its use as a pedestrian link and that excavation in the vicinity of the City South Substation, at Roden Cutler House would reduce the pedestrian thoroughfare and amenity associated with nearby shops and cafes. It also identified that the visual quality of the streetscape, at Roden Cutler House would also be reduced during this construction period. In the event that the Castlereagh Street construction site was to be used the EIS stated that the site has a medium landscape and visual quality, as the site is visually prominent from the surrounding streets and high-rise office towers. The mitigation measures proposed by the EIS involved: recommending that the construction programme consider the need to expedite the work at construction sites specifically at Roden Cutler House to minimise potential impacts on the amenity of the area and the screening of construction sites by the use of hoardings.

The Sydney City Council stated that the hoardings provided around the construction sites shall be in accordance with the Council guidelines and should feature project information panels to assist in informing the community of the project. EnergyAustralia did not make a formal response to this issue but the Council was generally satisfied with the comments made in the Representations Report in response to its concerns. The Department acknowledges the need for hoardings and to ensure that the visual amenity impacts are minimised, the Department recommends that detail designs be prepared as part of the Urban Design and Landscape Sub Plan, as per condition 83.

Tree Preservation

The EIS identified that the potential impacts on landscaping would be limited to the construction phase of the proposal with the impacts being focused at the work sites. The Sydney City Council stated that it requires the significant trees in the car park to be identified on plan and Council shall approve protection

for them prior to commencement of construction. The Council also stated that all trees should be protected at all times during construction, in accordance with Council's Tree Preservation Order. An audit of all significant trees for the full length of the proposed tunnel route that could be impacted by the proposed works is to be undertaken, including significant trees in the Sydney Police Centre Car Park. The Sydney City Council also stated that an appropriate bond for tree protection is to be payable to Council.

EnergyAustralia stated in the Representations Report that the project would not impact on street trees along the tunnel route. Given the depth of the tunnel the Department agrees that it is unlikely most trees would be affected. However, there are trees within the vicinity of the construction sites that could be affected. The Department recommends that the Proponent prepare a Tree Management Sub Plan, which would address management and protection of trees during construction.

Maintaining sites

There was an individual representation submitted in relation to maintaining sites. The query was whether EnergyAustralia or the contractor would pay for cleaning the outside of buildings (ie windows) when dust would be generated from various activities associated with the construction of the tunnel including earthworks, stockpiling and transport of soil. EnergyAustralia responded in the Representations Report, by stating that the mitigation measures detailed in Section 7.5.3 of the EIS would limit dust generated by the construction works.

The Department agrees that the objective should be to reduce dust generation at its source. The Department recommends the preparation of a construction stage Air Quality Sub Plan, which will address potential dust impacts. The opportunity will also arise for residents to raise concerns through the Community Liaison Group and the built in complaints mechanism.

7.6 Spoil and Waste Management

7.6.1 Background

The EIS states that the main waste generated will be sandstone based spoil. Most of this material will be classified as Virgin Excavated Natural Material (VENM). This material is suitable for reuse in construction purposes. The EIS states that particular attention will be given to adaptive reuse, although it will not be possible to reuse material on site.

The Representations Report states that the amount of spoil excavated would be about 23, 000m^3, which would bulk up to about 38, 000m^3.

Other waste would include material such as bitumen, concrete and cable cut offs. This material would be reused, recycled or disposed of as appropriate.

EnergyAustralia's consultant has stated that spoil will be stockpiled at the north western corner of the Police Centre site. The stockpile will cover an area of 15m by 12m, with a maximum height of 4m. All spoil generated from the road header will be removed through the Police Centre site. Spoil from other sites (shaft excavation) will be loaded directly onto trucks or into removable bins. Material excavated at night or other times when surface works are not permitted, will be stockpiled underground for removal during approved surface working hours.

Traffic generation resulting from spoil removal is discussed in section 6.1.1.

The EIS did not identify any significant contaminated land issues. It did state that surface material at the Police Centre site would need to be tested, if it were to be removed from the site.

7.6.2 Key Issues and Consideration

Some issues were raised about spoil transport. This issue is considered in sections 6.1.2 and 6.1.3.

The EPA indicated that reuse options should be identified, material should be classified in accordance with EPA guidelines, and there is a need to account for any contaminated spoil encountered.

General waste management and recycling

The Department notes that waste generation is an unavoidable consequence of the proposal. However, if waste is effectively managed, opportunities for reduction, re-use and recycling can be maximised. To this end, the Department's recommends that a Waste Management and Reuse Sub Plan be required. This Sub Plan would identify how spoil and waste would be handled and disposed based on the waste management hierarchy of reduce, re-use and recycle, and would provide specific requirements for waste minimisation and management.

Spoil transportation and reuse

Transportation issues are discussed in section 6.1.3. Other management issues include the need to ensure that dust and run off are controlled and that reuse and recycling are encouraged in preference to disposal. Accordingly, the Department recommends that EnergyAustralia be required to prepare a Spoil Management Sub Plan.

Contaminated Spoil

The EIS did not identify any particular contaminated land issues, nor did any representations raise any particular concerns. However, as a precaution, the Department recommends that conditions be applied which require EnergyAustralia to report on the extent of any contamination. Should contamination be found, the conditions will spell out a management regime that aims to minimise impacts to an acceptable level.

7.7 Utilities and Services

The EIS stated that a Feasibility Study detailed the location of known services in the vicinity of the proposed route. The EIS also noted that field investigations by means of exploratory holes/pits should be undertaken to confirm the presence and details of services and utilities at critical locations along the proposed cable tunnel route. The Department concurs that site investigations must be completed, although the depth of the tunnel should reduce risks of disturbing other services. A condition is recommended requiring the identification of services that could be affected.

The Department recommends that should a water or gas supply to individual premises be accidentally damaged, the contractor should ensure that service is restored as a priority.

To ensure that other services are not compromised the Department recommends that the Proponent prepare a contingency plan, as part of the Construction EMP and in consultation with all relevant service providers.

The Department also recommends that the Proponent consult with any relevant councils or relevant service providers, prior to the detailed design stage, regarding any possible future infrastructure proposals, and a condition to this effect is proposed.

To ensure the all local residents and businesses affected by the cable construction are notified of any potential disruption, the Department recommends a condition requiring the Proponent to notify affected parties and to minimise the disruption.

7.8 Risks and Hazards

This section of the report specifically considers hazards and safety issues that potentially pose an acute fatality, injury or irritation risk to humans. That is, only those risk impacts that may elicit an impact within a short period of time have been assessed. Chronic risk impacts, specifically those that may be associated with exposure to magnetic fields over an extended period, are considered in section 7.1.

7.8.1 Background

The Environmental Impact Statement indicates that the electricity cable will generally be constructed beneath public roads at a depth of 12 to 30 metres. Excavation of the tunnel to house the cable will be performed with road headers. The Proponent has indicated to the Department that no blasting will be required at any time during construction or operation of the electricity cable. The composition of the electricity cable is inert in the context of risk and other environmental impacts, comprising metallic components with insulating layers of high-density polyethylene (HDPE) and polyvinyl chloride (PVC).

The Proponent indicates that dangerous goods and hazardous materials (including petroleum, diesel fuel and LPG) will be used during the construction of the electricity cable. These materials will be needed for various construction equipment and will generally only be present in limited quantities associated with the respective equipment items. The Proponent suggests, however, that diesel fuel may be located at construction sites to facilitate refuelling of construction equipment without the need to transport construction equipment to off-site fuel locations (eg service stations). Correspondence from the Proponent during the Department's assessment of the proposal highlights that measures to mitigate any risk or other environmental impacts associated with the storage of diesel fuel will be fully documented through a Construction Environmental Management Plan.

Upon completion of construction of the electricity cable, the Proponent intends to retain a number of permanent access locations to permit ingress to the cable tunnel for maintenance/ inspection purposes. The Proponent suggests that these access points will be fully secured to prevent unauthorised access.

7.8.2 Key Issues and Consideration

A review of representations in response to the exhibition of the subject Environmental Impact Statement and the Representations Report highlight that very few parties raised hazards and risk issues as being of concern. Only two representations, from the Environment Protection Authority (EPA) and the NSW Fire Brigades, mentioned hazard-related issues. The EPA stated its concern in relation to spills of cable coolant material, the storage of chemicals at construction sites and the potential for on-site refuelling activities. The Department notes that the electricity cable will not require the use of a coolant. In relation to dangerous goods and hazardous materials, planningNSW recognises the EPA's concern, but supports the Proponent's position that the storage and handling of these materials could be adequately addressed through an appropriate management plan. To this end, the recommended conditions of approval include a requirement for the preparation and implementation of a Construction Safety Sub Plan (condition 107). The Plan will address a number of construction safety issues, including measures to ensure public and worker safety, procedures to follow to minimise the potential for conflicts with other subterranean infrastructure and contaminated soil, and specific protocols to deal with hazardous materials and potential spills.

The Fire Brigades' representation raised concern that there is no emergency lighting proposed for the cable tunnel. Further to this issue, planningNSW considers that comprehensive emergency planning is required to minimise the likelihood that the electricity cable will initiate or be involved in an emergency incident (and that any such involvement is appropriately managed). The conditions of approval address this matter with the inclusion of an Emergency Sub Plan (condition 108). In addition to procedures to be followed during an emergency, the Sub Plan requires fire safety and emergency infrastructure, including sprinklers and lighting, to be designed and developed in consultation with the Fire Brigades. The Sub Plan must be approved by the Director-General prior to the operation of the electricity cable.

The Department considers that the electricity cable represents a minimal risk impact on surrounding land uses during its construction and operation. Given that the Proponent has indicated that blasting will not be employed, construction activities are considered to pose little more than an incidental public safety issue associated with construction sites. These public safety issues can be addressed through simple physical barriers and warning mechanisms, as required under the Construction Safety Sub Plan (condition 107). To reinforce the Proponent's commitment to not use blasting methods for excavation, condition 69 specifically provides that the Proponent shall not undertake any blasting. In relation to hazards during the operation of the electricity cable, planningNSW is generally satisfied that given the composition of the cable, its depth below ground and the proposed cable route, operational risk impacts are minimal. This includes the impacts of the cable on nearby receptors and the potential for cable integrity to be breached by external influences. The aforementioned condition in relation to an Emergency Sub Plan has been drafted to ensure that all reasonable additional safety measures have been included in the design of the cable, the cable trench and associated infrastructure.

The Environmental Impact Statement and Representations Report have not detailed how cable infrastructure will be secured after the completion of construction. The Department considers it important that adequate measures be implemented to prevent unauthorised public ingress to the electricity cable and above-ground structures. Unauthorised access may generate public safety or cable integrity issues. Further, if not appropriately designed, the Department recognises that above-ground components of the electricity cable have the potential to encourage or harbour criminal activities that may reduce public safety. These issues can be addressed through adequate lighting, surveillance and the provision of open space and lines of sight with other inhabited areas. To address all of these issues, the Proponent must, during the detailed design of the cable and associated infrastructure (particularly above-ground components), prepare a Security and Crime Management Strategy for the approval of the Director-General (Condition of Approval 109). This approach is consistent with the joint Department-NSW Police Service "Safer By Design" programme. The Department considers this provision of the Approval is important to ensure crime minimisation through carefully designed structures.

7.9 Flooding and Hydrology

7.9.1 Background

The EIS made little mention of flooding. It did, however state that the risk from flooding is 'a high to extreme level'. It added that flooding is not a major concern to operation of the power supply because the cables are waterproof. The area of risk is water affecting services such as lighting and ventilation. There is a need to consider flooding from street level access points. The EIS concluded that the issue could be dealt with through good design.

No mention was made in the EIS of the potential for flooding to affect surface construction sites, or for any adverse off site impacts resulting from such sites being flooded.

7.9.2 Key Issues and Consideration

No concerns were raised in representations about potential flooding impacts, and there is little evidence to suggest that flooding is likely to present a major problem.

However, the Department considers it important that management measures be put in place to ensure that the risks of flooding are minimised. The Department recommends that conditions be imposed requiring the construction and operation stage environmental management plans to address flooding issues. These issues include protecting the tunnel from flooding, protecting construction sites and minimising off site impacts.

7.10 Acid Sulphate Soils

7.10.1 Background

The EIS stated that geotechnical investigations had found that potential acid sulphate soils (PASS) could occur within alluvium in the vicinity of George and Hay Streets. These soils lie above the tunnel and are not to be excavated. They are only likely to be oxidised if a significant drawdown in groundwater level occurs in the vicinity.

7.10.2 Key Issues and Consideration

No major concerns were raised in representations. However, the EPA recommended that comprehensive field testing be undertaken, and an acid sulphate soil management plan be prepared.

The Representations Report stated that measures such as grouting the tunnel will be taken to reduce the potential for drawdown. It is considered unlikely that the project would impact on groundwater levels to the extent that acid sulphate soils would be generated. However, further detailed investigations will be undertaken to determine the need for an acid sulphate soil management plan.

This is essentially a management issue. The use of good practice techniques should ensure there are no adverse impacts. The Department proposes that a condition be applied requiring the preparation of an Acid Sulphate Soil Management Sub Plan. The Department also recommends a number of other conditions relevant to the management of potential acid sulphate soil impacts. These include a detailed Groundwater Management Sub Plan and Soil and Water Quality Management Sub Plan.

7.11 Cumulative Impacts

The EIS states that cumulative impacts may occur as a result of each stage (separable portion) of the proposal. The EIS identifies that there is the potential for cumulative impacts to arise from the construction of other infrastructure projects in the inner city, such as the Cross City Tunnel and the TransGrid tunnel, as the construction timeframes of these projects are anticipated to overlap. The EIS notes that there will be large volumes of sandstone material that will be excavated. There is also potential for further supplies of sandstone to be accumulated should construction of the Parramatta Rail Link proceed.

The EIS identifies that there is also a potential for traffic congestion due to the overlap of proposed developments throughout the Sydney CBD and City fringe area. The EIS does state that the overall impacts are anticipated to be minimal, as the work sites are well removed from one another.

The Department recognises that EnergyAustralia is aware of cumulative impacts and concurs with EnergyAustralia that the impacts are manageable. The Department recommends the Proponent identify and monitor environmental impacts which have the potential to accumulate. A condition to this effect is recommended. It is also recommended that a condition be applied that specifically requires co-ordination of all works with TransGrid (relating to its Picnic Point to Haymarket 330KV cable proposal) in the vicinity of the Mary Ann Street adit and the Haymarket Substation, and spoil movement generally.

8 CONCLUSIONS AND RECOMMENDATIONS

The proposal is likely to increase the security and reliability of electricity supply to Sydney's central business district (CBD) and inner suburbs. This will assist in maintaining and enhancing Sydney's role as a global city. The Department concludes that the proposal is therefore justified from a strategic viewpoint. The Department recognises that there are concerns about the increased use of electricity and its implications for additional greenhouse gas emissions. Therefore, the Department recommends that a number of demand management and efficiency offset conditions be applied to the proposal.

Construction will have a number of temporary local impacts, including noise, air quality, traffic and business impacts. With appropriate management, these impacts are controllable to acceptable levels.

Any operational stage impacts are likely to be minimal, and are controllable. They principally relate to the operation of the tunnel's ventilation system.

It is recommended that the proposal as described in the EIS and as modified in the Representations Report and by subsequent advice provided to the Department, proceed subject to a number of recommended conditions. These are specified in the following section and are based on the extent of issues raised in representations, by other State agencies, and by the Department. These conditions would ensure that the construction and operation of the proposed 132 kV transmission line would occur with a greater surety of environmental acceptability.

The recommended conditions relate to:

- Demand management and energy efficiency offsets;
- environmental monitoring and reporting requirements;
- independent auditing;
- preparation of construction and operation stage EMPs – covering issues such as noise, air, water, spoil, and traffic;
- community liaison and consultation;
- property impacts.

These conditions will help to ensure that unavoidable adverse environmental impacts of the proposal would be mitigated within an appropriate environmental management framework.

It is considered that these impacts could be managed on the basis of the safeguards and mitigation measures identified in the EIS and the associated documentation, and the Recommended Conditions of Approval.

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9 RECOMMENDED CONDITIONS OF APPROVAL

This Section provides the Department's recommended conditions of approval for the project under Section 115B(2) of the EP&A Act. These are based on the Department's assessment of the EIS, the representations made to the Department and supplementary information and advice provided.

It is noted that the EIS and Representations Report contain extensive information on Sub Plans and mitigation strategies to be implemented as part of the proposal to ameliorate impacts. The recommended conditions of approval should therefore be implemented in conjunction with those Sub Plans and mitigation measures specified in the EIS and the Representations Report. Where there is an inconsistency with the recommendations in the EIS or Representations Report, the recommended conditions would prevail.

The following acronyms and abbreviations are used in this section:

ASS	Acid Sulphate Soils
CWG	Community Working Group
Department, the	Department of Planning
Director-General, the	Director-General of the Department of Planning or delegate
Director-General's Report	The report of the Director-General of the Department of Planning, prepared under section 115C of the Environmental Planning and Assessment Act 1979
DLWC	Department of Land and Water Conservation
DoP	Department of Planning
EIS	'*Proposed Sydney CBD and Inner Suburbs 132 kV Cable Project – Environmental Impact Statement*' prepared for EnergyAustralia by GHD and dated May 2001
EMF	Electric and Magnetic Fields
EMP	Environmental Management Plan
EMR	Environmental Management Representative
ENCM	Environmental Noise Control Manual
EP& A Act	Environmental Planning and Assessment Act 1979
EPA	Environment Protection Authority
ESD	Ecologically Sustainable Development
KV	Kilovolts
LALC	Local Aboriginal Land Council
L_{10}	The noise level, which is exceeded for 10 percent of the time and is approximately the average of maximum noise levels.
RBL	Rating Background Level
L_{10} 15 minutes 5dB(A)	For construction periods greater than twenty-six (26) weeks the EPA noise criteria is that L_{10} 15 minutes construction noise should not exceed the RBL by more than 5dB(A).
Minister, the	Minister for Planning
NPWS	National Parks and Wildlife Service
Proponent	EnergyAustralia
Relevant Councils	South Sydney City Council, Council of the City of Sydney
Representations Report	*Proposed Sydney CBD and Inner Suburbs 132 kV Cable Project* '*Representations Report*' prepared by EnergyAustralia and dated October 2001;
RIC	Rail Infrastructure Corporation
RTA	Roads and Traffic Authority

General

1. The proposal shall be carried out in accordance with:

   (a) the proposal contained in the Environmental Impact Statement (EIS) '*Sydney CBD and Inner Suburbs 132KV Cable Project*' prepared for EnergyAustralia by GHD and dated May 2001 and as modified by the Representations Report '*Sydney CBD and Inner Suburbs 132KV Cable Project'* prepared by EnergyAustralia and dated October 2001, and other modifications referred to in section 5 of the Director-General's report;
   (b) all identified Sub Plans, safeguards and mitigation measures identified in the EIS and Representations Report; and
   (c) the conditions of approval granted by the Minister.

   Despite the above, in the event of any inconsistency with the proposal as described in the EIS and Representations Report, the conditions of approval granted by the Minister shall prevail.

   These conditions do not relieve the Proponent of the obligation to obtain all other approvals and licences from all relevant authorities required under any other Act. Without affecting the generality of the foregoing, the Proponent shall comply with the terms and conditions of such approvals and licences.

   It shall be the ultimate responsibility of EnergyAustralia to ensure compliance with all conditions of approval granted by the Minister.

Compliance

General

2. The Proponent shall comply with, or ensure compliance with, all requirements of the Director-General in respect of the implementation of any measures arising from the conditions of this approval. The Proponent shall bring to the attention of the Director-General any matter that may require further investigation and the issuing of instructions from the Director-General. The Proponent shall ensure that these instructions are implemented to the satisfaction of the Director-General within such time that the Director-General may specify.

Pre-Construction Compliance Report

3. At least two weeks prior to commencement of substantial construction (or within such period as otherwise agreed by the Director-General), the Proponent shall submit for approval of the Director-General a report detailing compliance with all relevant conditions that apply prior to commencement of substantial construction and shall address:

   (a) the dates of submission of the various studies and/or requirements of various relevant conditions, and their approval and terms of approval; and
   (b) action taken or proposed to implement the recommendations made in terms of approvals and/or studies.

For the purpose of this clause, substantial construction at the Police Centre site is deemed to commence once the roadheader starts the tunnelling works.

Pre-Operation Compliance Report

4. At least one month prior to commissioning of the proposal, the Proponent shall submit for approval of the Director-General a report detailing compliance with all relevant conditions that apply prior to commencement of operation and shall address:

   (a) the dates of submissions of the various studies and/or requirements of various relevant conditions, and their approval and terms of approval; and
   (b) action taken or proposed to implement the recommendations made in terms of approvals and/or studies.

   The period of one month referred to in this condition above may be altered as agreed by the Director-General.

Dispute Resolution

5. The Proponent shall endeavour, as far as possible, to resolve any dispute with relevant public authorities arising out of the implementation of the conditions of this approval. Should this not be possible, the matter shall be referred firstly to the Director-General and if the matter cannot be resolved, then to the Minister for resolution. The Minister's determination of the disagreement shall be final and binding on all parties.

Contact Telephone Number

6. Prior to the commencement of construction, the Proponent shall institute, publicise and list with a telephone company a 24 hour complaints contact telephone number, which would enable any member of the general public to reach a person who can arrange appropriate response action to the complaint.

Complaints Register

7. The Proponent shall record details of all complaints received during construction and ensure that an initial response to the complaint is provided within 24 hours, and a detailed response within 10 days. Information on all complaints received shall be made available on request to the Director-General and all relevant government agencies. The Proponent shall nominate an appropriate person(s) to receive, log, track and respond to complaints within the specified timeframe. The name and contact details of this person(s) shall be provided to the relevant Council(s) and the Director-General upon appointment or upon any changes to that appointment.

Project Commencement

8. The Proponent shall notify the Director-General and all relevant authorities in writing of the project commencement, both in terms of construction and operation.

Advertisement of Activities

9. Prior to the commencement of construction, the proponent shall undertake consultation with all relevant Councils and the Community Working Group, as specified in Condition 14, to develop appropriate notification requirements and signage. As a minimum, the Proponent shall, prior to the commencement of construction, and then at three-monthly intervals, advertise in relevant local newspapers the nature of the works proposed for the forthcoming three months, the areas in which these works are proposed to occur, the hours of operation and a contact telephone number.

10. The Proponent shall ensure that the local community is kept informed (by way of local newsletters, leaflets, newspaper advertisements, and community noticeboards, etc.) of the progress of the

project, including any traffic disruptions and controls, construction of temporary detours and work required outside the nominated working hours, prior to such works being undertaken.

11. All non English speaking background communities (NESB) along the route should be identified and arrangements made for persons from NESB to raise concerns or ask questions before and during construction.

12. The Proponent shall establish a project Internet web site prior to the commencement of construction and maintain the Internet web site until 12 months after commencement of operation of the project. This Internet web site shall contain monthly updates of work progress and consultation activities, including but not limited to:

    (a) a description of relevant approval authorities and their areas of responsibility;
    (b) a list of environmental management plans and reports that are publicly available and the executive summaries of those reports;
    (c) minutes of local community working group meetings; annual reports and other public reports required by this approval, and results and interpretation of monitoring required by this approval;
    (d) links to all newsletters;
    (e) contact names and phone numbers of the project communications staff; and
    (f) 24 hour toll-free complaints contact telephone number.

    The Internet address is to be made publicly available.

13. Updates of work progress and construction activities shall be provided more frequently where significant changes in noise impacts are expected.

Community Working Group

14. The existing Community Working Group shall be maintained for the construction period to discuss detailed design issues and methods for minimising the impact on the local community and businesses during the construction stage.

The Proponent shall:

(a) maintain the representative Community Working Group, having considered the *Guidelines for the Establishment of the Community Liaison Groups* (see Attachment 1);
(b) ensure that a meeting is held prior to submission of the Construction Environmental Management Plan required under Condition 20;
(c) nominate a chair to be approved by the Director–General;
(d) employ a nominated person to serve as Community Liaison Representative. This person shall be approved by the Director-General;
(e) allow the Group to make comments and recommendations about the implementation of the development and environmental management plans, monitor compliance with conditions of this approval and other matters relevant to the construction of the development;
(f) ensure that the Group has access to the necessary plans and information for such purposes; and provide appropriate facilities and information to assist the Group in carrying out its functions;
(g) consider the recommendations and comments of the Group and provide a response to the Group and Director-General;
(h) ensure that the Group includes the Environmental Management Representative, representatives from EnergyAustralia, the contractor/s, relevant local community and business

groups including the Non English Speaking Background community, and relevant Councils unless otherwise agreed by the Director-General.

The Proponent shall bear all costs associated with the establishment and ongoing function of the Group. This includes the cost associated with (d); above: employment of the Community Liaison Representative.

The Community Liaison Representative (CLR) shall resolve community complaints to the greatest extent possible. The CLR shall be experienced in mediating disputes, oversee community consultation, and contact the EMR if an unacceptable noise or other impact is being generated.

The Group may make comments and recommendations about the urban design and construction of the proposal, which shall be considered by the Proponent. Issues for discussion shall include, but not be limited to, property/business impacts; noise control measures; traffic and access arrangements; spoil management; air and water quality; landscaping requirements and any other issues considered relevant by the Group.

Details of the Group, including membership and meeting schedules should be incorporated in the Construction EMP referred to in Condition 20.

Environmental Management Representative

15. The Proponent shall employ an Environmental Management Representative (EMR) who demonstrates compliance with AS/NZS ISO 14012:1996 *Guidelines for Environmental Auditing : Qualification criteria for environmental auditors*.

16. The EMR shall be approved by the Director-General prior to the commencement of construction.

17. The EMR shall be available during construction activity at the site and be present on-site during any critical construction activities as defined in the Environmental Management Plan (EMP).

18. The EMR shall:

    (a) have responsibility for considering and advising on matters specified in the conditions of approval and compliance with such;
    (b) review and approve the Proponent's induction and training programme for all persons involved in the construction activities and monitor implementation;
    (c) periodically audit the Proponent's environmental activities to evaluate the implementation, effectiveness and level of compliance of on-site construction activities with the EMP and associated plans and procedures, including carrying out site inspections at least fortnightly;
    (d) record and provide a written report to the Proponent of non-conformances with the EMP and require the Proponent to undertake mitigation measures to avoid or minimise any adverse impacts on the environment or report required changes to the EMP;
    (e) direct the Proponent to stop work immediately where considered necessary, if in the view of the EMR an unacceptable impact on the environment is likely to occur, or require other reasonable steps to be taken to avoid or minimise any adverse impacts;
    (f) review corrective and preventative actions to ensure the implementation of recommendations made from the audits and site inspections;
    (g) report monthly to the project manager;
    (h) review and approve minor revisions to the EMP;
    (i) provide information for community consultation, liaison with regulators, and respond to customer environmental complaints as required;

(j) provide reports to DoP on matters relevant to the carrying out of the EMR role as necessary including notifying DoP of any stop work notices; and
(k) certify the Construction and Operational EMP in accordance with Conditions 20 and 22.

Environmental Management System

19. The Proponent shall ensure the appointment of construction and/or operation head contractors that have an Environmental Management System prepared in accordance with the AS/NZS ISO 14000 series or BS7750-1994 certified by an accredited certifier and/or have a proven environmental management performance record.

Construction Environmental Management Plan

20. Prior to the commencement of construction, a Construction Environmental Management Plan (CEMP) shall be prepared, following consultation with the EPA, RIC, RTA, DLWC and relevant Councils. Where construction activities may be undertaken in discrete stages, the Proponent may prepare individual EMPs relating to specific stages of construction. An outline of any proposed staging of EMPs shall require the approval of the Director-General.

The Construction Environmental Management Plan (CEMP) shall be prepared in accordance with the conditions of this approval, all relevant Acts and Regulations and accepted best practice management Sub Plans.

The CEMP shall be certified by the EMR as being in accordance with the conditions of approval prior to seeking approval of the Director-General. The CEMP shall be approved by the Director-General prior to the commencement of substantial construction works.

The Construction Environmental Management Plan (CEMP) shall:

(a) address construction activities associated with all key construction sites, including staging and timing of the proposed works;
(b) clearly identify on a map the location of the cable and ancillary facilities;
(c) cover specific environmental management objectives and strategies for the main environmental system elements and include, but not be limited to: noise and vibration; air quality; water quality; erosion and sedimentation; access and traffic; property acquisition and/or adjustments; heritage and archaeology; groundwater; acid sulphate soils; spoil stockpiling and disposal; contaminated land; waste management; street tree protection; flooding and stormwater control; geotechnical issues and settlement; visual screening, landscaping and rehabilitation; contractors facilities; refuelling and fuel storage areas; hazards and risks; energy use, resource use and recycling; and utilities; and
(d) address, but not be limited to:

(i) identification of the statutory and other obligations which the Proponent is required to fulfil during project construction, including all approvals and consultations/agreements required from other authorities and stakeholders, and key legislation and policies which control the Proponent's construction of the project;
(ii) definition of the role, responsibility, authority, accountability and reporting of personnel relevant to compliance with the EMP;
(iii) measures to avoid and/or control the occurrence of environmental impacts;
(iv) measures (where practicable and cost effective) to provide positive environmental offsets to unavoidable environmental impacts;
(v) the role of the EMR;
(vi) environmental management Sub Plans for all construction processes which are important for the quality of the environment in respect of permanent and/or temporary works;

(vii) monitoring, inspection and test plans for all activities and environmental qualities which are important to the environmental management of the project, including performance criteria, specific tests, protocols (eg. frequency and location) and Sub Plans to follow;
(viii) environmental management instructions for all complex environmental control processes which do not follow common practice or where the absence of such instructions could be potentially detrimental to the environment;
(ix) steps the Proponent intends to take to ensure that all plans and Sub Plans are being complied with;
(x) consultation requirements with relevant government agencies; and
(xi) community consultation and notification strategy (including local community, relevant government agencies, and relevant Councils), and complaint handling Sub Plans.

Specific requirements for some of the main environmental system elements referred to in (c) shall be as required under the conditions of this approval and/or as required under any licence or approval.

The Construction EMP shall be made publicly available.

Environmental Monitoring – Construction

21. The Proponent shall submit to the Director-General a report(s) in respect of the environmental performance of the construction works and compliance with the Construction EMP and any other relevant conditions of this approval. The reports shall be prepared within six months of the start of substantial construction and thereafter at six monthly intervals or at other such periods as requested by the Director-General to ensure adequate environmental performance over the duration of the construction works. The report(s) shall include, but not be limited to, information on the:

(a) applications for consents, licences and approvals, and responses from relevant authorities;
(b) implementation and effectiveness of environmental controls and conditions relating to the work undertaken;
(c) identification of construction impact predictions made in the EIS and any supplementary studies and details of the extent to which actual impacts reflected the predictions;
(d) details and analysis of results of environmental monitoring;
(e) number and details of any complaints, including summary of main areas of complaint, action taken, response given and intended strategies to reduce complaints of a similar nature; and
(f) any other matter relating to the compliance by the Proponent with the conditions of this approval or as requested by the Director-General.

The report(s) shall be provided to the EPA, Community Working Group and all relevant Councils, and any other relevant government agency nominated by the Director-General. The report(s) shall also be made publicly available.

Operational Environmental Management Plan

22. An Operational Environmental Management Plan (OEMP) shall be prepared prior to the commencement of operation. The Operational EMP shall be prepared in consultation with the EPA and all relevant Councils and any other relevant government agency nominated by the Director-General. The Operational EMP shall be prepared in accordance with the conditions of this approval, all relevant Acts and Regulations and accepted best practice management procedures.

The OEMP shall be certified by the EMR as being in accordance with the conditions of approval prior to seeking the approval of the Director-General. The OEMP shall be submitted to the Director-General for approval prior to commissioning.

The Operational EMP shall include but not be limited to:

(a) identification of the statutory and other obligations which the Proponent is required to fulfil, including all licences/approvals and consultations/agreements required from authorities and other stakeholders, and key legislation and policies which control the Proponent's operation of the project;
(b) identification of environmental performance criteria;
(c) a detailed description of the sampling strategies and monitoring protocols (eg. specific monitoring requirements, and sampling frequency and location). This description should include the specific requirements of the EPA and how the sampling strategies and monitoring protocols are to be used to test against the environmental performance criteria;
(d) steps that EnergyAustralia intends to take to ensure compliance with all plans and procedures;
(e) description of the consultation requirements/arrangements with relevant government agencies, the local community and relevant Councils, including complaints handling procedures; and,
(f) management strategies for the environmental system elements including, but not limited to: magnetic field monitoring; interference with electrical/electronic and other equipment (such as communication/receival devices and devices required for human health such as pacemakers); property impacts; noise and vibration; water quality; groundwater; settlement; erosion and sedimentation; air quality; access and traffic; hydrology and flooding; visual screening, landscaping and rehabilitation; maintenance; hazards and risks; waste management (removal/disposal); and energy use, resource use and recycling.

Specific requirements for some of the environmental system elements referred to in (f) shall be as detailed under the conditions of this approval and/or as required under any licence or approval.

23. All sampling strategies and protocols undertaken as part of the Operational EMP shall include a quality assurance/quality control plan and shall be approved by the relevant regulatory agencies to ensure the effectiveness and quality of the monitoring programme. Only NATA accredited laboratories can be used for laboratory analysis.

24. The Operational EMP shall be made publicly available after approval by the Director-General.

Environmental Impact Audit Report

25. An Environmental Impact Audit Report shall be prepared:

(a) by an independent person(s) or organisation approved by the Director-General, at the Proponent's expense;
(b) submitted to the Director-General, the EPA, relevant Councils, and upon request by the Director-General, to any other relevant government authority;
(c) within 2 months after the first 12 months of operation, or at any time as requested by the Director-General.

The Environmental Impact Audit Report shall assess the key impact predictions made in the EIS and any supplementary studies and detail the extent to which actual impacts reflect the predictions during the first 12 months of operation and any other periods as required. The Report shall provide details on actual versus predicted impacts for all key issues identified in the EIS. The suitability of implemented mitigation measures and safeguards shall also be assessed. The Report shall also assess compliance with the Operational EMP. The Report shall discuss results of consultation with the local community in terms of feedback/complaints on the construction and operation phase of the project and any issues of concern raised.

The Report shall be made publicly available after approval by the Director-General. The Proponent shall comply with all requirements of the Director-General, EPA and other relevant authorities with respect to any reasonable measure arising from, or recommendations in, the report.

Demand Management

26. The Proponent is to contribute to a special purpose fund, in partnership with TransGrid, to underwrite a programme of activities to offset the environmental and social impacts of providing additional electricity supplies to the inner Sydney Region, by investigating the potential for reducing the demand for electricity by all classes of consumers.

27. The fund will receive a total injection of $10m over a period of five years, split equally between the two contributors.

28. The fund will be established and supported by the Director-General. It will be managed by a Committee comprising a nominee of the Director-General and a representative from each of the Proponent and TransGrid. The region covered by the fund will be the distribution sector of the Sydney region generally supplied from the interconnected network between TransGrid's Sydney North, Sydney South and Beaconsfield substations.

29. The Management Committee will produce guidelines describing how the fund will operate and be administered and submit these for approval by the Director-General, who may also approve variations to it on the advice of the Committee. The guidelines will include provisions for independent auditing to ensure transparency and the prudent disposition of the funds in achieving the required outcomes.

30. A report on the activities supported by the fund and its administration will be prepared and made publicly available at the end of each financial year.

31. The activities to be supported by the fund are to include, but not be limited to:

    Preparing an inventory of the existing standby generation facilities in public and private sector premises in the CBD and inner Sydney region that may be suitable for supplementing the supply of electricity in the network. The inventory (which can be modelled on the detailed California database) should include:

    (a) the type, age, capacity, location, owner and service contractor for each on-site generator with a nameplate capacity exceeding 300kW;
    (b) a quantitative and qualitative rating of the generator for its efficiency and environmental performance. The aim would be to identify cleaner systems that may be more appropriate for more extended use and ones with higher emissions and/or lower efficiencies that are suitable for emergency back-up purposes only; and
    (c) an assessment of the average and peak electricity demand for the sites being supplied and a determination of the likely capacity available for network demand reduction.

32. Subsequent to the preparation of a comprehensive inventory, an implementation strategy is to be prepared demonstrating how each standby generator could best be called upon at times of stress on the supply network to:

    (a) take load off the system by meeting the load requirements of the sites they serve; and,
    (b) if practicable, reduce network demand further by supplying any surplus electricity into the network.

33. The implementation strategy is to recommend technical, commercial and operational approaches to maximising the opportunities to rely on this distributed energy source, and provide a model business case for the owners of standby generators that demonstrates how they could be compensated to make their involvement commercially viable. Following implementation, the model is to be documented and made available for use in other constrained regions in NSW seeking to implement distributed generation.

34. The strategy is to evaluate the major facilities in the region that offer opportunities for power factor correction. Each site evaluation should include:

    (a) Measurement of the current power factor;
    (b) Assessment of opportunities for power factor correction; and
    (c) Preparation of a summary business case for each site where opportunities exist.

    The evaluation approach and summary information is to be documented and made available for use in other constrained regions in NSW seeking to implement a power factor correction initiative.

35. The strategy should evaluate the major facilities for interruptible load opportunities. Each site evaluation should include:

    (a) identification of any loads that could potentially be interrupted without causing major disruption or inconvenience;
    (b) a technical and commercial assessment of the feasibility of interrupting identified loads; and
    (c) preparation of a summary business case for each site where opportunities exist.

A summary of the database that results from this project is to be documented and made availablefor use in other constrained regions in NSW seeking to implement load interruptibility initiatives.

36. The strategy should evaluate the major facilities for their energy demand reduction opportunities, including improvements in equipment efficiency, cogeneration and energy management controls. Each site evaluation should include:

    (a) an energy audit, including evaluation of energy usage characteristics and characterisation of thermal loads;
    (b) technical and commercial assessment of the feasibility of any energy demand reduction opportunities identified;
    (c) preparation of an energy demand reduction programme; and
    (d) preparation of a summary business case for each site where opportunities exist.

37. Where relevant to the objectives of providing practical and accurate information on the opportunities for demand reduction, the strategy should support the implementation and promotion of demonstration projects. The range of projects considered should encompass a wide range of target sites and include documentation of the technical and commercial aspects to assist in the dissemination of information to building owners, developers, design professionals, energy service providers, other network service providers and the general public.

Tunnel Structural Integrity

38. The Proponent shall ensure that the structural integrity of the Tunnel Section is certified by a suitably qualified structural engineer prior to the operation of the cable. A copy of the certificate is to be included in the OEMP.

Property and Land Use

39. The Proponent shall consult on a regular basis with all affected landowners regarding any practical and cost-effective measures to minimise impacts which may be implemented prior to the commencement of construction, or within such time as agreed with the relevant landowner.

40. Prior to the placement of permanent rock anchors, the Proponent shall notify the owners of all affected properties of the need for placement of permanent rock anchors. The Proponent must provide sufficient detail to each owner to enable the precise location of such anchors relative to existing buildings to be determined. The Proponent must ensure, if necessary, adjustments to construction methods, at no cost to the property owner, to ensure that the placement of any rock anchors or other such construction stage measure does not impose any unreasonable restrictions on development of the affected property unless otherwise agreed by the landowner.

41. Prior to the placement of temporary soil or sand anchors the Proponent shall notify all affected property owners of the need for placement of temporary anchors and shall provide sufficient detail to determine the precise location of such anchors relative to existing buildings. The Proponent shall instigate, if necessary, adjustments to construction methods at no cost to the property owner, to ensure that the placement of any temporary soil anchors or other such construction stage measure does not impose any unreasonable restrictions on development (existing or proposed) unless otherwise agreed to by the landowner.

42. Structural surveys must be undertaken, prior to commencement of construction works, for all buildings and major structures above the tunnel works and other buildings/structures likely to be affected by tunnel works or other major vibration inducing construction activities in the vicinity of the buildings and structures. The Proponent must ensure that all affected property owners are notified of the survey and of their rights. A copy of the survey shall be given to each affected property owner upon request. The Proponent shall ensure that any damage occurring as a result of the construction is fully rectified at no cost to the owner(s). The extent of the survey shall be defined in the Construction EMP referred to in Condition 20. A suitably qualified structural engineer must certify that the survey area encompasses the maximum area that could be reasonably expected to be impacted by tunnelling or other major vibration inducing works.

43. Alternative access arrangements shall be provided to the reasonable satisfaction of the relevant Council, to any property or public area that would otherwise be denied access as a result of the construction or operation of the proposal. Such alternative access shall be provided at an appropriate standard to the reasonable satisfaction of the relevant Council. Any temporary access road(s) shall be removed and any affected areas reinstated to the reasonable satisfaction of the relevant Council when no longer required.

44. The proponent shall ensure that any access way affected by the proposal is reinstated to an equivalent standard or that adequate compensation is negotiated with the relevant landowner.

45. A detailed Signage Plan shall be prepared in consultation with the relevant Councils and all potentially affected businesses, with the objective of minimising impact on local businesses during the construction stage.

Traffic and Roadworks

Construction Traffic Management Sub Plan

46. As part of the Construction EMP referred to in Condition 20, a detailed Construction Traffic Management Sub Plan must be prepared prior to the commencement of construction works. The Sub Plan must be prepared in consultation with the RTA, relevant Councils and bus operators. It must address, but is not limited to:

(a) Minimising and monitoring use of local roads by heavy vehicles;
(b) Identification and designation of heavy vehicle routes, including spoil trucks;
(c) Adequate access to properties during construction;
(d) Scheduling of works to minimise traffic disruption;
(e) Safe pedestrian and cyclist movement;
(f) Safe traffic movement and access;
(g) Loss of parking spaces and provision of alternative spaces;
(h) Minimising worker car use;
(i) Minimising disruption to business activities;
(j) Ensuring adequate access for buses, and where bus stops are relocated alternatives are provided in close proximity and adequately sign posted; and
(k) Ensuring adequate access is available for garbage trucks and other service vehicles.

Castlereagh Street

47. Castlereagh Street is not to be closed unless the Proponent has obtained the Minister's separate and specific approval. In seeking the Minister's approval, the Proponent must:
    (a) demonstrate that it is essential the site be utilised to ensure the project can be completed within a reasonable time; and
    (b) prepare a detailed site specific traffic management plan.

    The traffic management plan shall address the effects on bus movements, pedestrian access and vehicle access and demonstrate that such impacts can be adequately managed. It must be prepared in consultation with:
    (a) Sydney City Council;
    (b) Roads and Traffic Authority (RTA); and
    (c) State Transit Authority (STA).

    The plan must also address the issues identified in Condition 46.

Road Dilapidation Report

48. A road dilapidation report shall be prepared for all non-State roads likely to be used by construction traffic prior to commencement of construction and after construction is complete. Copies of the report shall be provided to all relevant Councils. Any road/footpath damage, aside from that resulting from normal wear and tear, shall be repaired to a standard at least equivalent to that existing prior to the damage, at the cost of the Proponent and should be compliant with *Auspec 306U – Road openings and Restorations*.

Railway Lines

49. Any crossing of railway corridors and use of railway easements must be in accordance with the Rail Infrastructure Corporation's requirements. Any disturbed land and facilities shall be restored at the Proponent's cost to the satisfaction of the RIC.

Noise and Vibration

Pre-Construction Noise Monitoring

50. The Proponent shall undertake site specific ambient noise level monitoring to ascertain background levels at adit sites, material access shaft locations, construction sites, and site compounds.

Pre-Construction Noise Assessment

51. The Proponent shall undertake detailed noise assessments prior to the completion of the Construction Noise & Vibration Management Sub Plan. The noise assessment shall include the scope and nature of noise impacts and proposed mitigation measures associated with the changes to construction methods and scheduling as proposed in section 4.3 of the Representations Report.

Construction Noise and Vibration Management Sub Plan

52. A detailed Construction Noise and Vibration Management Sub Plan shall be prepared as part of the Construction EMP referred to in Condition 20 in consultation with the Director General, the EPA, and relevant Council(s). In addition to relevant government agencies, Council(s) CWG'S must also be consulted for the tunnel section and adit site. The Sub Plan shall provide details of noise and vibration control and management measures to be undertaken during the construction stage. Detailed analysis and assessment of potential impacts and mitigation measures shall be undertaken for each specific site through the Specific Construction Noise Impact Statements required in Condition 54. The Sub Plan shall include, but not be limited to:

    (a) identification of each work area, site compound and construction depot;
    (b) identification of general activities that will be carried out and associated noise sources for each work area, site compound and construction depot;
    (c) identification of the appropriate construction noise objective for the project with regard to the requirements of Condition 55;
    (d) identification of appropriate construction vibration objectives with regard to the requirements of Condition 70;
    (e) establishment of procedures for the assessment of noise and vibration impacts from each work site with regard to the requirements of Condition 54;
    (f) details of the overall management methods and procedures that will be implemented to control noise and vibration from the construction stage of the project;
    (g) a pro-active and reactive strategy for dealing with complaints including compliance with Conditions 54, 55 and 70;
    (h) noise and vibration monitoring, reporting and response procedures;
    (i) internal audits of compliance of all plant and equipment;
    (j) construction timetabling, in particular works outside standard hours, to minimise noise impacts;
    (k) procedures for notifying residents of construction activities likely to affect their noise and vibration amenity; and
    (l) contingency plans to be implemented in the event of non-compliances and/or noise complaints.

    With respect to b) above, the Proponent shall consider the use of a range of structural and non-structural measures during construction including barriers, acoustic treatment of residences, scheduling of construction activities to minimise impacts and temporary relocation of affected residents.

The Proponent shall submit a copy of the finalised Construction Noise and Vibration Sub Plan to the EPA.

Construction Hours

53. All construction activities, including entry and departure of heavy vehicles, and transportation of spoil shall be restricted to the hours of 7.00am to 6.00pm (Monday to Friday); 8.00am to 1.00pm (Saturday) and at no time on Sundays and public holidays.

Works outside these hours that may be permitted include:

(a) any works which do not cause noise emissions to be audible at any nearby residential property;
(b) the delivery of materials which is required outside these hours as requested by Police or other authorities for safety reasons;
(c) emergency work to avoid the loss of lives, property and/or to prevent environmental harm;
(d) tunnel excavation and other sub-surface activities (excluding the use of rock hammers between 10pm to 7am), providing the criteria in Conditions 55 and 56 can be met; and
(e) any other work approved by the Director-General through the Noise and Vibration Management Sub Plan (Construction) Process. Potentially affected noise receivers shall be informed of the timing and duration of any such works, at least 48 hours prior to commencement of the work.

Construction Noise Impact Statements

54. Specific Construction Noise Impact Statements shall be prepared in consultation with the Director-General, the EPA, other relevant government agencies, relevant Councils, and the CWG for specific stages of construction. These statements are to be consistent with the Construction Noise and Vibration Management Sub Plan and shall specifically address each of the major construction sites. The statements shall include:

(a) a description of the proposed processes and activities;
(b) identification of all potentially affected noise sensitive receivers including residences, schools, commercial premises and noise sensitive equipment;
(c) determination of appropriate noise and vibration objectives for each identified noise sensitive receiver;
(d) assessment of potential noise impacts from the proposed construction methods including noise from construction vehicles and noise impacts from required traffic diversions;
(e) examination of all reasonable and feasible noise mitigation measures including the use of alternative construction methods where potential noise impacts exceeds the relevant objectives;
(f) description and commitment to work practices which limit noise;
(g) description of specific noise mitigation treatments and time restrictions including respite periods, duration, and frequency (where possible programming of night works over consecutive nights in the same locality shall be avoided);
(h) justification for any activities outside the normal hours specified in Condition 53;
(i) extent of noise monitoring;
(j) internal noise audit systems including recording of daily hours of construction, progressive impact assessments as the work proceeds, conducting informal checks by the EMR, providing active and continuous communication links to relevant Councils, residents etc;
(k) community consultation and notification;
(l) assessment and examination of potential reasonable and feasible offsite mitigation measures for traffic noise; and
(m) additional noise mitigation measures as successfully negotiated with affected residents and other sensitive receptors.

With respect to (e) above, the Proponent shall consider the use of a range of structural and non-structural measures during construction including barriers, acoustic treatment of residences, scheduling of construction activities to minimise impacts and temporary relocation of affected residences.

The Proponent shall submit a copy of each finalised Construction Noise Impact Statement to the EPA.

Construction Noise Criteria

55. The Proponent shall ensure that noise from construction activities is limited to the L_{10} level measured over a period of not less than 15 minutes not exceeding the background level by more than 5dB(A) at any residence or other sensitive receiver unless specified in the Construction Noise Impact Statement prepared in accordance with Condition 54.

For the purposes of the noise criteria for this condition, 5dB(A) must be added to the measured level if the noise from the activity is substantially tonal or impulsive in nature in accordance with the approach specified in Chapter 4 of the NSW Industrial Noise Policy.

Regenerated Noise Criteria

56. Regenerated noise from construction works shall not exceed the following criteria as measured at the nearest sensitive receptor:

    (a) 40 dBA between the hours of 6:00 pm and 10:00 pm; and
    (b) 35 dBA between the hours of 10:00 pm and 7:00 am.

    These limits shall be implemented unless otherwise approved by the Director-General. The Proponent must provide the following details to the Director-General for consideration:

    (a) identification of potentially affected residences;
    (b) predicted regenerated noise impacts;
    (c) time periods when these impacts will occur;
    (d) duration of the impacts;
    (e) justification as to why the work needs to be undertaken during night time hours;
    (f) an analysis of alternative methods;
    (g) management measures that will be implemented including community consultation and provision of a 24-hour complaints line; and
    (h) contingency measures to be implemented in the event of noise complaints.

57. Prior to commencement of construction, the Proponent shall endeavour through the community consultation process to identify potential highly sensitive facilities, including scientific equipment, measuring equipment, photographic equipment, printing press and the like where the criteria in Condition 55 may not be adequate. Should such cases arise the Proponent shall consult with the potentially affected owners and develop appropriate mitigation measures to ensure impacts are acceptable.

58. The Construction Noise and Vibration Management Sub Plan required by Condition 52 shall address the following issues in relation to regenerated noise:

    (a) identification of known high-risk areas where there is potential for exceedances and measures for dealing with unexpected exceedances;
    (b) qualification of the potential range of impact above the criterion at the identified receivers;
    (c) identification of all reasonable and feasible mitigation and management measures that will be applied;
    (d) establishment of appropriate community consultation procedures to ensure that the community is notified of the potential impacts and community views are considered; and
    (e) contingency measures where significant community reaction occurs which could include cessation of work or as negotiated with affected residents.

Construction Noise Management

59. The Proponent shall implement all reasonable best practice noise mitigation and management measures including:

    (a) maximising the offset distance between noisy plant items and nearby noise sensitive receivers;
    (b) avoiding the co-incidence of noisy plant working simultaneously close together and adjacent to sensitive receivers;
    (c) minimising consecutive night time works in the same locality;
    (d) orienting equipment away from sensitive areas;
    (e) carrying out loading and unloading away from noise sensitive areas; and,
    (f) selecting site access points and roads as far as possible away from sensitive receivers.

60. Construction noise levels shall be monitored to verify compliance with the Construction Noise and Vibration Management Sub Plan. Should monitoring indicate exceedances of the Construction Noise and Vibration Management Sub Plan, the Proponent shall consult with the Director-General and implement best available additional mitigation measures.

61. The Proponent shall ensure that rock breaking, rock hammering, sheet piling and any other activities at or near ground level which result in impulsive tonal noise generation are limited to the following hours unless otherwise permitted by the Director-General:

    (a) 8 am to 12 pm, Monday to Saturday; and
    (b) 2 pm to 5 pm Monday to Friday.

62. Where these activities are undertaken for a continuous three hour period and are audible to noise sensitive receptors, a minimum respite period of at least one hour shall be scheduled before activities re-commence.

63. The Proponent shall ensure that no public address systems are used at any construction sites outside the standard working hours detailed in Condition 53. Any public address system shall be designed and installed with their pointing axis directed away from residential buildings and sensitive receptors.

64. In order to minimise noise impacts during construction, the Proponent shall consult with relevant Council(s) and where reasonable and feasible, erect operational noise mitigation measures prior to the commencement of construction.

65. The Proponent shall use only dampened rock hammers and/or "city" rock hammers to minimise the impacts associated with rock-breaking works.

66. The Proponent shall take reasonable steps to control noise from all plant and equipment including bulldozers, cranes, graders, excavators and trucks. Examples of appropriate noise control could include efficient silencers, low noise mufflers and alternatives to reversing alarms.

67. The Proponent shall ensure that the entry and departure of heavy vehicles are restricted to the standard daytime construction limitations as specified in Condition 53.

68. The Proponent shall ensure that the noisiest activities associated with night time works are scheduled wherever possible to be completed before midnight.

Blasting

69. The Proponent shall not undertake any blasting.

Vibration Criteria

70. The Proponent shall ensure that vibration resulting from construction of the project is limited to:

    (a) For structural damage vibration - German Standard DIN 4150 and BS 7385: Part 2 – 1993; and,
    (b) For human exposure to vibration – the evaluation criteria presented in British Standard BS 6472 or AS2670 for low probability of adverse comment unless as otherwise agreed by the Director-General in consultation with EPA through the construction noise and vibration management sub plan.

    Where there is an inconsistency between these standards, the more stringent criteria shall apply.

71. Unless otherwise agreed by the Director-General vibration levels shall not exceed 3 mm/s at the building foundation of heritage buildings and sensitive structures.

72. Prior to commencement of construction activities likely to result in high vibration levels, the Proponent shall endeavour through the community consultation process to identify potential highly sensitive facilities, including scientific equipment, measuring equipment, printing press and the like where the criteria in Condition 70 may not be adequate. Should such cases arise the Proponent shall consult with the potentially affected owners and develop appropriate mitigation measures to ensure impacts are acceptable.

Vibration Management

73. The Proponent shall ensure that wherever practical, piling activities are completed using bored piles. If driven piles are required they shall only be installed with the approval of the Director-General.

Operational Noise Management Sub Plan

74. As part of the Operational EMP referred to in Condition 22 the Proponent shall prepare a detailed Operational Noise Management Sub Plan. The Sub Plan shall provide details of noise and vibration control measures to be undertaken during the operation stages in accordance with the EPA's Industrial Noise Policy. The Sub Plan shall include, but not be limited to:

    (a) predicted noise levels;
    (b) location, type and timing of erection of permanent noise barriers and/or other noise mitigation measures demonstrating best practice including silencers and building treatments for associated plant rooms and enclosures for exposed plant;
    (c) specific physical and managerial measures for controlling noise;
    (d) noise monitoring, reporting and response procedures; and
    (e) the urban design issues relating to noise control measures.

The Proponent shall submit a copy of the Operational Noise Management Sub Plan to the EPA.

Operational Noise Management

75. Monitoring of operational noise shall be undertaken in accordance with the Operational Noise Management Sub Plan. The Proponent shall assess the adequacy of the ventilation noise mitigation measures within six months of opening the tunnel with regard to the criteria specified in the Operational Noise Management Sub Plan. Should assessment indicate a clear trend in noise levels which exceed the defined noise design goals in the Operational Noise Management Sub Plan, the Proponent shall implement further reasonable and feasible mitigation measures in

consultation with affected landowners and/or occupiers. The Proponent shall submit a copy of its assessment report to the EPA.

Flooding and Hydrology

76. As part of the Construction EMP referred to in Condition 20, a detailed Flooding Sub Plan must be prepared prior to the commencement of construction works. The Sub Plan must be prepared in consultation with DLWC and relevant Councils. It must address, but not be limited to:

    (a) Means of protecting excavations and tunnel from flooding/stormwater during construction and the means of dealing with any flood water/stormwater that enters excavations and tunnel during construction. This must include identifying any proposed use of existing drainage infrastructure and the means of minimising any adverse impacts, including capacity limitations within the drainage system;
    (b) Means of minimising impacts on existing and proposed drainage systems;
    (c) Means of protecting construction sites from flooding;
    (d) Means of ensuring site works do not exacerbate flooding elsewhere;
    (e) Mitigation measures to ensure that the off site consequences of work sites being flooded are minimised, and,
    (f) Consistency with the NSW Government Flood Policy and Flood Plain Development Manual.

77. The Operational EMP referred to in Condition 22 must identify the means of minimising the entry of flood water/stormwater to the tunnel and the means of disposal of any such water entering the tunnel. This must include identifying any proposed use of existing drainage infrastructure and the means of minimising any adverse impacts, including capacity limitations within the drainage system. The methods must be developed in consultation with DLWC and relevant Councils.

Water Quality Erosion and Sediment Control

Soil and Water Quality Management Sub Plan

78. As part of the Construction EMP and Operational EMP referred to in Conditions 20 and 22, a detailed Soil and Water Quality Management Sub Plan shall be prepared in consultation with the EPA, and all relevant Councils. The Sub Plan shall be prepared in accordance with the Department of Housing's guideline *Managing Urban Stormwater - Soils and Construction*. The Sub Plan(s) shall be prepared prior to construction or operation as appropriate.

    The Soil and Water Quality Management Sub Plan shall contain, but not be limited to the following measures or details, that are to be employed to:

    (a) minimise ingress of water into the tunnel (both groundwater and surface water);
    (b) minimise the amount of ingress water discharged to the stormwater system. Wherever possible, the Proponent should employ alternatives methods of disposal such as reuse/recycling, or discharge to the sewer;
    (c) management of the cumulative impacts of the development on the quality and quantity of surface and groundwater, including stormwater;
    (d) details of short and long term measures to be employed to minimise soil erosion and the discharge of sediment to land and/or waters;
    (e) identification of all potential sources of water pollution (including those resulting from maintenance activities) and a detailed description of the remedial action to be taken or management systems to be implemented to prevent discharge of these pollutants from all sources within the subject sites;
    (f) opportunities for recycling/re-use of stormwater;

(g) detailed description of water quality monitoring to be undertaken during the pre-construction, construction and operation stages of the proposal including identification of locations where monitoring would be carried out;
(h) contingency plans to be implemented in the event of major fuel spills and other chemicals; and
(i) a programme for reporting on the effectiveness of the sediment and erosion control system against performance goals.

Erosion and Sediment Control Works

79. The Soil and Water Management Sub Plan shall incorporate detailed erosion and sedimentation controls and site rehabilitation requirements which shall be prepared in consultation with DLWC and in accordance with the Department of Housing's Managing Urban Stormwater – Soils and Construction Manual.

Groundwater

80. As part of the EMPs referred to in Conditions 20 and 22, a detailed Groundwater Management Sub Plan shall be prepared to meet the requirements of DLWC.

The Sub Plan shall:

(a) provide details of groundwater control measures to be undertaken during both the construction and operation stages;
(b) include but not be limited to:
  (i) impacts on nearby structures from potential settlement;
  (ii) groundwater inflow control;
  (iii) handling, treatment and disposal of groundwater and contaminated groundwater;
  (iv) monitoring; auditing; measures for dealing with exceedances; and response actions; and
(c) aim to achieve reuse wherever practical, in preference to the stormwater system.

Approval from DLWC shall be obtained prior to the commencement of any dewatering work.

Acid Sulphate Soils Management

81. As part of the Construction EMP referred to in Condition 20, a detailed Acid Sulphate Soil Management Sub Plan must be prepared prior to the commencement of construction works. It shall be prepared in accordance with the *ASSMAC Acid Sulphate Soil Manual (1998)* or as revised. The Sub Plan shall be prepared in consultation with relevant Councils. The Sub Plan should assess the potential impacts of acid sulphate soils from:

(a) the disturbance of sulphidic material or extractive material containing sulphidic material (in the fines);
(b) impacts from the alteration of watertable levels (water use, drainage works, change of the bed of rivers, dewatering as component of extraction operation);
(c) acid run-off from stockpiles or the acidification of sulphidic fines; and
(d) the sale or use of material containing sulphidic material.

82. The Sub Plan shall address how management strategies would be integrated into the construction procedures and how any impacts would be minimised and managed effectively, and include a contingency plan to deal with the unexpected disturbance of potential or actual acid sulphate soils. It should reference the water quality monitoring programme contained in Condition 78.

Urban Design and Landscaping

83. The Proponent shall prepare, as part of the Construction Environmental Management Plan, a detailed Urban Design and Landscape Sub-Plan in consultation with relevant Councils and the Community Working Group. Suitably qualified urban designers and landscape specialists shall be utilised to develop the Sub Plan. The Sub Plan shall detail hoardings, screens, landscaping and other measures to be taken to reduce the visual impact of the proposal during the construction stage.

Tree Management Sub Plan

84. The Proponent shall prepare a Tree Management Sub Plan, addressing but not limited to the following:

    (a) identify any significant trees which may be affected during construction and detail appropriate management measures;
    (b) use of a suitably qualified Arborist to ensure that the condition of any trees affected are monitored throughout the construction period;
    (c) proposed measures to protect trees, consistent with Councils Tree Preservation Orders;
    (d) replacement trees and restoration works to the satisfaction of Council;
    (e) arrangements to be made with Council for bonds for trees; and
    (f) replacement of any trees lost during construction, using specimens of a similar maturity where practicable unless otherwise agreed with the relevant Council(s).

Heritage

Indigenous Heritage

85. As part of the Construction EMP an Indigenous Heritage Management Sub Plan shall be prepared outlining procedures that are to be implemented if previously unidentified items/areas of potential indigenous archaeological significance are identified during construction works. This shall include the requirement to cease work immediately and contact NPWS and Metropolitan LALC to determine appropriate action.

Non-Indigenous Heritage

86. Prior to construction the proponent shall identify all local and state listed non-indigenous heritage items within the construction zone of influence which may be potentially affected by vibration impacts or any other impacts during construction. The provisions of Conditions 20 and 71 shall apply to all identified items.

87. As part of the Construction EMP referred to in Condition 20, the proponent shall prepare a Non-Indigenous Heritage Management Sub Plan in consultation with relevant Councils and the NSW Heritage Office. The Sub Plan shall include, but not be limited to, the following:

    (a) obtaining excavation permits (in accordance with section 139 of the Heritage Act, 1977) for all excavation works proposed to be undertaken at the following sites:
        (i) Sydney Police Centre car Park;
        (ii) Roden Cutler House;
        (iii) Wade Place; and
        (iv) Castlereagh Street.
    (b) details of licences/approvals to be obtained in relation to non-indigenous heritage issues including those required under the NSW Heritage Act, 1977;

(c) procedures for monitoring of areas of potential archaeological sensitivity during initial clearing and construction activities with the involvement of the relevant Councils and NSW Heritage Office; and
(d) procedures to be implemented if previously unidentified items/areas of potential non-indigenous archaeological significance are identified during construction works including the requirement to cease work immediately and contact the NSW Heritage Office to determine appropriate action.

Air Quality and Greenhouse Gas

Construction Stage

88. As part of the Construction EMP referred to in Condition 20, a specific Construction Stage Air Quality Sub Plan shall be prepared. The Sub Plan shall promote the reduction of greenhouse gases by adopting energy efficient work practices and provide details of all dust control measures to be implemented during the construction stage. The Sub Plan shall include but not be limited to, the following:

    (a) include measures to reduce dust from stockpiles and cleared areas and other exposed surfaces;
    (b) address the monitoring and management and control of methane and other gases in the Tunnel;
    (c) developing and implementing procedures to minimise energy waste;
    (d) conducting awareness programmes for all site personnel regarding energy conservation methods; and
    (e) conducting regular energy audits during the project to identify and address energy wastage.

89. Where there is a risk of losing material, construction vehicles using public roads shall be maintained and covered to prevent any loss of load, whether in the form of dust, liquid, solids. Construction vehicles shall be maintained in such a manner, that they would not track mud, dirt or other material onto any street, which is opened and accessible to the public. In the event of any spillage, the Proponent is required to remove the spilt material within 24 hours.

90. No burning or incineration of materials shall be permitted on project sites.

Operation Stage

91. As part of the Operational EMP referred to in Condition 22, the Proponent shall address air emissions from the Tunnel vent, including the need for microbial control measures and micro climate monitoring. The EMP shall also address monitoring and management of methane and other gases.

Spoil Disposal and Waste Management

Spoil Management Sub Plan

92. As part of the Construction EMP referred to in Condition 20, the Proponent shall prepare a Spoil Management Sub Plan. This Sub Plan shall identify how spoil would be handled, stockpiled, reused and disposed. The Sub Plan shall be prepared in consultation with DLWC and relevant Councils before the commencement of construction at relevant sites. It must address the principles of the Waste Avoidance and Resources Recovery Act 2001. The Sub Plan should also address:

    (a) minimising run off from stockpiles;
    (b) dust control at stockpile sites;

(c) truck movements, including timing, route and minimising impacts on local amenity and other traffic. It must be consistent with the Traffic Management Sub Plan referred to in Condition 46 and 47; and
(d) final destinations of spoil.

93. All clean and/or treated spoil shall be reused or recycled where possible and cost effective to do so. Wherever possible, the Proponent shall ensure that the use of spoil generated from construction activities is maximised in preference to any import of fill.

Waste Management and Re-Use Sub Plan

94. As part of the EMP(s) (Construction Stage) and (Operation Stage) as relevant, a detailed Waste Management and Reuse Sub Plan shall be prepared. The Sub Plan shall address the management of wastes during the construction and operation stages respectively. It shall be prepared prior to construction and be consistent with the Waste Avoidance and Resources Recovery Act 2001, and the EPA's Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes, and shall identify requirements for:

a) waste avoidance;
b) reduction;
c) reuse; and
d) recycling,

and provide details of requirements for:

e) handling;
f) stockpiling;
g) disposal of wastes: specifically contaminated soil or water, concrete, demolition material, cleared vegetation, oils, grease, lubricants, sanitary wastes, timber, glass, metal, etc.; and
h) identifying any site for final disposal of any material and any remedial works required at the disposal site before accepting the material.

95. Any waste material that is unable to be recycled shall be disposed at a landfill licensed by the EPA to receive that type of waste. The Sub Plan shall be framed using the waste minimisation hierarchy principles of avoid-reduce-reuse-recycle-dispose. This shall also include the demand for water.

96. As part of the Sub Plan, an Action Plan shall be prepared to promote the use of recycled materials, including construction and landscape materials. The Plan shall detail how the proposal gives consideration and support to the Government's *Waste Reduction and Purchasing Policy*. The Plan shall also include details on measures to implement energy conservation best practice.

Contaminated Land

97. The Proponent must conduct a site investigation to determine the nature and extent of contamination. An Investigation Report must be submitted to the Director-General, as part of the EMP referred to in Condition 20, detailing the results of the investigation and an assessment of the potential risk posed by contaminants to health and the environment. The Report must be prepared in accordance with EPA's "Guidelines for Consultants Reporting on Contaminated Sites", and "Contaminated Sites: Guidelines on Significant Risk of Harm from Contaminated Land and the Duty Report".

98. As part of the Investigation Report referred to in Condition 97. The Proponent must include a Contingency Plan for dealing with unexpected occurrences of contaminated material, during the course of work.

99. If the results of the site investigation indicate that remediation is necessary to reduce or remove risks posed by contaminants, then the Proponent must remediate the land in accordance with a Remedial Action Plan approved by the Director-General. The Plan must be prepared in consultation with relevant Councils and land-holders. If contaminated material is disposed of off-site, the Proponent must examine all feasible options and this must be in accordance with the Waste Avoidance and Resources Recovery Act 2001 and the EPA's Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes.

100. If remediation is carried out, the Proponent must submit a Validation Report to the Director-General within 1 month of the completion of remediation works. The Report must confirm whether the pre-determined clean up objective has been attained and whether any further remediation works or restrictions on land use are required. The Director-General may require further remediation works if the pre-determined clean up objective has not been attained. The Director-General may also require an independent site audit of the remediation, at the Proponent's expense, if the Validation Report is inconclusive. A copy of the Report must be submitted to the EPA and relevant Councils at the same time the Report is forwarded to the Director-General.

101. All work associated with contaminated spoil, including the preparation of reports, must be carried out in accordance with EPA guidelines and guidelines prepared by the Australian and New Zealand Environment and Conservation Council (ANZECC) and the National Health and Medical Research Council (NHMRC).

Utilities and Services

102. The Proponent shall identify the services potentially affected by construction activities to determine requirements for diversion, protection and/or support. This shall be undertaken in consultation with the relevant service provider(s). Any alterations to utilities and services shall be carried out to the satisfaction of the relevant service provider(s), and unless otherwise agreed to, at no cost to the service/utility provider(s).

103. The Proponent shall ensure that existing cathodic protection systems are not adversely affected and that appropriate measures are put in place to minimise stray currents.

104. The Proponent shall develop a contingency plan, in consultation with the relevant service provider(s), to deal with accidental damage and repair of services.

105. The Proponent shall ensure that disruption to services resulting from the proposal are minimised and shall be responsible for advising local residents and businesses affected prior to any disruption of service.

106. The Proponent shall consult with relevant Councils, Sydney Water and other relevant service providers prior to detailed design of the cable regarding future infrastructure proposals. The Proponent shall consider any identified proposal in finalising the cable design.

Hazards and Risk

Dangerous Goods and Hazardous Materials

Construction Risk Management

107. The Proponent shall prepare and implement a Construction Safety Sub Plan to manage hazardous incidents and public safety during the construction of the electricity cable and associated infrastructure. The Plan shall include, but not necessarily be limited to:

(a) physical measures to be implemented to minimise the potential for public harm at and in the vicinity of construction areas;
(b) a program to ensure that safety measures implemented to minimise the potential for harm to the public remain in place and are adequately maintained while hazardous situations exist;
(c) procedures for the notification of residents in the vicinity of construction sites whose safety may be affected by construction activities;
(d) procedures to manage risk to construction workers;
(e) identification of pipelines, cables and other utilities that may be affected by construction of the electricity cable and associated infrastructure, either directly or indirectly, and methods to minimise those impacts;
(f) procedures to be followed in the event that contaminated material is discovered during any excavation works; and
(g) measures to be implemented to ensure safe transport of construction materials, including transport routes, transport times, vehicle speeds and driver behavioural requirements;
(h) measures to be implemented to ensure the safe handling of hazardous materials and to minimise the potential for spills of those materials;
(i) a protocol to manage the on-site refuelling of vehicles during construction; and
(j) contingency measures to contain, minimise and rehabilitate a spill of hazardous materials, should it occur.

The Construction Safety Sub Plan shall be submitted for the approval of the Director-General prior to the commencement of any construction activity, or within such period otherwise agreed by the Director-General.

Operation Risk Management

108. The Proponent shall prepare and implement an Emergency Sub Plan to manage emergency events that may arise in relation to the electricity cable and associate infrastructure. The Plan shall include, but not necessarily be limited to:

(a) identification of emergencies that may arise in relation to the electricity cable and associated infrastructure;
(b) procedures to be followed to address potential emergencies and minimise the impacts of emergencies on surrounding land uses;
(c) monitoring and communication systems installed to indicate an emergency;
(d) details of fire safety measures where relevant. This may include the need for use of sprinkler systems and lighting. The measures shall be developed in consultation with the NSW Fire Brigade;
(e) procedures for the notification of relevant emergency services, authorities and affected receptors of an emergency situation; and
(f) a system to investigate and address the cause(s) of any emergency to prevent recurrence.

The Emergency Sub Plan shall be submitted for the approval of the Director-General prior to the commencement of operation of the electricity cable, or within such period otherwise agreed by the Director-General.

109. The Proponent shall prepare and implement a Security and Crime Management Strategy to prevent unauthorised public ingress or access to relevant components of the electricity cable and associated infrastructure, and to minimise the potential for crime in the vicinity of cable infrastructure (eg vandalism, loitering, illegal dumping etc). The Strategy shall be generally in accordance with the principles outlined in the joint Department and Police Service publication *Crime Prevention and the Assessment of Development Applications*, and be developed in consultation with the NSW Police Service and relevant councils. The Strategy shall include, but not necessarily be limited to:

(a) details of security arrangements to prevent unauthorised access to all relevant components of the electricity cable and associated infrastructure, including physical exclusion measures, detection devices and management mechanisms;
(b) procedures for addressing security issues, should they arise;
(c) specific design features intended to discourage the incidence of crime at and in the immediate vicinity of relevant components of the electricity cable and associated infrastructure;
(d) lighting considerations, including light intensity, direction and hours of operation at and in the immediate vicinity of relevant components of the electricity cable and associated infrastructure, with the aim of minimising areas that may encourage crime;
(e) policies and procedures for the management and removal of graffiti, amelioration of vandalism, should it occur at or on any component of the of relevant components of the electricity cable and associated infrastructure; and,
(f) policies and procedures for the management and removal of illegal or inappropriate bill-posting and illegally dumped materials, should it occur at or on any component of relevant components of the electricity cable and associated infrastructure.

The Security and Crime Management Strategy shall be submitted for the approval of the Director-General prior to the commencement of construction of the electricity cable, or within such period otherwise agreed by the Director-General.

This condition only applies to "relevant" components of the electricity cable and associated infrastructure. That is, this condition only applies to those components that may be subject to security or crime issues (not underground components or any areas that may be reasonably considered inaccessible).

Cumulative Impact Management

110. As part of the Construction EMP referred to in Condition 20, the Proponent shall identify all other significant developments occurring in the vicinity of the cable construction area. The Proponent shall identify environmental impacts to be monitored during construction, which have the potential for cumulative effects to occur. The Proponent shall define time periods which the identified environmental impacts would be monitored and describe measures taken to reduce cumulative effects.

111. As part of the Construction EMP referred to in Condition 20, the Proponent shall review environmental impacts identified in Condition 110 every six months during the construction of the proposal. Any new impacts identified during construction shall be addressed appropriately to reduce the cumulative effects. The proponent shall identify how this was achieved as part of the Compliance Report referred to in Condition 21.

112. The Proponent shall coordinate all works with TransGrid (relating to its Picnic Point to Haymarket 330KV cable proposal) in the vicinity of the Mary Ann Street Adit and the Haymarket Substation, and spoil movement generally, in an attempt to reduce cumulative impacts in the CBD.

Note:

Any modification to the proposal that would be inconsistent with the conditions of approval shall only be carried out with the prior written approval of the Minister, in accordance with the relevant provisions of the EP&A Act.

Attachment 1

Guidelines for the Establishment of the Community Liaison Group

The proponent shall consider the following when establishing a Community Liaison Group:

1. The Group shall comprise at least two (2) representatives of the Proponent (the Environmental Management Representative and the Independent Community Liaison Representative), at least one (1) representative of the relevant Councils, at least two (2) community representatives and one (1) business representative.

2. At its first meeting, the Group shall consider its interrelationship with any existing community liaison/ consultative groups of adjoining or interrelated developments.

3. Representatives from relevant government agencies or other individuals may be invited to attend meetings as required by the Chair.

4. Where determined necessary by the Chair, an independent note taker would be provided by the Chair at the expense of the Proponent.

The Proponent shall, at its own expense:

(a) nominate two (2) representatives to attend all meetings of the Committee;
(b) provide to the Group regular information on the progress of work and monitoring results;
(c) promptly provide to the Group such other information as the Chair of the Group may reasonably request concerning the environmental performance of the development;
(d) provide access for site inspections by the Group; and
(e) provide meeting facilities for the Group, and take minutes of Group meetings. These minutes, once approved by the Group, shall be available for public inspection at EnergyAustralia's Community Liaison Centre at EnergyAustralia's head office within 14 days of the Group's approval;
(f) post minutes of Group meetings on the project Internet web site as specified in Condition 12; and,
(g) Where reasonably required engage consultants to interpret technical information provided under this approval and for licensing purposes, and tasks of a similar nature.