WATER FOR GOULBURN

Highlands Source Project

Part 3A Environmental Assessment
April 2010




Volume 1 - Report

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GOULBURN MULWAREE COUNCIL

Submission of Environmental Assessment

Prepared under the *Environmental Planning and Assessment Act 1979*, Section 75H

Environmental assessment prepared by:	
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Address	GHD Pty Ltd Level 15, 133 Castlereagh St Sydney NSW 2000 Australia
In respect of:	
Project to which Part 3A applies	
Applicant name	Goulburn Mulwaree Council
Applicant address	184-194 Bourke Street Locked Bag 22 Goulburn NSW 2280
Land to be developed	As described in the Environmental Assessment (NSW)
Proposed development	Construction and operation of a water transfer pipeline (83 km long, 300 - 375 mm dia) and infrastructure comprising a pump station and outlet connections.
Environmental assessment	An environmental assessment is attached
Certificate	I certify that I have prepared the contents of this document and to the best of my knowledge: • It is in accordance with the requirements of Part 3A; • It contains all available information that is relevant to the environmental assessment of the development to which it relates; and • The information contained in the document is neither false or misleading.
Signature	
Name	David Chubb
Date	27 April 2010

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APPENDICES

Glossary of Terms

Acid Sulfate Soils	Acid sulfate soils are the common name given to soils containing iron sulfides. When the iron sulfides in the soil are exposed to air, it produces sulfuric acids. The acid can move through the soil, acidifying soil water, groundwater and, eventually, surface waters.
Acoustic	Pertaining to the sense of organs of hearing, or to the science of sound.
Alluvial Deposition from running waters	In this context, it refers to 'alluvium' — soils such as the fertile floodplain soils that consist of fine-grained sediments including clays, silts and sands.
Ambient	Surrounding or existing.
Aquifer	A below ground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt, or clay) in which groundwater can be stored
Bank	Refers to the streambank of a stream channel; they appear as the steeply sloped outer walls of the channel.
Bed	Refers to the streambed of a stream channel; the lowest part of the channel between streambanks. It is usually composed of mobile sediments such as gravels, sand or silts carried in the bedload, or by bedrock, and includes common stream features such as pools, riffles, runs, glides and cascades.
Bedrock-controlled	Refers to stream channels where their shape and behaviour is largely controlled by bedrock steps and outcrops of the underlying geological strata. Usually occur in upland streams of 'hard rock' catchments at the middle to top of catchments.
Built Form	The component features of buildings, streets and spaces that make up built structure/s.
Bund	An impervious embankment of earth or a brick wall, which may form part or all of the perimeter of a compound that is provided to retain liquid.
Catchment	Total land area draining to any point in a stream.
Chain-of-ponds	A type of stream which appears as a series of ponds/pools which may be regularly spaced, or appear randomly. Between these ponds, the channel may be discontinuous, or appear as a slight depression or swale on the wide floodplain linking the ponds.
Chainage	The chainage at a location along a pipeline is the distance of that point in relation to the start of the pipeline based on 0.000 kilometres being located at the off-take at Wingecarribee Reservoir.
Channelisation	Straightening and (or) deepening a pre-existing channel, or constructing a new channel, for the purpose of runoff control or navigation.
Clay	A weathered form of aluminosilicate mineral particles, less than 0.004 mm in diameter.
Cohesive sediments	Composed primarily of clay-sized material, which have strong interparticle forces which act to hold them together.
Concept design	Initial functional layout of a concept, such as for the proposed duplication, to provide a level of understanding to later establish detailed design parameters.
Consent	Approval to undertake a development received from the consent authority.

Consent Authority	The government agency that determines a development application to undertake a proposed development. In the case of the Highlands Source Project the Consent Authority is the NSW Department of Planning.
Construction Environmental Management Plan (CEMP)	A document setting out the management, control and monitoring measures to be implemented during construction of a development, to avoid or minimise the potential environmental impacts identified during an environmental impact assessment process.
Culvert	A totally enclosed drain under a road or railway.
Cumulative impact	The sum on the environment resulting from the successive effects of several different impacts.
Curtilage	The area attached to a dwelling, house, building or object which forms part of its enclosure.
Cut	An excavation for constructing below the natural ground level.
Cut and fill balance	Difference between earthwork cut and fill volumes.
dB	Decibel, which is 10 times the logarithm (base 10) of the ratio of a given sound pressure to a reference pressure; used as a unit of sound.
dB(A)	Frequency weighting filter used to measure 'A-weighted' sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies.
Degradation	Removal of materials from one place to another via erosion, causing lowering of the elevation of streambeds and floodplains over time.
Degraded	A reach that has moved away from its intact condition and is not recovering; it is still adjusting to disturbance and is out of balance with its controls.
Detailed design stage	The stage at which the project design is detailed on the basis of an approved concept design.
Deposition	The dropping of material which has been picked up and transported by wind, water, or other processes.
Director-General's Requirements	Requirements for an environmental assessment issued by the Director-General of the NSW Department of Planning in accordance with the *Environment Planning and Assessment Act 1979*.
Element	A component, part or feature of the landscape (e.g. river, tree, hedges, bush). Groups of features of the soft landscape, for example roadside planting, street trees, open space.
Embodied emissions	The emissions associated with the extraction of raw materials, manufacture, and associated transport for the creation of a product.
Emission	The release of material into the surroundings (for example, gas, noise, water).
Enhancement	Landscape improvement through restoration, rehabilitation, reconstruction or creation.
Environmental impact	An environmental impact is any change to the environment either wholly or partially resulting from activities associated with the Project.
Ephemeral	Periodically contains water only after unpredictable rain. Usually dry, but may contain water for rare and irregular periods.

Ephemeral Stream	A stream, whose channel is always above the water table, which flows briefly in direct response to precipitation, receiving no continued supply of water from snowmelt or springs
Erosion	A natural process where wind or water detaches a soil particle and provides energy to move the particle.
Erosional Soil Landscapes	Have been sculpted primarily by erosive action of running water. Soil depth is usually shallow (with occasional deep patches) and landscapes usually consist of steep to undulating hillslopes.
Fauna	The animals of a given region or period, taken collectively.
Fill	Re-used earthen material
Floodplain	A level, low-lying area adjacent to streams that is periodically flooded by stream water. Floodplains are composed of sediments carried by rivers (alluvium) and deposited on land during flooding.
Flora	Plants of a particular region that make up the vegetation of a site.
Fluvial	Refers to the processes associated with running water such as a river or other freshwater source
Forest	A forest of trees in patches larger than 0.2 ha, with a minimum potential height of 2 m, and canopy cover greater than 20 per cent.
Frac-outs	Fractures or cave-ins
Geology	Science of the earth's history, composition, and structure, and the associated processes.
Geomorphology	The interdisciplinary and systematic study of landforms and their landscapes, as well as the earth's surface processes that create and change them.
Geomorphology/Geomorphic	The study of the nature and history of landforms and the processes which create them.
Geotechnical	A discipline of engineering associated with studying the ground and its geology.
Gradient	The degree of ascent or descent with a uniform slope.
Gravel	Sediment with diameters between 2 and 64 mm
Greenhouse gases	Gases that accumulate within the earth's atmosphere (eg primarily carbon dioxide and methane) and contribute to global climatic change/global warming (*i.e.* the 'greenhouse effect').
Groundwater	Subsurface water stored in pores of soil or rocks.
Gully erosion	The removal of soil by an excessive concentration of running water, resulting in the formation of deep channels.
Headcut/Headward Erosion	A steep, actively eroding point in the streambed, which migrates in an upstream direction to lower the streambed and cause streambanks to collapse. Also known as a 'nickpoint'.
Headwaters	The upstream extents of a stream, generally located in upper catchment areas. They are generally ephemeral first-, second- and third-order streams.
Heritage	Historic or cultural associations.
Hydraulic diversity	Variation in the physical effects of channel flow mechanics, such as depth, velocity and turbulence.

Hydraulics	The physics of channel flow that create its depth, velocity and turbulence.
Hydrological regime	Rainfall and run-off processes and movement through the environment.
Hydrology	The study of rainfall and surface water run-off processes.
Igneous rock	Rock formed by the cooling and solidification of magma.
Impact	See Environmental Impact in this glossary
Indirect impact	Impacts on the environment that are not a direct result of the development but are often produced away from it or as a result of a complex association, such as off-site traffic movements.
Landscape	Soft features of the urban, suburban, rural or natural environment, such as vegetation and green open spaces.
Landscape impact	Change in the elements, characteristics, character and qualities of the landscape as a result of development. These impacts can be positive or negative.
Landscape feature	Prominent eye-catching elements, or example a church spire, monument, distinctive landmark building, significant mature specimen tree that contributes to landscape character through appearance or specific civic use.
L_{AN}	Statistical sound measurement recorded on the "A" weighted scale.
$L_{Aeq\ (Time)}$	Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
$L_{Aeq\ (1\ hr)}$	The L_{Aeq} noise level for a one-hour period. In the context of the NSW DECCW environmental criteria for road traffic noise, it represents the highest tenth percentile hourly A-weighted L_{eq} during the period 7am to 10pm, or 10pm to 7am, (whichever is relevant). If this cannot be defined accurately, use the highest A-weighted L_{eq} noise level.
$L_{Aeq\ (9\ hr)}$	The L_{Aeq} noise level for the period 10pm to 7am.
$L_{Aeq\ (15\ hr)}$	The L_{Aeq} noise level for the period 7am to 10pm.
$L_{Amax\ (Period)}$	The maximum sound level recorded during a specified time interval.
$L_{Amin\ (Period)}$	The minimum sound level recorded during a specified time interval.
$L_{A10\ (Period)}$	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
$L_{A10\ (1\ hour)}$	The L_{10} level measured over a 1-hour period.
$L_{A10\ (18\ hour)}$	The arithmetic average of the L_{10} levels for the 18-hour period between 0600 and 2400 hours on a normal working day. It is a common traffic noise descriptor.
$L_{A90\ (Period)}$	The A-weighted sound pressure level that is exceeded for 90 per cent of the time over which a given sound is measured. This is considered to represent the background noise e.g. $L_{A90\ (15\ min)}$
L_N	Statistical sound measurement recorded on the linear scale.
L_w	Sound power level of the noise source.
Local area	According to the NSW Department of Environment and Climate Change guidelines for Section 5A of the Environmental Planning and Assessment Act 1979 (NSW) 'significance assessment tests' the local area is synonymous with the study area.

Magnitude	A combination of the scale, extent and duration of an impact.
Methodology	The specific approach and techniques used for a given study.
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for adverse landscape and visual impacts of a development project.
Morphology	In the context of this publication, it refers to the form and structure of waterways.
Mud	Fine sedimentary material, typically comprising both inorganic (mineral) and organic material.
Operation Environmental Management Plan (OEMP)	A document setting out the management, control and monitoring measures to be implemented during operation of a development, to avoid or minimise the potential environmental impacts identified during an environmental impact assessment process.
Option	A concept design alternative developed for consideration.
Particulates	Dust and other fine particles.
Perception (of landscape)	The psychology of seeing and possibly attaching a value and/or meaning (to landscape).
Planform	The lateral, two-dimensional shape of a waterway through a valley, as viewed from above.
Plant	Construction machinery, vehicles or equipment needed to carry out mechanical or construction activities.
Precautionary principle	If there are threats of serious or irreversible damage, lack of full scientific uncertainty should not be used as a reason for postponing measures to prevent environmental damage.
Project	Refers to the proposed Highlands Source Project. Broadly, the Project comprises of a proposed pipeline ca. 83 km in length to deliver water from the Wingecarribee Reservoir to the City of Goulburn in NSW.
Proponent	Goulburn Mulwaree Council (GMC).
Public open space	Land provided in urban or rural areas for public recreation, though not necessarily publicly owned.
Rail corridor	The area of land dedicated to the Australian Rail Track Corporation.
Rating Background Level (RBL)	The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24 hour period used for the assessment background level). This is the level used for assessment purposes. It is defined as the median value of: ◗ All the day assessment background levels over the monitoring period for the day; (7am to 6pm). ◗ All the evening assessment background levels over the monitoring period for the evening; (6pm to 10pm). ◗ All the night assessment background levels over the monitoring period for the night. (10pm to 7am).
Reach	A section of stream with the same character and behaviour.
Receptor	Physical landscape resource, special interest or person and/or viewer group that will experience an impact.
Residual impact	An impact that occurs/persists after mitigation measures have been put in place.

Riparian	Ecosystems particularly associated with all types of waterbodies.
Riparian zone	Land adjoining, directly influencing or which is directly influenced by waterbodies.
Risk	Risk is measured as the result of a combined consideration of, in particular: (i) how likely is it that an impact would occur (*i.e.* the likelihood), and (ii) the outcomes associated with the impact (*i.e.* the consequence)
Risk analysis	The whole process of: (i) describing the current environment in the vicinity of the Project and the values it provides; (ii) identifying and describing the potential impacts on the environment; (iii) assessing the level of risk that may be associated with the impact, based on a consideration of the likelihood and consequences of the impact occurring (*i.e.* a "risk assessment"); (iv) developing impact mitigation measures (including the design of further investigations that were required to better inform the risk assessment), the extents of which have been informed by the assessed level of risk that may arise in association with it.
River Styles framework	River Styles® is a geomorphic approach for examining river character, behaviour, condition and recovery potential. This provides a physical template for river management.
Salinity hazard	The varying degree of risk of salinity occurrence. Salinity occurs when there is excessive build up of dissolved salts in soil and groundwater.
Sand	Sediment with diameters between 0.06 mm to 2 mm
Scour	Streambank, bed or floodplain erosion where particles of sediment are removed individually by plucking or are sheared off. It is caused by the force of running water being greater than the sediment's ability to resist that force.
Scour water	Water released from the pipeline during scouring.
Scouring	A pipeline maintenance activity that required the release of pipeline water (scour water). The activity is predominantly undertaken when the pipeline needs to be maintained or cleaned internally.
Seasonal waterlogging	Soils subject to saturation during seasonally higher rainfall.
Sediment	Material of varying sizes that has been or is being moved from its site of origin by the action of wind, water or gravity.
Sedimentary rock	Rock formed from the consolidation of sediments
Sense of place	The essential character and spirit (genius loci) of an area.
Sensitive receiver	Land uses that are considered to be more susceptible to the impacts generated by the Project.
Shallow soils	Areas where the soil layer is thin and rock would likely be encountered at shallow depth.
Sheet erosion hazard	Soils susceptible to the removal of a uniform thin layer of soil by raindrop splash or water run-off.
Silt	Sediment with diameters between 0.002 mm to 0.06 mm

Sinuosity	The extent of curvature or meandering of a stream in comparison to down valley distance. Highly sinuous streams meander over a low gradient and short distance; streams with low sinuosity are straighter and have a steeper gradient.
Site compound	Area enclosing construction machinery, stockpiles and site offices usually adjacent to construction sites.
Sodicity	"Sodic soil" is typically associated with agricultural soil science. Its environmental engineering implications are highly dispersive, erodible soils, prone to waterlogging.
Sound Pressure Level (SPL)	20 times the logarithm to the base 10 of the ratio of the RMS sound pressure level to the reference sound pressure level of 20 micropascals.
Spoil	Excess of rock and/or earth material resulting from construction activities.
Steep slopes / Mass movement hazard	Soils on steep slopes which is subject to mass movement down slope.
Study area	The study area for this project is defined as described in Section 1 of this document. point where noise or air quality is predicted. A sensitive receptor would be a home, work place, church, school or other place where people spend time.
Study area	The study area for this project is defined as described in Section 1 of this document.
Substrate	The basic surface on which material adheres, typically mineral and (or) organic material that forms the bed of a stream.
Surface water	Surface water is water collecting on the ground or in a stream, river, lake, wetland, or ocean
Topography	The description or representation of the features and configuration of land Surfaces
Visual amenity	The value of a particular area or view in terms of what is seen.
Visual impact	Changes in the appearance of the landscape or in the composition of available views as a result of development, to people's responses to these changes, and to the overall impacts in regard to visual amenity. This can be positive (i.e. beneficial or an improvement) or negative (i.e. adverse or a detraction).

Acronyms & Abbreviations

AADT	Average Annual Daily Traffic
ADWG	Australian Drinking Water Guidelines (NHMRC 2004)
AHD	Australian Height Datum
AHIMS	Aboriginal heritage Information Management System
ALARP	As Low As Reasonably Practicable
ANZECC	Australia and New Zealand Environment and Conservation Council
ARI	Average Reoccurrence Interval
ARTC	Australian Rail Track Corporation
ASL	Above Sea Level
ASS	Acid Sulfate Soils
ASSMP	Acid sulphate soils management plan
AWS	Automated Weather Station
BCA	The Burra Charter of Australia
bgl	Below Ground Level
BNAC	Buru Ngunnawal Aboriginal Corporation
$CaCO_3$	Calcium Carbonate
CEMP	Construction Environmental Management Plan
CESMP	Community Engagement and Stakeholder Management Plan
CHAIR	Construction Hazard Assessment Implication Review
CLM Act	NSW *Contaminated Land Management Act 1997*
CMA	Catchment Management Authority
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DAF	Dissolved Air Flotation
DBP	Disinfection by Products
DCC	Commonwealth Department of Climate change

DCP	Development Control Plan
DECC	Former NSW Department of Environment and Climate Change
DECCW	NSW Department of Environment, Climate Change and Water
DEWHA	Commonwealth Department of Environment, Water, Heritage and the Arts
DGRs	NSW Director Generals Requirements
DICL	Ductile iron cement mortar lined
DOC	Dissolved organic carbon
DoC	Former NSW Department of Commerce
DoP	NSW Department of Planning
DPI	Former NSW Department of Primary Industries
DWE	Former NSW Department of Water and Energy
EDP	Economic Development Plan
EEC	Endangered Ecological Communities
EMP	Environmental Management Plan
EPA	NSW Environmental Protection Agency
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EP&A Regulation	NSW *Environmental Planning and Assessment Regulation 2000*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FCR	Free Chlorine Residual
FM Act	NSW *Fisheries Management Act 1994*
GAHAI	Gundungurra Aboriginal Heritage Association Inc
GHG	Green House Gas
GMC	Goulburn Mulwaree Council
GRP	Glassfibre Reinforced Polyester
GTAC	Gundungurra Tribal Aboriginal Corporation
HACCP	Hazard Analysis and Critical Control Point
HAZOP	Hazard and Operability
HDD	Horizontal Directional Drilling

HNCMA	Hawkesbury-Nepean Catchment Management Authority
I&I NSW	Industry and Investment NSW
IE	Integral Energy
ILALC	Illawarra Local Aboriginal Land Council
IWCM	Integrated Water Cycle Management
LEP	Local Environmental Plan
LGA	Local Government Area
LOS	Level of Service
MIC	Maximum Instantaneous Charge
NHMRC	National Health Environment and Medical Research Council
NOW	NSW Office of Water
NOx	Oxides of Nitrogen
NSW	New South Wales
NWC	National Water Commission
NWI	National Water Initiative
OEMP	Operational Environment Management Plan
OH&S	Occupational Health and Safety
PAC	Powdered Activated Carbon
PAD	Potential Archaeological Deposits
PASS	Potential Acid Sulfate Soils
PEA	Preliminary Environmental Assessment - in accordance with the EP&A Act
pH	Potential Hydrogen
PLALC	Pejar Local Aboriginal Land Council
POEO Act 1997	NSW *Protection of the Environment Operations Act 1997*
PW Act	NSW *Public Works Act 1912*
RBC	Regional Biodiversity Corridor
REP	Regional Environmental Plan
ROA	Railway of Australia

RTA	NSW Roads and Traffic Authority
SCA	Sydney Catchment Authority
SEMP	Sediment and Erosion Management Plan
SEPP	State Environmental Planning Policy
SEPP Infrastructure	*State Environmental Planning Policy (Infrastructure) 2007*
SEPP Major Developments	*State Environmental Planning Policy (Major Developments) 2005*
SEPP 44	*State Environmental Planning Policy No. 44 – Koala Habitat Protection*
SEPP 55	*State Environmental Planning Policy No. 55 – Remediation of Land*
SEPP Rural Lands	*State Environmental Planning Policy (Rural Lands) 2008*
STP	Sewerage Treatment Plant
SWL	Standing Water Level
TDS	Total dissolved solids
TMP	Traffic Management Plan
TOC	Total Dissolved Solids
TSC Act	NSW *Threatened Species Conservation Act 1995*
TSP	Total Suspended Particulates
UV	Ultra-Violet
WHO	World Health Organisation
WSC	Wingecarribee Shire Council
WTP	Water Treatment Plant

Units of Measure

cfu	Colony forming units
D	Day
G	Gram(s)
H	Hour
ha	Hectare(s)
Hu	Hazen units
kL	Kilolitre(s)
km	Kilometre(s)
kt	Kilotonne(s)
kV	Kilovolts
L	Litre(s)
M	Metre(s)
mg	Milligram(s)
mg/L	Milligrams per litre
mL	Millilitre (s)
ML	Megalitre(s)
ML/a	Megalitres per annum
ML/day	Megalitres per day
mm	Millimetre(s)
MPN	Most probable number
NTU	Nephelometric Turbidity Unit
PJ	Peta Joule(s)
ppm	Parts per million
t	Tonne(s)
vpd	Vehicles per day
vph	Vehicles per hour

Executive Summary

Securing Goulburn's Water Supply

Inflows into the drinking water storages within the Goulburn drinking water supply catchment have been below average for past 10 years. The Goulburn Mulwaree region has faced severe drought and water restrictions since 2002. By mid 2007 Goulburn had less then 12 months water supply available and was subject to Level 5 water restrictions.

Goulburn Mulwaree Council (GMC), in conjunction with a State Government Task Force, identified an Emergency Pipeline from Wingecarribee Reservoir as the best means of overcoming the water supply emergency and securing Goulburn's water supply for the future (GMC & DoC, 2007). The proposed pipeline is referred to as the Highlands Source Project. Subsequent rains in June 2007 and the water saving efforts of the community removed the emergency aspect of the Project, however the need for improved water security remains. If current conditions continue, Goulburn may face the same restrictions again in the near future.

GMC has prepared an Integrated Water Cycle Management (IWCM) Strategy that will outline actions for improving long term water sustainability. This Project is an integral part of this Strategy. Additionally, GMC has undertaken a Goulburn Water Supply Strategy Review, in which the Project was identified as the best solution for improving the city's water security. The proposed additional water would supplement the existing Goulburn water supply system.

This Environmental Assessment has been prepared in accordance with the requirements of Part 3A of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979*. The assessment has been prepared to support an application to the NSW Minister for Planning for Project Approval to construct and operate the Project. The assessment addresses the requirements of the Director-General of the NSW Department of Planning (DoP) dated 14 December 2009.

The Project

The Highlands Source Project (referred to as the 'Project' for the purposes of this assessment) involves the pumping of water from the Wingecarribee Reservoir at the existing raw water extraction point and transfer through an underground pipeline to the Goulburn water supply network.

The Project involves construction and operation of a pipeline and associated infrastructure with the capacity to transfer up to 5 ML/day of water a distance of approximately 83 km from the Wingecarribee Reservoir to the Goulburn water supply system. Two pumping scheme options for supplying water to Goulburn are currently under investigation:

- A Raw Water Transfer Option, whereby Goulburn would draw untreated water from Wingecarribee Reservoir and deliver it to Goulburn Water Treatment Plant (WTP) prior to distribution; and
- A Treated Water Transfer Option whereby treated water from Wingecarribee WTP would be supplied directly into the water reticulation system in Goulburn. This connection could be achieved in two ways:
  - Direct connection to the existing treated water reticulation network on the north side of Goulburn; or

– Direct feed into a proposed reservoir on Governor's Hill in east Goulburn. If a connection into a proposed reservoir on Governor's Hill occurs, the reservoir and its associated connection works would not form part of this project.

There are only relatively minor differences in the infrastructure required for both options. The Project infrastructure includes a pump station, an underground pipeline and an outlet structure or connections to existing infrastructure.

The Project is expected to commence construction in mid 2010 with the pipeline commissioned and operational by the end of June 2011.

Key Project principles

The Project has been developed based on a number of key principles as follows:

- Minimising as far as practicable the area of disturbance, particularly the clearing of native vegetation;
- Any endangered ecological communities (EECs) removed during construction would be offset by Goulburn Mulwaree Council;
- Construction environmental management controls would be implemented throughout the construction of the Project to protect the natural and cultural environment outside the disturbance area; and
- Rehabilitation would be progressively implemented throughout construction.

Project need and justification

In 2007, Goulburn received widespread publicity when the city's water security recorded critically low levels with storages at 12 per cent of capacity. At this time, the Goulburn community was subject to Level 5 water restrictions which severely limited the use of water by all community residents, businesses and tourists.

The Goulburn water supply has been severely affected by recent drought conditions. The Goulburn water storages were last full in November 2000 and the storages have not overflowed since November 1996. Level 3 water restrictions are currently in place, however more severe restrictions may come into force should sufficient rainfall and runoff not occur. An alternative source of water supply is critical to securing the future of Goulburn's water supply.

Investigations were undertaken to determine a suitable solution to securing Goulburn's water supply. Many supply and delivery options were assessed and considered (Chapter 7) as well as alternative measures to increase the security of the existing supply. The preferred option involved constructing an underground water pipeline from the existing Wingecarribee raw water extraction point to the Goulburn Mulwaree water supply network. A treated water option to transfer water direct from the Wingecarribee WTP to the Goulburn mains supply was also considered. It was decided to progress investigation and design of this option. This option became known as the Highland Source Project and is an integral part of Goulburn Mulwaree Council's Integrated Water Cycle Strategy.

The Project would contribute to the future water security of Goulburn. Some specific benefits of the Project include:

- Providing a level of water supply security for Goulburn that is consistent with other communities in NSW;

- Enabling severe water restrictions to be replaced by demand management measures – while water restrictions would likely still be required, the risk to Goulburn residents of facing a repeat of the severe Level 5 water restrictions incurred during 2000 to 2005 will be reduced;
- Greater water security would provide Goulburn with improved opportunities to attract business and industry;
- Providing an alternative water source would provide environmental relief to the already stressed Wollondilly River, improving the amenity provided by the River to downstream communities;
- The Project is well aligned with re-use and demand management programs to accommodate growth in Goulburn that are currently proposed in the IWCM Strategy which is under development; and
- Important community facilities, such as the swimming pool and sporting fields, would be less likely to be closed due to unavailability of water to operate and maintain these facilities.

Project alternatives

Over the past few years, Goulburn Mulwaree Council has been reviewing options for a secure water supply for Goulburn and surrounding region, with a considerable amount of work undertaken in the last four years. The proposal to extract water from the Wingecarribee Reservoir has been considered as part of these investigations. All the options identified between 2005 and 2009 have been the subject of community consultation, and the reports in which they were considered were made available to the public.

Water supply options have been considered in the following reports:

- Water Cartage Contingency Plan Options (November 2005);
- Drought Emergency Pipeline Route Corridor Option Study (August 2007); and
- Goulburn Water Supply Strategy Review (January 2009).

In March 2009, Goulburn Mulwaree Council announced the Highland Source Project would be implemented to secure Goulburn's water supply. The Council confirmed its commitment to the project by issuing a media release on 18 March 2009 stating:

> *'Goulburn Mulwaree Council has unanimously agreed to proceed with pre-construction, design, cost and funding work of the Highlands Source Project to secure Goulburn City's water future until at least 2040. The pipeline is one part of an Integrated Water Solution for Goulburn. A number of other strategies are also be part of the future plans. This scheme has been shown to be the most effective in addressing the effects of climate change on Goulburn's water supply, and it will see Goulburn through any future droughts by providing a constant supply of water.'*

Legislative requirements

This document has been prepared to meet the requirements of Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Part 3A of the EP&A Act establishes an assessment and approval regime for development that is declared to be a Part 3A project by either a State Environmental Planning Policy or Ministerial Order (section 75B).

Development may be declared to be a Part 3A project in certain circumstances, one of which is where the development is a major infrastructure that, in the opinion of the Minister for Planning, is *"of State or regional environmental planning significance"*.

On 9 July 2007, the Minister for Planning declared the Project to be a project of regional planning significance, pursuant to section 75B(1) of the EP&A Act, and ordered the Project to be declared as a project to which Part 3A of the Act applies[1].

According to section 75D(1) the Minister for Planning is the approval authority for Part 3A projects.

Environmental impacts and mitigation measures

Investigations have been undertaken during the preparation of the environmental assessment to assess potential environmental impacts. These included specialist assessments of potential environmental impacts on drinking water quality, geomorphology, hydrology, ecology, heritage, soils and groundwater, landscape and visual amenity, noise and vibration, greenhouse gas, social, traffic and transport and hazards and risk. A summary of the key findings of the environmental assessments and proposed mitigations follows.

Drinking water quality

Goulburn's water supply is wholly sourced from a subcatchment of the Wollondilly River catchment. The catchment supports a variety of landuse, with agriculture (especially grazing) and semi-rural living being the main types.

Wingecarribee Reservoir is located on the Wingecarribee River, about 15 km southeast of Bowral, NSW. The reservoir is an earth and rockfill dam that was completed in 1974, and it is owned and operated by the Sydney Catchment Authority (SCA).

The Project would have impacts on the drinking water quality that would provide both benefits to the quality of the water supply in Goulburn as well as introducing new risks that would require careful management. These new risks would not be beyond what could reasonably be expected from a surface water supply system in other parts of Australia, and would be manageable. The Wingecarribee Reservoir is already a well utilised drinking water source reservoir. Managed appropriately, the operation of the Project would offer some potential benefits to Goulburn's drinking water quality.

The primary risks that require management in any water supply are those to human health posed by pathogenic micro-organisms that may be present in the water. It is not likely that the Project would result directly in unmanageable health risks to Goulburn residents.

Ecology

A total of 27 threatened plant species are considered likely to occur within the habitats present within the proposed corridor. Of these, only two threatened flora species were recorded as occurring along the proposed pipeline route: Camden Woollybutt (*Eucalyptus macarthurii*) is listed as Vulnerable under the TSC Act and Hoary Sunray (*Leucochrysum albicans* var. *tricolor*), listed as endangered under the EPBC Act. One EEC listed under the TSC Act, Southern Highlands Shale Woodlands, was recorded at various

[1] Official Notice 8368, NSW Government Gazette No. 167,9 November 2007

locations along the proposed pipeline route, with a total of 314.5 ha mapped within the 400 m survey corridor.

Vegetation clearance calculations for the two options for the proposed pipeline route showed the treated water option would result in the permanent clearing of 18.81 ha of native vegetation and 41.74 ha of non-native vegetation, with temporary disturbance of 83.46 ha of non-native vegetation. The raw water option would result in the permanent removal of 18.73 ha of native vegetation and 49.55 ha of non-native vegetation, with temporary disturbance to 99.10 ha of non-native vegetation.

The native vegetation to be permanently removed during construction includes 4.32 ha of the Southern Highlands Shale Woodlands EEC, as well as potentially up to 100 individuals and associated habitat for the threatened Camden Woollybutt. No individuals of Hoary Sunray would be affected.

A total of 30 threatened fauna species are considered likely to occur within the survey corridor. Field surveys confirmed the presence of six species of threatened fauna including: Gang-gang Cockatoo, Glossy Black Cockatoo, Brown Treecreeper, Eastern Falsistrellus, Large-footed Myotis and Eastern Bentwing Bat, which are all listed as vulnerable under the TSC Act.

Vegetation to be cleared in the construction corridor is likely to provide habitat for the six fauna species identified within the survey corridor and others considered likely to occur at least on occasion. Impacts on fauna would include reduced shelter or roosting sites, foraging habitat and actual food abundance. Clearing would have additional negative effects on the quality of habitats in the broader locality through edge effects and incremental fragmentation of habitat.

The mitigation of adverse effects arising from the proposed pipeline construction has been presented according to the hierarchy of avoidance, mitigation and offsetting of impacts, consistent with the approach outlined in the DEC/DPI (2005) guidelines.

Potential impacts of the Project on native biota and their habitats would be greatest in the construction footprint during the construction phase due to clearing of vegetation and direct habitat loss and modification. Specific mitigation measures have been incorporated into the Project design to avoid or minimise such impacts on the natural environment within the pipeline corridor, and in particular to reduce potential impacts on threatened species and their habitats.

A Biodiversity Management Strategy, incorporating measures to avoid, mitigate and offset biodiversity loss arising from the proposed pipeline construction has been developed in consultation with DECCW and GMC. The Strategy comprises four key actions:

- Additional targeted surveys to obtain comparable baseline data on the biodiversity values of the proposed offset sites and the survey corridor.
- Refinement of the pipeline corridor through the detailed design phase, whereby the design team will make adjustments to the alignment of the pipeline (subject to engineering constraints) in response to data obtained from the additional field surveys, to further avoid or reduce direct impacts on biodiversity values.
- Preparation of a Flora and Fauna Management Plan (FFMP) that will be prepared during the detailed design phase of the Project. The FFMP will identify detailed site-specific/species-specific mitigation measures and environmental management protocols to be implemented before, during and post construction to further avoid or reduce impacts on threatened biodiversity. The FFMP will comprise a sub-plan to the CEMP and OEMP for the Project and will be prepared in consultation with DECCW and finalised before construction.

- Preparation of an Offset Plan, in consultation with DECCW, that will detail the biodiversity values of the proposed offset sites, and provide an assessment of how the offset will compensate for unavoidable impacts on threatened biota.

Further details on proposed mitigation measures to be implemented during construction and during operation of the Project are provided in Appendix E.

Indigenous heritage

The majority of the pipeline corridor has been variously impacted by clearing and pasture development, and track, road and fencing construction. Notwithstanding this, the field survey for the Aboriginal assessment identified a total of 25 sites in the study area. The sites include isolated finds, artefact scatters and potential archaeological deposits. Two sites were previously recorded in the vicinity of the pipeline corridor; however only one could be located during the field survey. Seventeen sites would be directly impacted by the project.

A significance assessment was undertaken with the assessment criteria that apply in NSW. Most of the Aboriginal sites subject to impact are assessed as having moderate or low archaeological significance. Two sites were assessed as having a moderate/high scientific significance, while 10 sites were assessed as having moderate archaeological significance. For other sites, the scientific significance was low or not able to be determined at this stage. The assessment of cultural significance has been undertaken with Aboriginal groups and will continue throughout the detailed design and construction of the Project. It is noted that only the Aboriginal community can determine Aboriginal cultural significance and that confirmation of this significance component is dependent on written submissions to the heritage assessment by appropriate representative organisations.

On the basis of previous research, the results of field survey and the implementation of the mitigation measures identified, it is unlikely that there would be Aboriginal heritage issues that would pose an absolute constraint to the Project. Furthermore it is expected that these mitigation measures would equally apply to any additional sites that might be encountered during future investigations.

Non-Indigenous heritage

The study area has been subject to farming and rural residential occupation since the early-mid 1800s. The majority of European sites identified in the course of this study would not be impacted by the Highland Source Project. While the pipeline alignment passes through and adjacent properties that contain heritage listed items, in most cases it would not directly impact the curtilage associated with these items and, the distance between the listed items and the construction zone is such that they would not be directly impacted by dust and vibrations.

House ruins and tree plantings located near the Kenmore Psychiatric Hospital Complex is the only site where direct impacts may occur that would compromise the heritage value of the item. In this instance, it may be possible to minimise impacts through additional research and survey at the site, together with narrowing of the pipeline corridor across the knoll where this complex is situated. It is unlikely that with the implementation of the mitigation measures, there would be any European heritage issues that would pose an absolute constraint to the Project.

Soils and groundwater

The Project would involve extensive excavation along the length of the pipeline route, with additional excavation and earthworks being undertaken at the site of the pump station and outlet connections as well as at horizontal directional drilling (HDD) and thrust boring locations. The potential for impacts to geology, soils, groundwater and soil contamination during excavation works and other construction activities are considered to range from unlikely to moderate and can be managed with the implementation of the proposed erosion and sedimentation controls proposed for the project.

A rehabilitation plan would be developed for the project. The rehabilitation plan would describe the rehabilitation management, objectives and activities necessary to assess and rehabilitate areas impacted by construction works. Rehabilitation would be undertaken with close interaction with the affected local community. Rehabilitated areas would be maintained during the establishment period.

Potential operational impacts to geology, soils, groundwater and soil contamination are likely to be less significant than the potential construction impacts as they have been minimised by the design of the Project.

Surface water quality

The Project provides an opportunity to have some beneficial impacts on the surface water quality within the Sydney drinking water catchments, for example by revegetation and by offsetting land clearing, as described in the ecological assessment report undertaken for this Project. However, the Project would have impacts on and introduce new risks during the construction phase to the overall surface water quality that would require careful management.

The greatest risks to waterway contamination occurs during the construction phase and is associated with excavation activities and stock piling of material by introducing a pathway for mobilized sediment to enter the waterways at localized points. The standard set of project controls to be implemented for the Project would generally provide adequate control against the greater majority of these risks to surface water quality, and ensure a neutral effect on water quality in the Sydney drinking water catchment. They also comply with the recommended work practices that have been endorsed by the SCA.

With the implementation of strict project controls, it is considered that the Project would have a neutral effect on the quality of water discharging to the receiving environment.

Geomorphology

Eight broad waterway types were observed along the pipeline route during the field inspection. These include headwater systems, confined systems, valley fill systems, channelised fill systems, chain of ponds systems, bedrock controlled by fine grained systems, bedrock controlled by sand systems and low sinuosity fine grained systems.

Most waterways along the pipeline route are considered to be relatively geomorphologically stable. This is a reflection of the landscapes and type of waterway systems the proposed pipeline traverses. Some waterways, however, displayed existing instabilities in the form of either headward erosion or bank erosion.

A number of potential impacts have been identified concerning the construction and operational phases of the Project. These are concerned with the impact that construction of the pipeline has on the form and stability of the potential 138 waterways crossed by the pipeline. Waterway assessments indicated that

the bulk of waterways are Drainage Lines or Minor Creeks and are relatively stable. Hence, with appropriate construction practices, re-instatements and rehabilitation, the impact of pipeline construction on waterway form and stability will be low. Nevertheless, some waterway crossing sites exhibit existing instabilities and/or sensitivities for which additional mitigation measures have been provided. With adoption of these additional measures, the overall impact of pipeline construction on waterway form and stability would be low.

Land use

The main potential impacts on land use would occur during the construction phase of the Project. Impacts may include disruption to land use and access, in particular the use of private land along the pipeline corridor, underground services and electricity transmission lines would be temporarily disrupted. As the pipeline would be constructed in a linear fashion, any impacts would be short term and limited to the duration of the construction period.

Sensitive receptors related to the surrounding land uses would also have the potential to experience impacts on amenity, in particular with regards to noise and visual amenity during construction. The proposed pipeline is located in close proximity to a number of residential dwellings which are located on large properties. Approximately 40 dwellings are located within 100 metres of the pipeline alignment with 16 dwellings located within 50 metres. The nearest of these dwellings are two dwellings located approximately 10 metres from the pipeline alignment. These dwellings are located in the northwest corner of Ivy Lea Place in Goulburn and a property located off the Hume Highway west of the second crossing of the Wollondilly River.

Land use impacts during operation of the project would predominantly relate to restrictions on the use of land within the permanent pipeline easement (such as building, digging, cropping, ploughing and planting restrictions in the pipeline easement) and maintenance access. Most agricultural activities such as livestock grazing and small-scale cultivation would be able to continue during operation of the pipeline. Maintenance access would be infrequent and localised to specific points along the pipeline, mainly the locations of the scour valves, and would not impact on the use of the land. As such, it is considered that operational impacts on land use would be minimal.

Overall, the construction and operation of the pipeline would have low impacts to land use. Where impacts occur, mitigation measures would be implemented to further reduce the potential impacts.

Noise and vibration

Noise and vibration disturbing nearby residents and dust generation affecting health and amenity have been included as part of the Environmental Assessment. These emissions are commonly associated with developments of this kind. Although they are likely to occur, they would be relatively short-lived, as construction of the Pipeline is expected to take less than one year. During this time, construction sites would move along the pipeline corridor and therefore impacts on any one location would be short-term.

Excavation work, under-boring, and rock hammering are predicted to produce the highest noise levels at sensitive receptors and have the potential to exceed the highly noise affected noise level of 75 dB(A) when operating within 50 m of residential receivers. As such, at these locations activities would be restricted to standard hours if possible.

Approximately 16 dwellings have been identified as being located within 50 m of the proposed pipeline alignment. Of those 16 dwellings, two dwellings are located approximately 10 m from the pipeline alignment.

It is unlikely that implementation of all reasonable and feasible noise mitigation measures would reduce noise levels to below the *noise affected level* of 40-46 dB(A). Therefore all potentially impacted residents would need to be informed of the nature of the works, expected noise levels, duration and contact details.

The majority of construction activities along the pipeline are not expected to produce perceptible levels of vibration due to the distance from the receivers. However, some activities such as excavation, rock breaking, rolling and compacting may produce levels of vibration that are perceptible and potentially intrusive when construction activities are located within 50 m of residence.

Though blasting is not anticipated, it remains a possibility and as a consequence blasting mitigation techniques have been provided to reduce the magnitude of the noise and vibration levels as well as the perception of vibration at sensitive locations. If required blast monitoring would be undertaken to assess compliance and confirm the predictions and all residential receivers be informed when blasting is to be undertaken.

Air quality

Existing air quality in the vicinity of the pipeline corridor is considered to be good. Potential air quality impacts during construction include dust and particulate emissions and fuel combustion emissions. The potential for emissions would be minimised through a number of mitigation measures and controls and the implementation of a dust management sub-plan. Operational impacts are expected to be negligible.

Greenhouse gas

The major sources of emissions during construction would be diesel for manufacturing of pipes and pipe material, construction vehicles and vegetation clearance. Emissions associated with the consumption of electricity were estimated to contribute 100 per cent of the total emissions during operation of the proposed pipeline and pump station.

The total construction emissions for the Project were estimated to be 27 190 tonnes of CO_2-e over the construction period. The annual emissions equate to 0.02 per cent of total emissions for NSW, based on *DCC State and Territory Greenhouse Gas Inventories 2007.*

The total emissions for the first 30 years of operations are estimated to be 30 060 tonnes CO_2-e. While these emissions are only a small fraction of the Australian and NSW total emissions, there remain opportunities to take-up environmentally and economically appropriate measures to reduce greenhouse gas (GHG) emissions.

Social and economic

The location of infrastructure and the alignment of the pipeline have been chosen in consultation with local landowners and the broader community to minimise overall impacts. The Proponent is currently in the process of negotiating with landowners over access to their land for the purpose of construction, including land rehabilitation, and operation of the pipeline.

During the construction phase, potential social impacts would be minimised through careful planning and the adoption of appropriate mitigation measures. The increase in traffic, road closures, noise and disturbance to property access would all modify rural ambience to a moderate degree during construction. These impacts are expected to be minimal, and would be of a limited duration.

There is a social benefit to Goulburn and the region in the improvement in the security of water supply as well as a potential economic benefit. Employment generated by the Project, both directly and indirectly, would bring significant benefits, particularly as new businesses are attracted to the region due to the opportunity water security offers.

Goulburn Mulwaree Council would implement a community engagement program to ensure that the community is informed of any impact and progress of construction of the project.

Landscape character and visual impacts

The construction of the Project would generate visual impacts during the construction period. Impacts would be experienced at the site for the pump station and along the length of the pipeline corridor. Construction impacts would be primarily due to the proximity and presence of sensitive residential receivers. However, the impacts would be temporary and limited to the construction period.

Operational impacts of the project would occur as a result of:

- The introduction of new structures in the landscape at the pump station and associated access arrangements;
- The linear pipeline corridor, which would need to remain free of trees and shrubs to maximum of approximately 10 m wide; and
- Addition of associated pipeline infrastructure/structures, including maintenance access, signage, air and scour valves, which would increase the number of permanent static elements.

The pump station and the pipeline easement would be the main visual elements of the project and would have moderately significant adverse landscape and visual impacts. Measures to reduce the potential impacts to landscape character and visual amenity include the reduction of vegetation clearing in areas containing native vegetation or other sensitive environments. Rehabilitation of disturbed land areas would occur progressively and rehabilitation targets would be agreed with landholders during the land acquisition phase.

Traffic and transport

Potential impacts to traffic and transport would occur during the construction period. The volume and intensity of truck movements would increase over varying amounts during the 8 to 10 month construction period. The additional construction traffic due to the project can be adequately accommodated on the Hume Highway, the Illawarra Highway, regional and local Council roads at acceptable levels of service. However, there is likely to be disruption to traffic where the pipeline crosses roads by open trenching resulting in possible single lane closures and temporary speed reductions on some roads. Thrust boring techniques used under State controlled roads is likely to cause minimal impact to traffic during daytime hours; however temporary lane closures and speed reductions may be required during night work undertaken.

The delivery of materials and equipment that will be spread over the construction period can be arranged to minimise impact on the local community. As most of the construction activity will be confined within the

construction corridor and the adjacent local roads, traffic movements within the corridor would need to be managed by the implementation of an appropriate traffic control plan. Arrangements would be made with property owners to ensure access to their properties is possible at all times.

Hazards and risks

Hazards and risks during construction of the project would be undertaken consistent with an integrated Health, Safety and Environmental Management System that conforms to AS/NZS 4801:2001 OH&S Management Systems and AS/NZS ISO 14001:2004 Environmental Management Systems.

The main hazards and risks relate to the construction of the pipeline within the vicinity of the existing Moomba – Sydney gas pipeline easement. Twelve hazards were identified in a preliminary pipeline hazard assessment. After the implementation of recommendations to manage the potential impacts, only one hazard continues to present an intermediate risk to the operation of the gas pipelines: HDD going off track at creek crossing and highways and potentially rupturing the gas pipeline/s. The recommended management action involves tracking the drilling head when drilling is undertake under streams, roads and railways to reduce the risk of the cutter head going off track and impacting the gas pipeline. The offset distance between the pipeline construction and the gas pipeline easement would also be increased proportional to the drilling distance required, *i.e.* 50 m of HDD required, therefore a 50 m offset distance would be required.

Operation of the pump station, the pipeline itself and the outlet works are not considered to significantly impact on public health and safety.

Infrastructure, utilities and services

A number of existing services and infrastructure would be crossed during the construction of the 83 km of pipeline from Wingecarribee Reservoir to Goulburn. Standard construction methods would be employed during construction such that the potential impacts to these services are minimised. It is not expected that these services would be impacted in the long term and discussions would be held with service providers such that disruptions to the operation of the infrastructure is avoided or limited.

The main potential impacts to infrastructure, utilities and services relate to construction in vicinity of the gas pipeline easement and the Hume Highway, railways, the fibre optic easement, and water and electricity supplies. Standard construction methods as determined by Gorodok and APA, the RTA and ARTC and other service providers would be employed to reduce the potential impacts to this infrastructure. Additional mitigation measures would be employed for construction undertaken adjacent to the gas pipeline easement.

Spoil handling and waste management

The main wastes that would be generated during construction include excess spoil, vegetation and landscape materials, construction material, general waste from site personnel, paints and solvents and wastewater and sewage.

The majority of landowners have indicated their interest in using spoil remaining after pipeline construction works to address erosion issues. A detailed investigation of these areas would be undertaken as part of the construction program and would require ongoing liaison with the landowners during the construction process. Any commitments to assist landowners would be developed before construction commences.

Any spoil that could not be reused would be sent to a licensed landfill, where it would be beneficially used as a landfill cap. Other construction waste would be reused and recycled were possible. The remaining waste would be disposed of at appropriately licensed facilities.

Potential major haulage routes for offsite disposal or reuse of spoil and other waste materials include the Hume Highway, the Illawarra Highway and Old Hume Highway (Sydney Road).

A detailed waste management sub-plan would be prepared as part of the construction environmental management plan to address relevant legislation and set out the requirements and procedures for the management of spoil and other wastes. Procedures to prevent spillage and emergency plans to manage environmental incidents would be developed as part of the construction environmental management plan.

Environmental monitoring

Both the construction and operation of the project would be supported by the implementation of best practice management techniques defined by the construction and operational environmental management plans.

An ongoing monitoring program with an adaptive management approach would be adopted. Adaptive management is a process whereby the results of environmental monitoring are continually assessed and modifications or additional safeguards adopted if necessary. The monitoring program would provide the necessary information to inform, and if required, adapt the operation, particularly the rehabilitation aspects, of the project.

The proposed construction phase monitoring would include:

- Sediment and erosion control;
- Water quality monitoring, particularly when construction is close to waterways;
- Dust monitoring; and
- Noise monitoring near sensitive receivers.

The proposed operation phase monitoring would include:

- Post-construction pipeline rehabilitation in disturbed areas;
- Scour water discharge monitoring; and
- Drinking water quality monitoring.

All monitoring would be undertaken according to the relevant Australian Standards and accepted scientific protocols. The local community and other interested stakeholders would be encouraged to participate in the monitoring program and development of any adaptive response measures that may be required.

The summary of commitments listed in this table include the development of construction and operation environmental management and monitoring plans as discussed above, and the additional measures recommended by the individual impact assessment chapters (refer to Chapter 28 for the complete list).

Conclusion

The proposal to transfer water from the Wingecarribee Reservoir to the Goulburn Water supply represents a major investment in securing the water supply for Goulburn and has substantial social benefits and potential economic benefits. The environmental assessment indicates that while there are some potential impacts, appropriate mitigation measures would be applied to minimise these impacts to acceptable levels. As a result, there is unlikely to be any significant residual impacts as a result of the Project.

A high standard of environmental management would guide this project and the significant economic and social benefits of the project would positively impact on this region for many years to come.