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Goulburn Mulwaree Council

Report for Highlands Source Project

Preliminary Environmental Assessment

October 2009

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Glossary and Acronyms

CEMP	Construction Environmental Management Plan
CE&SM	Community Engagement and Stakeholder Management
CMA	Catchment Management Authority
CO	Carbon Monoxide
CO_2	Carbon Dioxide
NOx	Oxides of Nitrogen
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
DoP	NSW Department of Planning
DPI	NSW Department of Primary Industries
DWE	Former NSW Department of Water and Energy
EA	Environmental Assessment - in accordance with the EP&A Act
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*
EPI	Environmental Planning Instrument
EPL	Environment Protection Licences
ESD	Ecological Sustainable Development
FM Act	NSW *Fisheries Management Act 1994*
GHG	Green House Gas
GMC	Goulburn Mulwaree Council
Heritage Act	NSW *Heritage Act 1977*
IWCM	Integrated Water Cycle Management Strategy
LEP	Local Environmental Plans
LGA	Local Government Area

LG Act	*Local Government Act 1993*
NES	National Environmental Significance
NMVOC	Non-methane Volatile organic Compounds
NPW Act	NSW *National Parks and Wildlife Act 1974*
NV Act	NSW *Native Vegetation Act 2003*
PEA	Preliminary Environmental Assessment - in accordance with the EP&A Act
Pipelines Act	NSW *Pipelines Act 1967*
POEO Act 1997	NSW *Protection of the Environment Operations Act 1997*
The Proponent	The Proponent is Goulburn Mulwaree Council
The Proposal	The Proposal is the Highlands Source Project, a pipeline scheme to transfer water from the Wingecarribee Reservoir to the Goulburn Water Treatment Plant.
PW Act	NSW *Public Works Act 1912*
REP	Regional Environmental Plan
Roads Act	NSW *Roads Act 1993*
RTA	NSW Roads and Traffic Authority
SCA	Sydney Catchment Authority
SEPP Infrastructure	*State Environmental Planning Policy (Infrastructure) 2007*
SEPP Major Projects	*State Environmental Planning Policy (Major Projects) 2005*
SEPP Rural Lands	*State Environmental Planning Policy (Rural Lands) 2008*
TSC Act	NSW *Threatened Species Conservation Act 1995*
WARR Act	*Waste Avoidance and Resource Recovery Act 2000*
WM Act	*Water Management Act 2000*
WMP	Waste Management Plan
WSC	Wingecarribee Shire Council
WTP	Water Treatment Plant

Executive Summary

This Preliminary Environmental Assessment (PEA) has been prepared by GHD Pty Ltd on behalf of the Goulburn Mulwaree Council (GMC) for a proposed development of a pipeline and ancillary infrastructure to enable water transfers from the Wingecarribee Reservoir to the City of Goulburn's water supply system (the 'Highlands Source Project').

This PEA has been prepared in accordance with the provisions under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Goulburn has faced severe drought and water restrictions since 2002. By mid 2007 Goulburn had less then 12 months' water supply available. GMC, in conjunction with a State Government Task Force, identified an Emergency Pipeline from Wingecarribee Reservoir as the best means of overcoming the emergency and drought proofing Goulburn for the future. Subsequent rains in June 2007 removed the emergency aspect of the project; however the need for improved water security remains.

Since 2007, a range of options for securing Goulburn's water supply have been investigated. GMC has prepared a draft Integrated Water Cycle Management (IWCM) Strategy that will outline actions for improving long term water sustainability. The IWCM Strategy is expected to be finalised towards the end of 2009, and it is anticipated that the Highlands Source Project will be an integral part of this Strategy. Additionally, GMC has undertaken a *Goulburn Water Supply Strategy Review*, in which the Highlands Source Project was identified as the best solution for improving the town's water security.

The Highlands Source Project is a proposed pipeline scheme to transfer water from the Wingecarribee Reservoir (*ca.* 9 km east of Moss Vale NSW) to the Goulburn Water Treatment Plant (WTP). The primary objectives of the Highlands Source Project are:

- To provide a pipeline from Wingecarribee Reservoir to Goulburn to deliver water and relieve some of the stress being placed on Goulburn's current water supplies.
- To deliver the Highlands Source Project by June 2011.

The proposed pipeline will be approximately 83 km in length and will be located within the Local Government Areas of Wingecarribee Shire Council (WSC) and Goulburn Mulwaree Council (GMC). Subject to detailed design, the necessary ancillary infrastructure will likely include an offtake and pump station near the Wingecarribee Reservoir, power and controls, balance tank, and telemetry system. GMC has indicated that the pipeline will be designed to accommodate a flow of 7.5 ML/day (over a 22 hour period). Initially the pipeline will deliver 5 ML/day. The mode of operation of the system, whether it will be continuous or intermittent, will be determined during a later study. A decision on whether raw or treated water would be transferred from Wingecarribee to Goulburn is pending.

This PEA describes the Highlands Source Project and outlines the process of construction and pipeline operation that would likely be associated with the development. A preliminary environmental assessment has been undertaken and key environmental issues identified through a risk assessment process. Key Issues are considered to be:

- Presence and proximity of threatened flora and fauna adjacent to and within the proposed pipeline corridor.

- Listed and potentially previously unidentified Indigenous and non-Indigenous heritage items located within and adjacent to the existing pipeline corridor.
- Social impacts associated with the acquisition of land for the pipeline corridor.
- Proximity of residential and commercial properties in urbanised areas.
- Disturbance of soil during bulk earthworks and potential for erosion and sedimentation of adjacent watercourses, and the creation of waste products during construction.

Suggested work scopes for specific environmental areas have been proposed for the Environmental Assessment and are outlined in Table 19 (p. 50) of this document.

Additionally, the Environmental Assessment report for the Highlands Source Project would include:

- Consideration of planning and statutory requirements.
- Strategic justification for the project.
- Description of the project.
- Discussion of project options.
- Outline of construction activities.
- Consideration of the principles of sustainability in the context of the project.
- The scope, methods and results from the environmental assessments and investigations.
- An interpretation of the results from the investigations to develop:
  - Management actions,
  - A list of the risk mitigation actions and activities that would be relevant for inclusion in the Construction and Operational Environmental Management Plans,
  - A Statement of Commitments.

1. Introduction

1.1 Preface

This Preliminary Environmental Assessment (PEA) has been undertaken by GHD Pty Ltd on behalf of the Goulburn Mulwaree Council (GMC) for a proposed development of a pipeline and ancillary infrastructure to enable water transfers from the Wingecarribee Reservoir to the City of Goulburn's water supply system (the 'Highlands Source Project'). This document incorporates the draft PEA that was produced in August 2009 by Eco Logical Australia Pty Ltd.

This PEA has been prepared in accordance with the provisions under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 GMC as the Proponent

GMC is a local government body that was formed in 2004 by the amalgamation of Mulwaree Shire Council and Goulburn City Council. GMC's role is to provide the functions and services that are listed in the *Local Government Act 1993* (LG Act) to the communities within its jurisdiction. As outlined in the LG Act, the provision of water supply services to country towns in New South Wales is the responsibility of local government.

Situated in the Southern Tablelands of New South Wales, GMC covers an area of 3 232 km^2 and is home to 27 277 people[1]. The GMC area includes the regional service centre of Goulburn and the surrounding rural villages of Marulan, Tallong, Bungonia, Windellama, Tirrannaville, Lake Bathurst, Tarago and Towrang.

1.3 Background

Goulburn has faced severe drought and water restrictions since 2002. By mid 2007 Goulburn had less then 12 months' water supply available. GMC, in conjunction with a State Government Task Force, identified an Emergency Pipeline from Wingecarribee Reservoir as the best means of overcoming the emergency and drought proofing Goulburn for the future (GMC & DoC, 2007). Subsequent rains in June 2007 removed the emergency aspect of the project; however the need for improved water security remains.

Since 2007, a range of options for securing Goulburn's water supply have been investigated. GMC has prepared a draft Integrated Water Cycle Management (IWCM) Strategy that will outline actions for improving long term water sustainability. The IWCM Strategy is expected to be finalised towards the end of 2009, and it is anticipated that the Highlands Source Project will be an integral part of this Strategy. Additionally, GMC has undertaken a Goulburn Water Supply Strategy Review, in which the Highlands Source Project was identified as the best solution for improving the city's water security.

[1] This information was current at 12 October 2009 according to the GMC website: http://www.goulburn.nsw.gov.au/about.html

1.4 The Proposal (objectives and overview)

The Highlands Source Project (from hereon referred to as the Proposal) is a pipeline scheme to transfer water from Wingecarribee Reservoir (*ca.* 9 km east of Moss Vale NSW) to Goulburn's water supply system. The primary objectives of the Proposal are to:

- Provide a pipeline from Wingecarribee Reservoir to Goulburn to deliver water and relieve some of the stress being placed on Goulburn's current water supplies.
- Deliver an operating pipeline and ancillary infrastructure by June 2011.

The proposed pipeline will be approximately 83 km in length and will be located within the Council areas of Wingecarribee Shire Council (WSC) and GMC. Subject to detailed design, the necessary ancillary infrastructure will likely include an offtake and pump station near the Wingecarribee Reservoir, power and controls, balance tank, and telemetry system.

The potential pipeline corridor is shown in Figure 1. Two water transfer options are being considered:

- The pipeline may transfer raw water from the Wingecarribee Reservoir to the Goulburn WTP, where it would be treated prior to entering the Goulburn distribution network, or
- The pipeline may transfer treated water from the Wingecarribee WTP, and be input directly to the Goulburn distribution network.

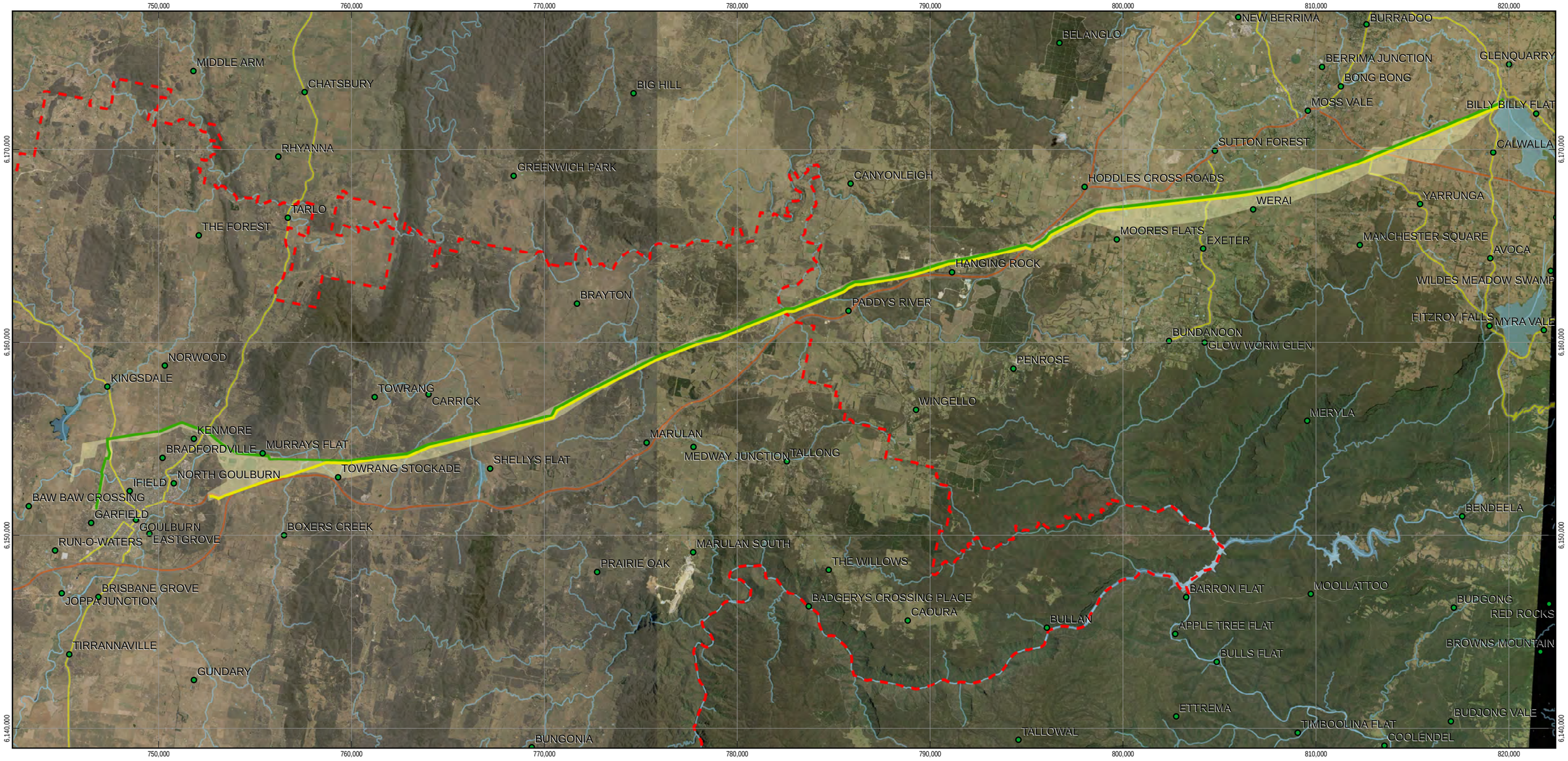
Future investigations will determine the preferred option. The final decision will have implications for the final pipeline route, as shown in Figure 1.

The pipeline will be designed to accommodate a flow of 7.5 ML/day (over a 22 hour period). Initially the pipeline will deliver 5 ML/day. The mode of operation of the system, whether it will be continuous or intermittent, is also under consideration.

1.5 Purpose of this Preliminary Environmental Assessment

This PEA provides a preliminary assessment of the key issues associated with the Proposal and outlines broad methodologies for subsequent detailed environmental assessment. Key environmental features are discussed further in Section 7.

The purpose of this PEA is to describe the key elements of the Proposal, with the view to seek formal Director General's Requirements from the Department of Planning (DoP), including requirements from other government agencies, as the basis for the detailed Environmental Assessment (EA) and further design development.



Legend

- Original Route (Raw Water)
- Original Route (Treated Water)
- Original Route Corridor
- Locality
- PrimaryRoad
- ArterialRoad
- Rivers, Creeks
- Lakes, Dams
- GMC / WSC LGA Boundary

1:200,000 (at A3)

0 1 2 4 6 8

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Goulburn Mulwaree Council
Highlands Source Project

Preliminary Environmental Assessment

Wingecarribee to Goulburn Pipeline Route

Job Number	23-13312
Revision	A
Date	16 OCT 2009

Figure 1

G:\23\13312\GIS\ArcView\Wkspace\PEA\23_13312_PEA_Figure1.mxd

Data source: WSC, GSC, Department of Lands, GHD Created by: trbellwood

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2. Strategic Context and Need for the Proposal

2.1 Strategic Context

2.1.1 The need to augment Goulburn's water supply

The Proposal is about future proofing GMC's population and prosperity. Goulburn is a regionally important centre strategically located in both the Sydney-Canberra and Sydney-Melbourne corridors. In order to achieve its potential, Goulburn needs to secure its long term water supply.

Goulburn mainly sources water from the Wollondilly River, which feeds the Sooley and Pejar Dams. These dams release water to the Rossi Weir, the final storage prior to treatment at Goulburn WTP. In 2007, Goulburn received widespread publicity when the city's water security recorded critically low levels with storages at 12 % of capacity.

The exhaustion of the Pejar Dam, together with an extended period of severe drought restrictions, resulted in an anticipated water supply failure within less than 12 months.

During the drought GMC commissioned a more rigorous review of Goulburn's water supply security (GMC & DoC, 2007). This assessment determined that the town's water supply was not as secure as had previously been believed and would require augmentation to avoid frequent and lengthy periods of drought restrictions. Impacts of future climate change are anticipated to reduce the system secure yield even further.

Three options were investigated:

1. One-Way Pejar Pipeline: The option involved construction of a pipeline from Pejar Dam to Sooley Dam to avoid losses which occur when water is released down river from Pejar Dam to Rossi Weir.
2. Two-Way Pejar Pipeline: The second option was to add extra pumping capacity from Rossi Weir to Sooley Dam to harvest more water from high flows at Rossi Weir and a pump station to transfer water through the pipeline from Sooley to Pejar Dam.
3. Highlands Source: The third option involved piping water to Goulburn from the Wingecarribee Reservoir which is part of the Sydney and Southern Highlands supply system.

The review of Goulburn's water supply security determined that a pipeline connection to the Sydney Catchment Authority's (SCA's) Wingecarribee Reservoir was the best solution for improving the town's water security. A decision was made to proceed with detailed planning and design of the water transfer pipeline through this current project.

2.1.2 Water to be sourced from the Wingecarribee Reservoir

The Sydney Catchment Authority (SCA) manages a total of 21 storage dams (11 major dams), that hold more than 2 500 000 ML of water. Wingecarribee Reservoir is part of a network of storages known as the 'Shoalhaven Scheme'. This scheme includes: Tallowa Dam (with an available storage of 34 520 ML), Wingecarribee Reservoir (16 550 ML) and Fitzroy Falls (7570 ML). Wingecarribee Reservoir is used as a transfer storage. Water in the reservoir can be diverted to either the Nepean storages or to Warragamba Dam. The Shoalhaven Scheme is used to top up the water supply to Sydney and the Illawarra during drought periods. It also supplies the Southern Highlands and Nowra. Utilising the

Wingecarribee Reservoir would allow Goulburn access to a more reliable water source from a high rainfall area.

Discussions have been held with the SCA, and the Authority has given approval in principle for Goulburn to access up to 5 ML/d. Additionally, the NSW Independent Pricing and Regulatory Tribunal has included a regulated price for the supply of water to Goulburn through to 2012 in its current determination (IPART, 2009).

2.2 Benefits of the Proposal

The Proposal will contribute to the future water security of Goulburn. Some specific benefits of the Proposal include:

- It will provide a more secure water supply for Goulburn, particularly during major droughts. The pipeline accesses a reliable water source from a high rainfall area.
- It will enable severe water restrictions to be replaced by demand management measures – 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 will provide Goulburn with improved opportunities to attract business and industry.
- Providing an alternative water source will 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.
- Important community facilities, such as the swimming pool and sporting fields, will be less likely to be closed due to unavailability of water to operate and maintain these facilities.

3. Proposal Description

3.1 Regional Context and Site Location

3.1.1 Region

The Proposal comprises approximately 83 km of trunk water main and ancillary infrastructure, extending from Wingecarribee Reservoir within the Wingecarribee Local Government Area (LGA), to the Goulburn WTP within the Goulburn Mulwaree LGA (Figure 1).

The Wingecarribee LGA is located in the Southern Highlands and centred approximately 150 km south of Sydney. The majority of the LGA is elevated > 640 m (above sea level). The Goulburn Mulwaree LGA is situated to the south west of the Wingecarribee LGA. The pipeline corridor follows an upward sloping gradient to Goulburn, *ca.* 702 m (above sea level).

3.1.2 Environmental Context

The pipeline corridor runs north of, and roughly parallel to, the catchment boundary separating the Hawkesbury Nepean catchment from the Southern Rivers catchment placing it entirely within the area managed by the Hawkesbury Nepean Catchment Management Authority (CMA).

The area through which the proposed pipeline would traverse generally drains north, with the eastern section of the pipeline route draining naturally into the Wingecarribee River, and the western section of the pipeline route draining into the Wollondilly River. These two rivers confluence within the Wollondilly Nature Reserve.

Average rainfall at Moss Vale and Goulburn is 967 mm *p.a.* and 666 mm *p.a.* respectively, with rainfall distributed relatively evenly over the year. Annual rainfall within the Goulburn Mulwaree LGA is variable with the wettest year on record being 1949 (1183 mm) and the driest year being 1896 (346 mm). Long periods of drought have been historically experienced, most recently with Goulburn facing severe drought from 2002 to 2007.

The pipeline follows an upward sloping gradient from an altitude of approximately 675 metres at Moss Vale to 702 metres above sea level at Goulburn.

The pipeline area is underlain by rocks of a Palaeozoic age and an overlying sequence of sediments and volcanics forming the Cookbundoon Syncline. The region is covered by landscapes such as tablelands and associated grassy woodlands, alluvial flats, dissected plateaus, escarpment country and porphyrys. The natural ecosystems within the region have been extensively modified since European settlement and the extent of the component vegetation communities within the proposed development area has been dramatically reduced.

3.2 Proposal Outline

3.2.1 Overview

The Proposal is to construct and operate the water supply scheme that would transfer water from the Wingecarribee reservoir to the Goulburn WTP. The scheme comprises approximately 83 km of DN 300 mm to DN 375 mm diameter pipeline, a pump station at the Wingecarribee Reservoir, power and controls, a balance tank, and a telemetry system.

If approved it is proposed to have the transfer scheme operational by June 2011. The Proposal's timeframe is set by the conditions governing the provision of government funding under the Australian Government Water Smart Australia Program.

Key construction activities include:

- Trench excavations and placement of the pipeline;
- Constructing railway, road and river crossings;
- Constructing a pump station and controls at the Wingecarribee Reservoir site; and
- Constructing a balance tank at an appropriate location along the pipeline (subject to design requirement)

Key operational activities would include:

- Regular maintenance of the pumping station;
- Regular maintenance of the air valves and scour valves; and
- Less frequent maintenance of the pipeline (*e.g.* pigging to remove blockages, or repairing bursts as required).

3.2.2 Route Location and Selection

The Proposal was based upon a pipeline route defined by GMC from Wingecarribee Reservoir to Goulburn WTP. The originally proposed route, as described and examined as a possible emergency pipeline route (GMC & DoC, 2007), utilised existing gas and electricity easements for a large proportion of its alignment. On commencing the project, GHD were advised by APA Group that the pipeline could not be located within the existing gas easement as originally proposed by GMC.

It was agreed that the route could generally be retained by offsetting the alignment to be adjacent to the gas pipeline easement. In this location the pipeline would require further vegetation clearing, thus widening the existing cleared easement.

In response to the inability to utilise the existing alignment as initially proposed, GHD investigated five alternative routes to determine if perceived constraints on the original route could be reduced.

The five alternative routes were analysed with both positive and negative aspects identified for all.

The various route alignments were examined and considered in light of aspects such as:

- Minimising the number of landholdings traversed;
- An assessment of potential pipe construction and operating costs as dictated by pipe length, number of creek and road crossings;

- A consideration of the difficulty of construction (due to factors such as ground conditions and gradient); and
- Selecting the route that would likely result in minimal disturbance of local vegetation and need less clearing, *etc.*

There was little to suggest that any of the alterative routes would provide significant benefits over the original route.

None of the routes appeared to offer hydraulic operational advantage due slightly higher terrain occurring between Exeter and Canyonleigh.

Whilst the presence of other services including the high pressure gas pipeline and Telstra service cables were of concern with the original route, all alternative routes posed a similar level of constraint. In particular, other routes which maximised the use of existing power easements raised other issues due to the hazard of working adjacent to overhead power lines.

In order to utilise the original route an additional 15 m clearing would be required to be made adjacent to the existing 20 m wide cleared gas easement. The alternative options considered impacted a lesser area of dense vegetation but still traversed through land which contains threatened ecological communities, which currently have little fragmentation as a result of existing easements.

Following the investigation of the five alternative routes, it was recommended that an alignment based on the original route be retained as the preferred alignment for the Proposal (Figure 1).

The preferred pipeline route corridor would be located mostly adjacent to existing infrastructure easements that have previously been cleared and either remain cleared or have regenerating vegetation present. From Wingecarribee Reservoir, the pipeline route largely runs adjacent to existing power line easements until it crosses the Hume Highway. After crossing the Hume Highway, the pipeline route would be located adjacent to and outside of an existing gas pipeline easement, which it follows almost the entire way to Goulburn.

As mentioned (Section 1.4), two options are still being considered for the point at which the pipeline would enter the Goulburn water supply system. Both of these options would be progressed until detailed design phase and both would be subject to further environmental assessment.

As shown in Figure 1, the pipeline corridor would encroach on some semi-urban and urban areas on the outskirts of Goulburn.

3.3 Construction Phase

3.3.1 Site Establishment (Site Compound Areas)

Primary and secondary site compounds would be required for the construction phase of the Proposal. Primary compounds would predominately be used for site offices, amenities, storage of major plant and equipment and storage of materials. Primary compounds would be located in close proximity to major construction sites and would provide adequate access and sighting for the Project.

Secondary site compounds would be predominately used for storage of minor plant, equipment and materials. Nominal amenities may also be provided in these locations. Secondary site compounds would also be located in areas close to major construction works. However, the area of secondary site compounds would generally be smaller than primary site compounds.

Location of these site compounds will be determined at a later stage but are likely to be located within the investigation corridor.

3.3.2 Pipeline Trenching and Placement

The pipeline construction corridor would be in the order of 20 m wide while the pipeline is being constructed. Tree clearing would be required along the perimeter of the existing utility easements at certain points along the pipeline route to accommodate construction of the pipeline. Following construction, an easement (of perhaps 10m) will be maintained as a cleared landscape to allow access for maintenance activities.

The following construction activities will occur for the installation of the pipeline (nominally 300 – 375 mm in diameter):

- Maintenance access road provision;
- Delivery and stringing of pipes along proposed route;
- Excavation of an open trench along the pipeline route, with trench spoil mounded to one side;
- Installation of the pipe
- Re-establishment of the trench and existing ground cover;
- Under-boring of major roads, significant waterways and rail lines ; and
- Commissioning and completion.

A range of heavy plant including excavators and trenchers would be required to access the pipeline route to enable installation.

3.3.3 Easement Acquisition

Construction of the Proposal would require the acquisition of an easement over land within which the pipeline is located. Further notes on the land acquisition process (in a planning context) are discussed in Section 4.6

3.3.4 Crossings

The pipeline would cross railways (including the Moss Vale Unanderra Railway) and major roads (*e.g.* the Hume and Illawarra Highways), local roads and various water bodies (including the Wollondilly River).

RTA controlled roads, and railway lines will be crossed by under-boring, with the majority of local roads crossed by open trenching.

Crossings of waterways will be made by either trenching, or a range of boring techniques. These techniques will be determined following consideration of technical and geological constraints during the detailed design phase.

3.3.5 Private Property Access During Construction

Private vehicle access to surrounding private properties would be maintained throughout the construction program. If existing vehicle access routes are temporarily or permanently severed, alternate routes may be provided.

3.3.6 Construction Hours

Typical hours of construction in NSW are 7:00 am until 6:00 pm Monday to Friday and 8:00 am till 1:00 pm Saturday. Extended working hours may be required to ensure the project us completed within the allocated funding timeframe. The need for extended working hours will be determined during detailed design.

3.4 Operation Phase

3.4.1 Water transfers

The pipeline would be designed to accommodate a flow of approximately 7.5 ML/day (over a 22 h period). Initially the pipeline will deliver 5 ML/day. The mode of operation of the system, whether it will be continuous or intermittent, will also be determined during a later study. The water transfers will be made by a pump station located at the Wingecarribee Reservoir.

During the operation phase of the Proposal, GMC staff will periodically traverse the route to undertake routine maintenance and ensure the pipeline is functioning adequately. The maintenance crews will remain in the cleared pipeline easement at all times and cause minimal disturbance to the natural environment.

3.4.2 Maintenance Activities

Ongoing maintenance activities would need to be undertaken. Minor maintenance works on associated infrastructure would be undertaken throughout the life of the asset.

Key operational activities would include:

- Regular maintenance of the pumping station;
- Regular visual inspection of the air valves and scour valves; and
- Less frequent maintenance of the pipeline including scouring the pipeline to remove sludge building up. If raw water is selected to be transferred to Goulburn, then it is likely that the water would need to be pumped from the pipe, removed by tanker and handled or discarded in an appropriate manner. If treated water is selected to be transferred, then water may be discharged to an adjacent waterway, farm dam, or pumped and removed by tanker.

Any leakages or ruptures of the pipeline along the section of pipeline located adjacent to the gas easement may be reported to GMC by the APA group during the regular fly-overs by helicopter of the gas easement.

4. Planning Framework

This section provides a discussion of the relevant Acts, environmental planning instruments and approvals applicable to the Proposal.

4.1 Approval Process

4.1.1 State Environmental Planning Policy (Major Projects) 2005

The aim of *State Environmental Planning Policy (Major Projects) 2005* (SEPP Major Projects) is to identify development to which the assessment and approval process under Part 3A of the EP&A Act applies.

The assessment process under Part 3A of the EP&A Act will apply to the most significant types of development that may potentially have an environmental impact. Development can be declared as a project to which Part 3A applies 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 Proposal to be a project of regional planning significance, pursuant to section 75B(1) of the EP&A Act, and ordered the proposal to be declared as a project to which Part 3A of the Act applies[2].

4.1.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) establish the statutory planning context for assessment and approval of the proposed works.

Part 3A. Part 3A of the EP&A Act consolidates the assessment and approvals process for all major projects requiring approval of the Minister for Planning, which were previously assessed under Parts 4 and 5 of the Act. Part 3A applies to government infrastructure projects, developments previously classified as State significant and any other projects, plans or programs declared by the Minister. It provides a separate streamlined and integrated development assessment and approvals regime for projects of State significance.

Clause 75(B)1 of the EPA&A refers to Part 3A and states that "This part applies to the carrying out of development that is declared under this section to be a project to which this part applies…by a State environmental planning policy".

Under Section 75D, the Minister is the approval authority for Part 3A projects. Section 75D provides that:

"*(1) A person is not to carry out development that is a project to which the Part applies unless the Minister has approved the carrying out of the project under this Part.*

(2) The person is to comply with any conditions to which such an approval is subject."

[2] Department of Planning Reference D07/1829

Section 75E of the EP&A Act provides that a proponent may apply for approval from the Minister to carry out a major project. This document supports the project application for the Proposal. Accordingly, the application will be subject to assessment by the Director General of the Department of Planning and determination by the Minister for Planning in accordance with the EP&A Act.

It is noted that under Section 75J(3) of the EP&A Act, the Minister cannot approve the proposed development if it is wholly or in part, prohibited under an Environmental Planning Instrument. The Proposal is not prohibited under any of the following relevant Instruments:

- SEPP Infrastructure,
- SEPP Rural Lands, or
- the Local Environmental Plans (LEPs) of Wingecarribee and Goulburn-Mulwaree Councils.

Land owner's consent. Section 8F of the *EP&A Regulation* outlines the requirements for the consent and/or notification of the owner of land on which a Major Project is to be carried out. Consent of the owner is not required where the application is made by a public authority (clause 1(a)) or relates to a linear infrastructure project (clause 1(d)). For the purpose of Section 8F of the regulation, "linear infrastructure project" is defined as development for the purposes of linear transport or public utility infrastructure. The Proposal is considered a linear infrastructure project undertaken by a public authority. As such, there is an obligation under clause 3(a) (section 8F of the regulation) for the proponent to:

"*Give notice of the application… to the public by advertisement published in a newspaper circulating in the area of the project before the start of the public consultation period for the project.*"

Council has commenced stakeholder engagement and community consultation for this project (see Section 5).

Approvals that do not apply. Section 75U(1) of the EP&A Act outlines the approvals and authorisations under other NSW legislation that do not apply to an approved Part 3A project. Specifically, these include:

- A permit under section 201, section 205 or section 219 of the *Fisheries Management Act 1994*.
- An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*.
- A permit under section 87 or a consent under section 90 if the *National Parks and Wildlife Act 1974* (this section relates to the protection of Aboriginal objects).
- An authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act to be repealed by that Act) to clear native vegetation or State protected land.
- A permit under Part 3A of the *Rivers and Foreshores Improvement Act 1948* (the *Rivers and Foreshores Act 1948* has been repealed);
- A bush fire safety authority under section 100B of the *Rural Fires Act 1997*.
- A water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the *Water Management Act 2000* (section 75U(1)).

Section 75U(2) of the EP&A Act also states that:

"*Division 8 of Part 6 of the Heritage Act 1977 does not apply to prevent or interfere with the carrying out of an approved project*."

The application of the Acts to the Proposal will be determined as a part of the Environmental Assessment subsequent to this PEA. As such, the Acts to which the above approvals that do not apply under a Part 3A project are discussed in Sections 4.2 and 4.3.

Approvals to be applied consistently. Section 75V of the EP&A Act stipulates approvals and legislation that must be applied consistently to the approval of a project under Part 3A. Specifically, section 75V, as it relates to this project, states:

"*An authorisation of the following kind cannot be refused if it is necessary for carrying out an approved project and is to be substantially consistent with the approval under this Part:*

(a) an environment protection licence under Chapter 3 of the Protection of the Environment Operations Act 1997 (for any of the purposes referred to in section 43 of that Act),

(b) a consent under section 138 of the Roads Act 1993,

(c) a licence under the Pipelines Act 1967."

4.1.3 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (SEPP Infrastructure) came into effect on 1 January 2008. The aim of SEPP Infrastructure is to facilitate the effective delivery of infrastructure across the State through increased regulatory certainty and improved efficiency and flexibility in the location of infrastructure and service facilities while providing adequate stakeholder consultation.

Division 24 of SEPP Infrastructure outlines provisions for water supply systems. In this division, different systems are defined as follows:

*"**water reticulation system** means a facility for the transport of water, including pipes, tunnels, canals, bores, pumping stations, related electricity infrastructure, dosing facilities and water supply reservoirs.*

***water storage facility** means a dam, weir or reservoir for the collection and storage of water, and includes associated monitoring or gauging equipment.*

***water supply system** means a water reticulation system, water storage facility, water treatment facility, or any combination of these.*

***water treatment facility** means a facility for the treatment of water (such as a desalination plant or a recycled or reclaimed water plant) whether the water produced is potable or not, and includes residuals treatment, storage and disposal facilities, but does not include a water recycling facility within the meaning of Division 18 (Sewerage systems).*"

Clause 125 allows for the following without consent:

"*(1) Development for the purpose of water reticulation systems may be carried out by or on behalf of a public authority on any land;*

(2) Development for the purpose of water storage facilities, ……by or on behalf of a public authority on land in Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone SP1 Special Activities, Zone SP2 Infrastructure or an equivalent land use zone;

(3) Development for the purpose of water treatment facilities may be carried out by or on behalf of a public authority on land in any of the following land use zones:

(a) RU1 Primary Production,

(b) RU2 Rural Landscape,

….

(g) SP2 Infrastructure.

(4) Development for the purpose of a water supply system may be carried out on land reserved under the National Parks and Wildlife Act 1974 only if it is authorised by or under that Act."

SEPP Infrastructure overrides all Environmental Planning Instruments with the exception of:

- State Environmental Planning Policy No 14—Coastal Wetlands (SEPP 14).
- State Environmental Planning Policy No 26—Littoral Rainforests (SEPP 26).
- SEPP Major Projects.

Subject to Clause 14 of SEPP Infrastructure, if development carried out by or on behalf of a public authority:

"*(a) is likely to have an impact that is not minor or inconsequential on a local heritage item (other than a local heritage item that is also a State heritage item) or a heritage conservation area, and*

(b) is development that this Policy provides may be carried out without consent."

then development must not be undertaken unless an assessment of the impact has been prepared. This assessment, in conjunction with notice of the development, must be provided to the relevant local council(s) and consideration given to any response. Issues with respect to heritage items are discussed at Section 7.7 of this PEA.

4.1.4 Local Environmental Plans

The proposal is located in LGAs of Wingecarribee and Goulburn-Mulwaree.

The following EPIs are applicable within these LGAs:

- *Wingecarribee Local Environment Plan 1989* (WLEP 1989).
- *Draft Wingecarribee Local Environment Plan 2009* (Draft WLEP 2009); and
- *Goulburn Mulwaree Local Environmental Plan 2009* (GMLEP 2009).

Subject to Clause 79 of SEPP Infrastructure the proposed works are permissible without consent, as SEPP Infrastructure over rides other Environmental Planning Instruments (except those SEPPs listed at Section 4.1.2) in the event of an inconsistency.

4.2 Commonwealth Legislative Considerations

4.2.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) regulates actions that may have a significant impact on matters of National Environmental Significance, which include:

- World Heritage properties;
- National Heritage places;

- wetlands of international importance;
- listed threatened species and ecological communities
- migratory species protected under international agreements;
- Commonwealth marine areas; and
- nuclear actions (including uranium mines).

Under Part 6 of the EPBC Act, actions likely to impact on matters of National Environmental Significance require approval from the Commonwealth Minister for the Environment.

A Protected Matters search under the EPBC Act (Eco Logical, 2009) returned no records of World Heritage properties, National Heritage places, wetlands of international importance, Commonwealth marine areas or nuclear actions. However the following matters of National Environmental Significance were identified as likely to occur within the area of the Proposal:

- Three (3) threatened ecological communities;
- Forty-one (41) threatened species;
- Fourteen (14) migratory bird species;
- Eight (8) Commonwealth lands;
- One (1) Commonwealth heritage place;
- Seventy-nine (79) places on the Register of National Estate; and
- Twelve (12) listed marine species.

The presence of the threatened ecological communities and threatened species listed above are considered to be of importance to this proposal. It is expected that most of the 'heritage' related National Environmental Significance listed above are located within the township of Goulburn (Eco Logical, 2009).

Accordingly, based on the final pipeline route and the results of a detailed ecological investigation, consultation with the Department of Environment, Water, Heritage and the Arts (DEWHA) will be undertaken to determine the need to refer the Proposal under the Act.

It is noted that a bilateral agreement exists between the Commonwealth and NSW allowing the approval process under the EP&A Act to be accredited under the EPBC Act if this is required.

4.2.2 Native Title Act 1993

The *Native Title Act 1993* administers processes relating to the recognition, protection and determination of native title and dealings with native title land.

Native title is concerned with the rights and interests of Aboriginal and Torres Strait Islander peoples in relation to land and water in Australia and its territories. The Act is administered by the Commonwealth Department of Environment, Water, Heritage and the Arts.

A desktop archaeological assessment was undertaken by Navin Officer (2009) for the proposal. The assessment states that "*Native Title claim number NC97/7 includes part of the Highland Source Pipeline study area. The claim, by the Gundungurra Tribal Council Aboriginal Corporation (#6) is registered and active*."

The following additional Commonwealth legislation may have relevance to the project, and will also be addressed in the environmental assessment:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984.*
- *Protection of Movable Cultural Heritage Act 1986.*

4.3 Relevant NSW Legislation

The following NSW legislation may have relevance to the project, and, will be considered in the environmental assessment:

- *Contaminated Land Management Act 1997.*
- *Fisheries Management Act 1994.*
- *Heritage Act 1977.*
- *National Parks and Wildlife Act 1974.*
- *Native Title (New South Wales) Act 1994.*
- *Native Vegetation Act 2003.*
- *Pipelines Act 1967.*
- *Protection of the Environment Operations Act 1997.*
- *Roads Act 1993.*
- *Threatened Species Conservation Act 1995.*
- *Waste Avoidance and Resource Recovery Act 2001.*
- *Water Act 1912.*
- *Water Management Act 2000.*

With respect to the above legislation, consideration will be given to clauses 75U and 75V of the EP&A Act for approved Part 3A projects. These sections of the EP&A Act cater for approvals under other NSW legislation that either do not apply or are to be applied consistently.

4.4 Regional Environmental Plans

As of 1 July 2009, Regional Environmental Plans (REPs) are no longer part of the hierarchy of environmental planning instruments in NSW. All existing REPs are now deemed State Environmental Planning Policies (SEPPs). The REPs are currently being reviewed as part of NSW planning system reforms.

The *Drinking Water Catchments Regional Environmental Plan No. 1* is relevant to the Proposal. This plan aims to create healthier catchments that deliver high quality water while sustaining diverse and prosperous communities, provide statutory components to assist in achieving healthy catchments and to achieve the water quality management goals.

Specifically, the REP prevents a consent authority granting consent to the carrying out of development under Part 4 of the EP&A Act on land in the Sydney drinking water hydrological catchment unless:

"*(a) it has considered whether the proposed development will have a neutral or beneficial effect on water quality, and*

(b) it is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on water quality."

As the proposal is a project to which Part 3A of the EP& A Act applies, the above 'neutral or beneficial use' considerations do not apply. However, the Proposal is not expected to contravene this REP.

4.5 Regional Policies and strategies

4.5.1 Sydney to Canberra Corridor Strategy 2006-2031

The *Sydney–Canberra Corridor Regional Strategy* applies to the local government areas of Wingecarribee, Goulburn Mulwaree, Upper Lachlan, Yass Valley, Palerang and Queanbeyan.

The primary purpose of the Regional Strategy is to accommodate and manage growth while ensuring that the rural landscapes and environmental settings of the Region are not compromised. It seeks to ensure that land is available and appropriately located to sustainably accommodate the projected population growth and associated housing, employment and environmental needs over the period until 2031.

The Proposal is considered to be in accordance with the strategy as it will facilitate population increases in Goulburn region.

4.6 Land acquisition and access options

At this stage GMC has not yet determined the approach that will be taken to acquire and/or access the pipeline route on private property. There are estimated to be approximately 100 landowners along the pipeline route

Wherever possible, the Proponent would prefer to reach a negotiated agreement to acquire the easement. If all reasonable attempts to reach an agreement fail, compulsorily acquisition of the easement would likely need to occur. Implementation of a land access and easement acquisition process which gives certainty to accessing the land and provides some flexibility to the alignment of the pipeline in the event minor realignment is required in respect of environmental, design, construction or other constraints.

Ongoing access to the pipeline route will need to occur to allow for surveying and design, and for construction. Applicable legislation that allows alternative access arrangements to occur is described below.

5. Consultation and Stakeholder Engagement

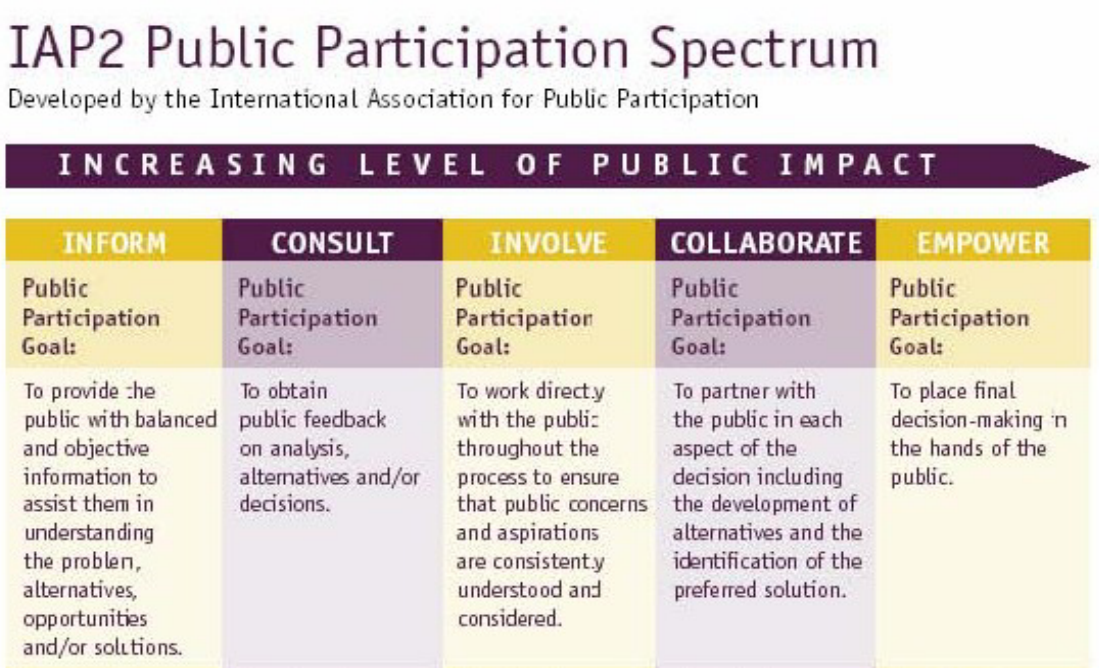
A Communications and Stakeholder Engagement Strategy is being developed to provide the local community, statutory and industry stakeholders with information about the Proposal and provide them with clearly defined opportunities to provide informed feedback.

GMC proposes to undertake an appropriate level of consultation with relevant communities and stakeholders including:

- Department of Planning (DoP);
- Department of Environment, Climate Change and Water (DECCW);
- Department of Environment, Water, Heritage and the Arts (DEWHA);
- Department of Water and Energy (DWE);
- Roads and Traffic Authority (RTA);
- Goulburn Mulwaree Shire Council (GMC);
- Wingecarribee Shire Council (WSC);
- Business community groups;
- Local Aboriginal Land Councils and Aboriginal stakeholder groups;
- Transport and emergency services;
- Road users (local and regional road network users, due to road works and changes to the network during both construction and operation); and
- The community, including all potentially affected land owners.

The level of stakeholder engagement during the construction and initial operation of the project will be at the “Inform”, “Consult” and “Involve” levels, according to the IAP2 Spectrum of Public Participation (see Figure 2). By engaging the community at the “Involve” level, the Project Team confirms they will keep the community informed, listen to and acknowledge concerns and aspirations, and work with the public so that their concerns and aspirations are understood and considered in project implementation. Levels of engagement will adapt as is appropriate according to the stage of the Project.

Figure 2 The IAP2 Public Participation Spectrum



Key outcomes from implementing the Strategy would be to:

- Raise awareness amongst affected land owners of the proposed pipeline route and land acquisition issues well in advance;
- Raise awareness amongst affected communities and land owners of construction works programs and their consequences well in advance; and
- Activate and manage effective feedback mechanisms between the community, Goulburn Mulwaree Council, GHD and the Environment Representative.

This strategy is based on current knowledge of the project and stakeholder needs and aspirations, and thus reflects the activities that are believed to best fit the needs of the project now and for the future. However, in light of changing project priorities and needs the strategy and the approach may change. This strategy will be updated accordingly as the need arises.

The Communications and Stakeholder Engagement Strategy would include the following activities:

- Provision of a project website, telephone information, complaints line, email address and free post for enquiries;
- The development and constant monitoring of a consultation database;
- Develop project factsheets;
- Continued liaison with stakeholders;
- Consultation and meeting with affected landowners;
- Organising material for public display; and
- Organising consultation and meetings with other identified stakeholders.

6. Preliminary Environmental Assessment Method

This section provides an overview of the method used to conduct the PEA. The PEA itself is provided in Section 7.

6.1 Scope

This PEA documents a preliminary assessment of the key issues associated with the Proposal and outlines broad methodologies for undertaking more detailed environmental assessment.

The scope of this PEA was to undertake a desktop study aimed at describing the possible environmental impacts associated with the Proposal as it is described in Section 3.2, *i.e.* the construction and operation of the pipeline.

The SCA has given GMC in-principle approval to access the Wingecarribee Reservoir's water. As such the impact of the extraction of water does not form part of this assessment.

6.2 General Environmental Issues

The general environmental issues associated with the Proposal have been identified based on existing data and knowledge of the site held by GMC, preliminary investigations undertaken by the project team and an understanding of the statutory framework and general approvals requirements. The broad environmental areas identified that may be impacted by the Proposal and that would need to be considered and managed include (in no particular order):

- Flora and Fauna
- Surface and Groundwater
- Drinking Water Quality
- Soils, Geology and Contamination
- Traffic and Transport
- Social and Economic
- Noise and Vibration
- Air Quality
- Landscape and Visual Amenity
- Land use
- Aboriginal and Non-Indigenous Heritage
- Greenhouse Gases
- Resource Use and Waste Management

6.3 Desktop Study

A desktop-level study was undertaken to describe the existing environment and the very broad potential impacts from the Proposal in each of the areas listed above. The results from this desktop assessment

are provided in Sections 7.2-7.14. The outcomes were used to inform the development of future work and investigations that should be undertaken as part of the subsequent EA.

6.4 Issue Prioritisation and Scope for Further Assessment or Management

A higher degree of investigation, assessment or management may be required for some of the identified environmental issues than others. Generally, the greater the risk to the environment and/or community that is associated with an activity, the greater the investigation or management effort that may be required.

A risk-based approach was used to relatively prioritise each of the identified potential impacts that may arise from the Proposal. The potential environmental risk was considered as a function of the likelihood of an impact occurring and the environmental consequences if they did occur. Table 1 presents the matrix used for the prioritisation. Each issue was given a ranking between one and three for the likelihood of occurring if left unmanaged and a number between one and three for the perceived consequence of effects if left unmanaged, in accordance with the following definitions:

Likelihood of Occurrence

1 Lower: Unlikely to occur.

2 Medium: Potential to occur.

3 Higher: Probable to occur.

Consequence of Unmanaged Effects

1 Lower: Insignificant to minor environmental change; localised implications; imperceptible or short term cumulative impacts; offsets readily available.

2 Medium: Moderate adverse environmental change; regional implications; modest or medium term cumulative impacts; offsets available.

3 Higher: Adverse environmental change; inter-regional implications; serious or long term cumulative impacts; offsets not readily available.

The matrix below was then used to place the described issue as either a Category A, B or C priority. The Category A issues can be considered the highest priority areas and should be the main focus of the next stage of Environmental Assessment work. Category B and C issues would still also need to be considered.

Table 1 Issues Priority Matrix

Likelihood of Occurrence	Consequence of Unmanaged Effects		
	3 Higher	2 Medium	1 Lower
1 Lower	Category B	Category C	Category C
2 Medium	Category A	Category B	Category C
3 Higher	Category A	Category A	Category B

The risk and issue prioritisation was undertaken for each of the issues following the desk-top review. The information collected during the review, together with professional judgment, was relied upon to subjectively allocate the likelihood and consequence scores so as to provide an overall category. Where there were information gaps or uncertainties, a precautionary approach was adopted and the uncertain aspect (in regard to likelihood, consequence, or both) was rated as "higher" (*i.e.* a ranking of '3' in line with the definitions and matrix above).

As mentioned, this prioritisation exercise was undertaken to inform the level of detail that may be required for further assessment. The higher priority issues may require more detailed assessments. In general, the following was applied when scoping the requirements for the Environmental Assessment:

- **Category A** issues (highest priority) – would require further specialist investigations and field work are the highest priority for the Environmental Assessment to enable identification of appropriate management and mitigation options. These issues should be specifically addressed in any Statement of Commitments included as part of the Environmental Assessment.
- **Category B** issues – may be desirable to undertake further investigations as part of the Environmental Assessment to address some uncertainties, and these should be addressed in any Statement of Commitments included as part of the full Environmental Assessment.
- **Category C** issues – may not require further investigation where identifiable management/mitigation guidelines exist; only broad or desk-top level investigations may be required (if any).

A summary of the issues and the prioritisation categories that were assigned to them is provided in Table 19, together with a description of further investigations that may be appropriate.

7. Preliminary Environmental Assessment

7.1 Introduction

This section provides a preliminary assessment of the environmental impacts that may be associated with the Proposal. Key features of the existing environment, potential environmental issues resulting from the Proposal, and proposed assessment methodologies have been presented.

7.2 Flora and Fauna

Unless noted otherwise, the information contained within Section 7.2 is a summary of work that has been undertaken by Eco Logical (2009).

7.2.1 Existing Environment

The Eco Logical (2009) review of potential impacts to flora and fauna was based on information derived from:

- NSW DECCW threatened species, populations and ecological communities of NSW – Atlas of NSW Wildlife website (http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp);
- Commonwealth DEWHA Species Profile and Threats Database and Protected Matter Search Tool (http://www.environment.gov.au/erin/ert/epbc/index.html);
- Review of vegetation mapping conducted as part of the *Native Vegetation of Southeast NSW: A Revised Classification and Map for the Coast and Eastern Tablelands* by Tozer *et al*. (2001);
- Review of regional corridor mapping conducted by the Hawkesbury Nepean CMA[3].

Whilst much of the land in the vicinity of the Proposal is significantly altered and occurs within existing easements for gas pipelines or powerlines, some areas of native vegetation remain within or in close proximity to the proposed pipeline corridor. These may support a variety of threatened flora and fauna species, populations and ecological communities and warrant consideration for their contribution to biodiversity, scientific, educational and aesthetic values.

Vegetation and Endangered Ecological Communities. An analysis of vegetation mapping has highlighted that the proposed pipeline route passes through or between twelve mapped vegetation communities (Tozer *et al*., 2001) and would directly impact approximately 17.8 ha either within or directly adjacent to the mapped vegetation communities (Figure 3,Table 2). This area includes approximately 3.22 ha of potential threatened ecological communities listed under either the TSC Act or EPBC Act.

[3] Conducted in 2005 and available at http://www.hn.cma.nsw.gov.au/resourcelibrary/ on 15 October 2009

Table 2 Tozer *et al.* (2001) vegetation community statistics and area of impact under Pipeline Proposal

Community and Legislative Status	Estimated Impacted Area (ha)	Area Extant (ha)	Amount Remaining (%)	Reserved (ha)	Proportion of Remnant Reserved (%)
Eastern Tablelands Dry Forest	8.2	48 200	60-75	11 200	10-25
Tableland Hills Grassy Woodland	3.1	5 400	10-25	10	<1
Tableland Grassy Box-Gum Woodland (EEC)	2.2	17 800	10-25	10	<1
Tableland Low Woodland	1.7	10 500	20-35	2 500	<10
Southern Highlands Shale Woodland (EEC)	1.0	56 300	80-95	30 600	40-55
Shoalhaven Sandstone Forest	0.7	111 800	45-65	21 800	<15
Tableland Swamp Flats Forest	0.5	770	65-85	170	5-25
Wingecarribee Burragarong Sandstone Forest	0.3	65 700	80-95	41 600	50-65
Elevated Gorge Forest	0.3	34 600	80-95	14 700	30-45
Western Tablelands Dry Forest	0.1	36 900	40-60	4 500	<10
Tableland Bog (potential EEC)	0.01	18 800	20-40	720	<2
High Range Sheltered Forest (potential EEC)	0.01	20 900	>90%	14 100	55-75
Total	**17.82**				

Four of the vegetation communities correspond with (or have the potential to be contained within) endangered ecological communities listed under the TSC Act or the EPBC Act.

Table 3 Relationships between Tozer *et al.* (2001) vegetation communities and Endangered Ecological Communities listed under the TSC Act or Threatened Ecological Community listed under the EPBC Act

Tozer *et al*. (2001) Community Name	Corresponding EEC under TSC Act	Corresponding TEC under EPBC Act
Tableland Grassy Box-Gum Woodland	White Box Yellow Box Blakely's Red Gum Woodland	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland
Southern Highlands Shale Woodland	Southern Highlands Shale Woodlands in the Sydney Basin Bioregion	N/A
High Range Sheltered Forest	Part of this community is contained within the listed threatened community Southern Highlands Shale Woodlands in the Sydney Basin Bioregion	N/A
Tableland Bog	Part of this community is contained within the listed threatened community Montane Peatland and Swamp of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	Temperate Highland Peat Swamps on Sandstone.

Threatened Species. A combined search of the Atlas of NSW Wildlife and the EPBC Protected Matters Search Tool revealed a suite of threatened flora and fauna recorded within a 10 km radius of the proposed pipeline route including:

- 33 flora species;
- 42 fauna species; and
- 12 migratory species.

A likelihood of occurrence assessment was performed for each of the species (Eco Logical 2009), with the majority of species found to have the potential to occur along the pipeline route.

Because no targeted surveys have been conducted to date no species are recorded as definitely occurring and hence the likelihood of occurrence assessment is based on the following descriptors:

- Likely = a medium to high probability that a species uses the site; and
- Potential = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur (Eco Logical 2009).

Based on this assessment the following threatened species are considered 'likely' to occur within the proposed pipeline route:

- Regent Honeyeater (*Xanthomyza phrygia*);
- Gang-gang Cockatoo (*Callocephalon fimbriatum*);
- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*);
- Swift Parrot (Lathamus discolor);
- Hooded Robin (south eastern form) (*Melanodryas cucullata cucullata*);

- Diamond Firetail (*Stagonopleura guttata*);
- Barking Owl (*Ninox connivens*); and
- Powerful Owl (*Ninox strenua*).

An additional 36 threatened species have the potential to occur and ten migratory species are likely to occur or have potential to occur within the proposed pipeline route.

Regional Corridors. The proposed pipeline does not approach the boundaries of any gazetted National Parks, the nearest being Tarlo River National Park approximately 10 km to the north and Morton National Park approximately 10 km to the south (Eco Logical, 2009).

Parts of the proposed pipeline route cross through vegetation communities that are included in corridor mapping prepared by Hawkesbury Nepean CMA. The vegetated corridors crossed by the pipeline are the Abercrombie River to Morton National Park corridor around the Murrays Flats and Nattery Hill areas towards the western end of the pipeline, and the Bargo to Morton National Park corridor around the Penrose State Forest within the eastern section of the pipeline (Eco Logical, 2009).

Aquatic Ecology. The proposed pipeline route traverses a number of waterways from rivers to small tributaries. Major creeks or rivers that would be crossed include Wingecarribee River, Wollondilly River, Kelly's Creek, Jaorimin Creek, Narambulla Creek, Boxer's Creek, Uringalla Creek and Paddys River. The majority of riparian areas along the proposed pipeline route support limited vegetation.

No listed wetlands were identified from within a one kilometre radius of the pipeline route (Eco Logical, 2009).

7.2.2 Potential Impacts

Vegetation and Endangered Ecological Communities. Indirect impacts from clearing a 15 m strip of vegetation throughout the pipeline route would occur, along with some minor fragmentation of patches of vegetation. The magnitude of these impacts would depend on the community type, condition and current connectivity of vegetated patches (Eco Logical, 2009).

Clearing of native vegetation poses a threat to flora and fauna species, populations and threatened ecological communities that are present. Preliminary analysis of previous vegetation mapping indicates that at least three threatened ecological communities are likely to require clearing of vegetation as a result of the proposed pipeline including:

- White Box Yellow Box Blakely's Red Gum Woodland (EPBC Act - White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland);
- Southern Highlands Shale Woodlands in the Sydney Basin Bioregion; and
- Montane Peatland and Swamp of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions (EPBC Act - Temperate Highland Peat Swamps on Sandstone).

Due to land use constraints, clearing of vegetation including EECs may be required if it is not possible to contain the alignment within the existing cleared areas of the existing powerline or gas easements and cleared agricultural land

Habitat loss may affect the viability of threatened flora populations that occur within this area. This would potentially lead to disruptions in ecological processes that play an important role in maintaining the long-term viability of EECs.

Edge effects and fragmentation from construction and operation activities such as weed invasion may contribute to the loss of biodiversity.

Threatened Species. Due to the pipeline's proposed location, predominantly within existing easements, the level of fragmentation for fauna and flora species is likely to be minimal for the majority of species though for some species, increases in the width a the existing easement may present increased barriers to movement and therefore genetic flow between populations (Eco Logical, 2009).

Potential impacts to fauna habitat would arise predominately during the construction phase of the Proposal. Clearing of native vegetation would lead to a reduction in the habitat that supports native fauna and clearing and potential widening of existing easements in woodland habitats would increase fragmentation in the region, potentially reducing connectivity and increasing edge effects and barriers for some species at or near movement thresholds.

Potential activities associated with the Proposal that may impact on threatened flor and fauna include:

- Direct removal of individual threatened plants;
- Direct impact to frogs and reptiles through injury during the construction phase;
- Loss of potential foraging, roosting and to a lesser extent breeding habitats as a result of potential widening of existing easements;
- Impact to aquatic breeding habitats through the contamination of creeks, watercourses and water-filled depressions.
- Indirect impacts on species and habitat areas during construction through erosion of exposed soils from clearing and sedimentation of waterway habitats; and
- Increased easement widths resulting in increased barriers to movement and fragmentation;

Areas where vegetated corridors would be crossed by the proposed pipeline already have existing easements in place for the underground gas pipeline. Impacts are likely to be confined to clearing some vegetation (approximately a 10 m width) within the easement areas or adjacent vegetation on the edge of the existing easement (Eco Logical, 2009).

Potential longer term impacts on corridor areas due to the proposed development include increased weed (including noxious weeds) abundance and diversity due to introduction of weed propagules from machinery, soil disturbance and loss of vegetative cover, as well as edge effects on adjacent areas from clearing activities within the easement (Eco Logical, 2009).

Aquatic Ecology. If clearing of vegetation is required (for example around waterways, where under-boring would not occur), potential impacts on streams include erosion due to bank instability, and deposition of sediments into waterways. These processes would reduce the quality and condition of waterways, impacting on aquatic species and ecosystem health.

Impacts on aquatic ecology through processes such as vegetation clearing and erosion and deposition of sediments throughout waterways are largely controllable, and need to be considered as part of a soil and water management plan (Eco Logical, 2009).

If under-boring of the larger rivers is required, testing would be undertaken to ensure that under-boring does not compromise the structural bed of the waterway. Should under-boring cause cracking of the bedrock, local subsidence and/or erosion, such impacts would be detrimental to the local hydrology and ecological function of the watercourses.

Table 4 Summary and prioritisation of Flora & Fauna Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Clearing of native vegetation, particularly EECs and threatened species	A
Construction	Edge effects from construction and operation activities such as weed invasion.	B
Construction	Indirect impact to fauna through habitat loss, altered run-off patterns, contamination of water courses, increased lighting, and increased predation by exotic species.	B
Construction	Direct impact to fauna particularly frogs and reptiles through injury.	B

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.2.3 Considerations for Environmental Assessment

No targeted field surveys have been conducted within the indicated pipeline route. Although the majority of the proposed pipeline route would occur within existing utility easements, the Proposal still has the potential to directly and indirectly impact on the habitat of threatened species populations and ecological communities. The proposal may require some additional widening of existing easements and clearing within existing easements. The potential impacts of this clearing requires targeted field investigations in order to make informed decisions about the potential impacts of the project on threatened species and identify mitigation measures that would minimise the risk to native biota.

The study area for the ecological assessment is based on the investigation corridor as shown in Figure 1. The ecological investigation would be undertaken in accordance with the draft DECC *Guidelines for Threatened Species Assessment* under Part 3A of the EP&A Act 1979 and other guidelines issued within the Director Generals Requirements.

Vegetation and ecological communities. The proposed pipeline route is likely to traverse s number of vegetation communities including possible three threatened ecological communities listed under the TSC Act and/or EPBC Act. Targeted field surveys conducted during the preparation of the EA should allow for development of mitigation measures and biodiversity offset requirements for cleared vegetation including threatened ecological communities. Targeted field surveys would be required to:

- Validate existing vegetation mapping along the pipeline route:
- Validate the extent of impact to ecological communities in areas where clearing is required;
- Identify the location and condition and validate the extent of impact to threatened ecological communities listed under the TSC Act and EPBC; and

- Identify known and potential habitat areas for threatened flora species and where appropriate conduct targeted species specific field surveys to identify individual threatened flora populations that are likely to occur in the subject site.

These aims would likely be achieved by the following methods:

- Walking transects to ascertain vegetation community boundaries in particular the location of threatened ecological communities including:
  - White Box Yellow Box Blakely's Red Gum Woodland (EPBC Act - White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland);
  - Southern Highlands Shale Woodlands in the Sydney Basin Bioregion; and
  - Montane Peatland and Swamp of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions (EPBC Act - Temperate Highland Peat Swamps on Sandstone).
- Random meander traverses to search for threatened species within areas of suitable habitat;
- Sampling quadrats to collect structural and floristic data on each vegetation community and to conduct targeted searches for cryptic species (such as orchids) in areas of suitable habitat; and
- GPS recording of vegetation boundaries along walking transects, as well as locations of significance for flora including threatened species.

Fauna. The proposed pipeline route is likely to traverse s number of vegetation communities that include suitable potential habitats for threatened fauna species listed under TSC Act and/or EPBC Act. Targeted field surveys conducted during the preparation of the EA should allow for development of mitigation measures and biodiversity offset requirements for individual threatened fauna species with surveys likely to be required to:

- Identify habitat types within the subject site and study area in order to conduct targeted investigations in suitable habitat types including:
  - Woodland habitats – surveys for avifauna, nocturnal birds, mammals (including bats) and reptiles;
  - Ephemeral and permanent watercourses and depressions – surveys for amphibians, waterbirds and some reptiles;
  - Rocky outcrops and caves – surveys for bats and reptiles;
  - Hollow bearing trees – surveys for hollow dependent fauna such as owls, some birds, mammals and bats.
- Identify the flora and fauna species occurring within the study area at the time of survey and determine the habitat potential within the study area for any additional flora and fauna species including threatened species listed under the TSC Act and EPBC Act
- Identify the potential direct and indirect impacts of the proposed activity on fauna and biodiversity values of the area;
- Develop mitigation measures to reduce the potential direct and indirect impacts of the proposed activity on flora and fauna species in the study area; and
- Determine if the biodiversity principles of 'improve or maintain' would be met as a result of the proposed construction and operation of the works and in line with the accepted mitigation measures of the project.

Both general and targeted (threatened or otherwise significant species) field surveys would be carried out in order to generate lists of fauna present within the study area. Field surveys would be carried out to record the fauna present within each habitat type and to specifically target threatened fauna known or considered likely to occur. This specifically includes the suite of woodland birds (*e.g.* Hooded Robin, Diamond Firetail and Brown Treecreeper) and owl species considered likely to occur as outlined earlier.

Spotlighting, call playback, opportunistic scat collection and analysis etc for mammals and owls, and ultrasonic detection for bats, hand searches and call playback for frogs and owls, plus diurnal reptile and bird surveys, are expected to be required where suitable habitat is present.

Aquatic Ecology. Database searches of threatened aquatic species listed on the EPBC Act and FM Act indicate that no threatened aquatic species have the potential to occur within the investigation corridor. However, further advice and targeted surveys for aquatic habitats is likely to be required as part of the EA. Therefore, aquatic habitat assessment is likely to be considered an appropriate survey method to undertake to assess potential impacts on aquatic habitat and assemblages.

Field surveys would incorporate an aquatic habitat assessment which would aim to:

- Identify potential habitat areas for aquatic fauna including riffles, pools etc;
- Identify any potential barriers to fish passage such as weirs located upstream and downstream of crossing points; and
- Locate suitable trenching or crossing points for permanent and ephemeral waterways and possible locations for under-boring with the following field data likely to be recorded:
  - General waterway morphology (e.g. permanent or ephemeral; gully / stream / river / wetland; presence of pools; width of waterway; etc);
  - Flow regime (intermittent / permanent / freshwater; slow / rapid);
  - Observable indicators of water quality (such as turbidity and presence of aquatic macroinvertebrates) and surrounding and upstream land use;
  - Instream and riparian vegetation;
  - Fish habitat (refuge areas - snags / undercut banks / reedbeds; potential breeding areas – gravel beds and fallen trees).

7.3 Surface and Groundwater

7.3.1 Existing Environment

The Kangaroo River and Wingecarribee Reservoir. The Proposal would involve taking water from the Wingecarribee Reservoir to deliver it to the Goulburn water supply system. Wingecarribee Reservoir is part of a network of storages known as the 'Shoalhaven Scheme'. The reservoir spills to the Wingecarribee River which then confluences with the Wollondilly River, which feeds Warragamba Dam, Sydney's main water supply storage. The Shoalhaven Scheme is used to top up the water supply to Sydney and the Illawarra during drought periods. It also supplies the Southern Highlands and Nowra.

Surface water along the pipeline corridor. The pipeline runs north of, and roughly parallel to, the catchment boundary separating the Hawkesbury Nepean catchment from the Southern Rivers catchment placing it entirely within the area managed by the Hawkesbury Nepean Catchment Management Authority (CMA). The Wollondilly River is the main watercourse in the regions adjacent to the proposed

pipeline corridor. A number of tributaries would be intersected by the proposed alignment. These include:

- Kellys Creek
- Black Bobs Creek
- Long Swamp Creek
- Paddys River
- Uringalla Creek
- Jaorimin Creek
- Lockyersleigh Creek
- Narambulla Creek
- Osborns Creek
- Wollondilly River
- Boxers Creek
- Kenmore Creek
- Several unnamed tributaries of these above named watercourses.

Groundwater. A search of the NSW Natural Resource Atlas database[4] of groundwater works maintained by DWE was undertaken to gather information on bore water extraction in the area. The Proposal would likely traverse through designated Groundwater Management Units (including the Southern Highlands GMU, which has an indicative depth to the water table of about 15 m). The Kingsdale Aquifer is also located near Goulburn. There are a number of groundwater bores within the vicinity of the pipeline corridor.

7.3.2 Potential Impacts

The Kangaroo River and Wingecarribee Reservoir. During the operation of the Proposal, water would be drawn from the Wingecarribee Reservoir. The reservoir is used as transfer storage by SCA and is therefore filled largely via the transfer of water from Fitzroy Falls Reservoir. This transfer system is managed by SCA. An agreement would be developed between the SCA and GMC in relation to how the Proposal would be operated[5]. The agreement would ensure there are no impacts on SCA's operating licences.

Surface water along the pipeline corridor. During construction of the Proposal, potential impacts on surface hydrology and water quality may include:

- Potential erosion from exposed soils and sediments and material stockpiles caused by inadequate management measures, resulting in an increase in sediments in watercourses.
- Potential spills of fuels, greases and other chemicals from inadequate storage, handling and disposal procedures.

[4] http://www.nratlas.nsw.gov.au/

[5] Note that the SCA has already been consulted on this Proposal and a water sharing agreement has been made.

- Potential blockage of flow paths affecting low flows through construction within creek lines and through erosion and sedimentation control structures.
- Potential to alter flows during periods of high flow as a result of larger obstructions within and adjacent to creek and drainage lines.

These would require sediment and flooding control measures to be in place during the construction phase.

The proposed pipeline would be buried underground, and only small structures such as scour and air valves and the pump station would be constructed above ground. Following the restoration of the ground level to be aligned with original terrain levels, the operational impacts of the Proposal on the floodways and hydrology of the region would be largely insignificant.

Groundwater. Groundwater aquifers and management units may be disturbed by the trenching and excavation activities during construction, however the depth to the watertables in the region that were indicated in the DWE Natural Resource Atlas database indicate that this may be unlikely. Nevertheless the potential for groundwater interference to occur during excavation and the mitigation required would need to be assessed in more detail.

Table 5 Summary and prioritisation of Surface and Groundwater Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Potential blockage of flow paths affecting low flows through construction within creek lines and through erosion and sedimentation control structures.	B
Construction	Groundwater aquifers in the region may be exposed or impacted by trenching activities	C

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.3.3 Considerations for Environmental Assessment

Interferences to local drainage patterns during construction phase would need to be managed. The following tasks would be undertaken with respect to the creek and stream crossings:

- Review the location and size of required waterway crossings.
- Provide comment on the impact of the proposed waterway crossings.
- Review the proposed rail alignment and the potential location of additional waterway crossings.
- Comment on the potential hydrologic and hydraulic impact of the Proposal on adjacent properties.
- The water quality assessment would consider the potential impacts associated with construction and operation of the Proposal.

The mitigation measures proposed would address the risk posed by sedimentation, spillage of fuels and chemicals during construction and address issues to be included in the Construction Soil and Water Management Plan. An operational impact assessment would address issues relating to maintenance and drainage of the rail line once constructed.

Groundwater

A desktop groundwater study could be undertaken to examine the potential for interfering with local aquifers, conforming to recommended approaches outlined in the Sydney Coastal Councils Group (SCCG, 2006) publication *Groundwater Management Handbook: A Guide for Local Government*.

7.4 Drinking Water Quality

7.4.1 Existing Environment

In general, Goulburn's treated drinking water quality has been quite good, though it has deteriorated during recent extreme drought periods (*NSW State of the Environment Report 2004*). The Wingecarribee Reservoir raw water has recently experienced low dissolved oxygen levels, iron concentrations in excess of *Australian Drinking Water Guideline* (NHMRC, 2004) values and the microbial indicator *E. coli* is frequently detected during monitoring (SCA, 2008). The Wingecarribee Reservoir has also had a recent history of blue-green algae outbreaks[6]. The Wingecarribee WTP has been designed to adequately treat raw water with these characteristics.

The water treatment processes adopted are related to the raw quality of the water being treated. A comparison of the water treatment processes of the Wingecarribee WTP and the Goulburn WTP has found that the processes are quite different at each (GMC & DoC, 2007).

7.4.2 Potential impacts

A review of the treatability characteristics of the Wingecarribee Dam and Goulburn's Sooley Dam waters indicates that mixing, flocculation and clarification processes together with the typical chemical dosages required to treat waters from each dam differ (GMC & DoC, 2007). A potential impact of mixing the new water source with Goulburn's current supply is that it could:

- alter the raw water characteristics in a way so that the Goulburn WTP would operate sub-optimally, or
- introduce new loads of contaminants (*e.g.* microbes or algae) that could challenge the existing Goulburn WTP.

Table 6 Summary and prioritisation of Drinking Water Quality Issues

Process/Activity	Potential Impacts	Risk category[a]
Operation	Mixing of waters with different qualities may impact on the treatability of the raw water at Goulburn WTP and result in sub-optimal or poor quality water being distributed.	**B**

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.4.3 Considerations for Environmental Assessment

In the event that a decision is made to pipe raw water from Wingecarribee Reservoir to the Goulburn WTP, sufficient investigation would be required to ensure that the Goulburn WTP has adequate facilities

[6] http://www.sca.nsw.gov.au/publications/awqmr08/incidents/wingeblue accessed at 15 October 2009

and measures to effectively treat the Wingecarribee water. In any event, GMC should identify measures to avoid and manage community complaints and expectations associated with the change in drinking water characteristics. This should involve a catchment-to-tap level drinking water quality risk assessment in line with the methods described in the *Australian Drinking Water Guidelines* (NHMRC, 2004).

7.5 Soils, Geology and Contamination

7.5.1 Existing Environment

Soils and Geology. A desktop analysis of the soil landscapes for the areas to be affected by the pipeline development was undertaken and erosion potential for the relevant landscape units was identified by Eco Logical (2009). A summary of the landscape units with the highest erosion hazard potential identified in that report is provided in Table 7.

Acid sulphate soil data was accessed based on the available mapping (DNR, 2006) by Eco Logical (2009) who has indicated that no acid sulphate soils have been identified within the pipeline corridor.

Contamination. Where practicable the Proposal would be designed within existing infrastructure easements. This would be confirmed during the detailed design phase of the Proposal. Current land uses adjacent to the rail corridor are predominately large blocks of land used for rural residential and grazing purposes. Hence potential contaminants in the soil arising from agriculture and farming activities would be generally confined to specific locations and activities including those used for storage and use of pesticides and/or hydrocarbons, machinery storage and vehicle maintenance areas.

Table 7 Soil Landscapes and their erosion potential within the proposed development area (modified from Eco Logical, 2009)

Soil Landscape Unit Code	Soil Landscape Unit	Area Affected (ha)	Erosion Hazard and Description
myz	Mandagery	7.90	Low-High. Moderate to severe sheet erosion, soil creep, gullying and stream bank erosion occur within this unit.
roz	Rowans Hole	6.02	Widespread sheet erosion, localised gully erosion.
mhz	Monastry Hill	5.77	Low-Moderate. Prior to urban development area not eroded significantly. Disturbance of the soil surface for urban development would create significant short term erosion problem. Close proximity to Wollondilly River.
gaz	Garland	5.28	Moderate. Gullying of drainage lines can be moderate to severe. Sheet erosion only in very dry years or bushfires. Occasional salting in low-lying areas.
ddz	Durran Durra	4.57	Sheet erosion is common on cleared slopes. Minor to moderate gully erosion occurs in drainage depressions.
goz	Goulburn	4.23	High. These areas usually accumulate sediment. Some stream bank erosion may occur.
brz	Bindook Road	3.73	Moderate. Little erosion occurs in northern areas. Some gullying of drainage lines occurs in the south
bcz	Blakney Creek	2.97	Moderate-High. Moderate to severe gullying and moderate sheet erosion occur extensively. Saline areas on many valley flats, in particular around Nerrimunga Creek and near Rugby.
blz	BullamAlita	2.49	High. Moderate to severe gullying and moderate sheet erosion particularly in north-eastern areas. Saline areas are found, but incidence is not as great as on the Blakney Creek landscape soil landscape.
twz	Tarrawarra	2.40	Widespread sheet erosion, localised gully erosion.
mnz	Marulan	0.82	Low-High. Some gullying of drainage lines. Sheet erosion expected after bushfires or dry periods.
pnz	Picton	0.31	Widespread sheet erosion.

7.5.2 Potential Impacts

Activities associated with construction of the Proposal would comprise ground excavations and earthworks involving the movement and exposure of spoil, with potential to increase the risk of an erosion and runoff hazard. The majority of areas that would encounter soil disturbance are likely to have received some level of disturbance in the past due to development of the existing gas pipeline corridor and the agricultural activity that takes place on the land. In summary

- Soils exposed during excavation and vegetation removal may result in erosion.

- Watercourses within the project corridor may be impacted through an increase in sediment loads during rainfall events that would lower existing water quality. Other pollutants could potentially be introduced to waterways during construction, through chemical spills.
- Acid sulphate and/or contaminated soils that potentially exist in the area may impact on the surrounding environment once exposed.
- Expansive soils that exist in the area may create stability issues during construction.
- Compaction of soils during construction could lead to decreased permeability.
- Wind erosion may occur from unsecured stockpiles or soil mounds created during the earthworks or mobilisation of fill material.

There is also the potential for saline areas to be encountered within particular soil landscapes (such as the Garland landscape) and this would need further investigation.

If contamination is present it may pose a health risk to workers and onsite personnel constructing the pipeline. The potential for workers and personnel involved in the construction of the pipeline to be exposed to any contamination occurring along the alignment would depend on a number of factors including the depth and direction of groundwater flow, the nature of soil and permeability of the surrounding geologic formation.

Table 8 Summary and prioritisation of Soil, Geology and Contamination Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Ground excavations and earthworks involving the movement and exposure of spoil have the potential to increase the risk of erosion, runoff, and reduce local water quality through sediment laden runoff.	A
Construction	Liberation of salts within the soils during construction activities, particularly in Garland regions.	B
Construction	Exposure of workers to contaminated soils	C

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.5.3 Considerations for Environmental Assessment

Further investigation is needed within these Garland soil areas to ascertain risks associated with disturbing saline areas, the risks to the long-term integrity of underground infrastructure and how they should be managed (Eco Logical, 2009).

Erosion potential can be identified and limited by application of appropriate controls and by development of a Soil and Water Management Plan in consultation with guidelines for soils and construction (*e.g.* Landcom, 2004). Key features of such a plan would include: appropriate timing to minimise areas with exposed soils, appropriate location of stockpiled soils; engineering measures to prevent and retain sediment migration; and prompt rehabilitation of disturbed areas.

The methodology to assess potential contamination along the proposed pipeline alignment and any lands to be acquired would comprise the following:

- Preliminary review of information to identify areas of concern and/or properties that may have potential or existing contamination and that would require further assessment.
- A Phase One Contamination Assessment of those properties / areas that have been identified as having potential or existing contamination, and would include the following:
  - Consider past importation of fill within the study area.
  - Development of recommendations for further investigations, if required.
  - Provision of a suite of mitigation measures to reduce the risk of exposure to potential contaminated soil and groundwater during the construction phase.

7.6 Noise and Vibration

7.6.1 Existing Environment

Aside from the small portion of the pipe corridor that takes in parts of the Goulburn suburban area, the vast majority of the pipeline would be constructed in rural areas, with only a small number of homesteads (*i.e.* noise receptors) in vicinity of the corridor.

7.6.2 Potential Impacts

The construction of the pipeline would increase noise and vibration levels at receivers closest to the corridor, particularly in the vicinity of Goulburn suburban areas. Construction noise would result from actual works and traffic.

During operation (pumping and discharge of flows) any associated noise levels are likely to be minimal.

Table 9 Summary and prioritisation of Noise & Vibration Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Temporary noise and vibration impacts associated with construction of the pipeline and associated works.	B
Operation	Additional localised noise and vibration impacts from the operation of the pump stations.	C

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.6.3 Considerations for Environmental Assessment

The impacts associated with noise and vibrations are not considered significant. Assessment and management of the construction noise would be undertaken in accordance with relevant guidelines (*e.g.* DECC, 2009). This would involve:

- A construction noise and vibration assessment would be undertaken for the project. Occupants of noise sensitive properties would be consulted as part of this assessment. This would involve:

- Identification of noise sensitive receivers.
- Noise monitoring for baseline noise levels (if required).
- Modelling and predictions of noise levels.

- Planning to ensure that activities would be organised so that noise and vibration impacts are minimised during construction.

7.7 Aboriginal and Non-Indigenous Heritage

A desktop archaeological assessment for the Proposal has been undertaken (Navin Officer Heritage Consultants, 2009). This Section 7.7 summarises the findings from that report.

7.7.1 Existing Environment

A search of the DECC AHIMS database located 77 Aboriginal sites within one kilometre of either side of the pipe route. Of these sites at least four may be directly impacted by the proposal. These include a scarred tree and three artefact scatter sites. There is high potential that sections of the route contain as yet unrecorded artefacts.

To examine non-indigenous heritage aspects, a search of the following was undertaken:

- Goulburn Mulwaree and Wingecarribee LEPs;
- NSW Heritage Register and Inventory;
- National Heritage List;
- SCA's s170 Heritage Register;
- Register of the National Estate.

It was found that there are 49 historic heritage items in close proximity to the pipeline route. Of these, 31 may be directly impacted. These include houses and commercial buildings, a hospital (Kenmore Hospital Complex was listed on the national Heritage List), a swimming pool complex, a railway station, cemeteries, bridges and culverts, Wingecarribee Swamp, veterans' allotments and other items. A review also found other items that are unrecorded but that may be of heritage significance, including old fence lines, nineteenth century structures and early roads.

7.7.2 Potential Impacts

Where possible, items of heritage significance would be avoided. However it is possible that pipeline construction could result in some impact on these items. Potential impacts that may result from the Proposal include:

- Direct or indirect disturbance to items of heritage significance.
- Effect on the amenity of heritage artefacts within close proximity of the pipeline corridor, during construction and (for example near pump stations or air valves) during operation.

During pipe operation, impacts to heritage items are expected to be negligible.

Table 10 Summary and prioritisation of Heritage Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Direct or indirect disturbance (including disturbance of amenity) to items listed on the NSW State Heritage Register, National Heritage List, *etc.*	A

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.7.3 Considerations for Environmental Assessment

The following key tasks would be undertaken to further assess the non-Indigenous heritage impacts associated with the Proposal:

- Review of existing data (such as the Heritage Office State Heritage Inventory) for records of known heritage sites and issues.
- Field investigations and comprehensive survey of the investigation corridor (with a focus on registered heritage items) by archaeologists.
- Provide input to Design Team on significance of the heritage items and issues associated with impacting on the items.
- Prepare a report/ reports assessing the significance of any identified and affected items, the significance of any impacts and recommending mitigation measures.

The assessment of Aboriginal heritage impacts would be undertaken in accordance with the *DECC Interim Community Consultation Requirements for Applicants* and *Guidelines for Aboriginal Heritage Cultural Heritage Assessment and Community Consultation* and would involve the following key tasks:

- Review of existing data (such as the Aboriginal Heritage Information Management System) for records of known Aboriginal heritage sites and issues.
- Issue of letters and newspaper advertisements to identify Aboriginal stakeholders with an interest in the Proposal to be involved with field investigations.
- Field investigations of the study area by archaeologists and representatives of the registered Aboriginal stakeholders.
- Prepare a report/reports assessing the significance of any identified and affected items, the significance of any impacts and recommending mitigation measures.

7.8 Air Quality

7.8.1 Existing Environment

Ambient air quality along the proposed pipeline route is expected to be good due to the area being predominately rural. Air quality may decline slightly where the proposed route is in proximity to, or intersects major roads and railway lines, such as the Hume Highway.

7.8.2 Potential Impacts

Impacts to air quality are expected to be limited to the construction phase with no impacts to air quality from the constructed pipeline expected. Minor impacts on air quality may arise from construction activities including dust and emissions from vehicles or plant. These may be:

- Plant, equipment and vehicles utilised during construction and operation would increase localised traffic levels and are likely to generate greenhouse gas emissions and impact on local air quality.
- Energy usage required for construction activities would result in the release of greenhouse gas emissions.
- Dust emissions may be generated from earthmoving equipment activities, vegetation loss and wind erosion of stockpiled excavated material during construction.

Table 11 Summary and prioritisation of Air Quality Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Dust emissions from exposed excavation, stockpile mounds, infrastructure construction, transport of fill, and construction machinery	B
Operation	Emissions associated with pumping	C

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.8.3 Considerations for Environmental Assessment

The significance of these impacts are considered to be minor, although further assessment in accordance with *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (DECC, 2005) would quantify the scale of these impacts.

A qualitative desktop air quality assessment would be undertaken as follows:

- Existing local air quality would need to be determined, project emissions predicted (for construction and operation), and potential impacts assessed. Greenhouse gas emissions for the construction of the project would be in line with government guidelines (such as the *NSW Greenhouse Plan 2005*).
- Standard soil and water mitigation measures for pipeline projects would be adopted.

7.9 Social and Economic Impacts

7.9.1 Existing Environment and Potential Impacts

Some relevant points are that:

- The Wingecarribee Reservoir is a restricted area and is not permitted to be used for fishing, swimming, *etc.*, and so construction of pump stations and offtake structures would not impose on recreational water users.
- The pipeline corridor is predominantly located on rural land, either public owned or used for agriculture. There would be some land acquisition requirements associated with this Proposal, and some above ground structures that may be located on persons' property.

- Goulburn has been on high level water restrictions for many years. The additional water supply for the city would be beneficial for the local community. The pipeline construction would create local jobs.

Table 12 Summary and prioritisation of Socio-Economic Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Impacts on ability to use Wingecarribee Reservoir for recreation	C
Construction and Operation	Cumulative impacts if visual amenity, noise, vibration and air quality deteriorate.	B
Construction and Operation	Concerns amongst local residents regarding land acquisition and property values.	A

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.9.2 Considerations for Environmental Assessment

- A comprehensive community engagement and stakeholder management (CE&SM) program has commenced and would continue to determine a profile of the pipeline corridor and the surrounding local area.
- A review of socio-economic issues for the area would be undertaken to more fully assess the impacts of the project.
- Stakeholder views and community responses would be considered in the assessment.

7.10 Greenhouse Gases

7.10.1 Potential Impacts

The greenhouse gases that would be emitted during the construction of the Proposal include:

- Carbon Dioxide (CO_2)
- Carbon Monoxide (C0)
- Oxides of Nitrogen (NOx)
- Non-methane Volatile organic Compounds (NMVOC)

The greenhouse gas emissions of the construction phase of the Proposal are primarily associated with the following:

- Clearance of existing vegetation (CO_2 emissions from decomposition of cleared biomass retained on site) and associated activities (such as GHG emissions from vehicles used for land clearing and transportation of green waste to management location).
- Energy (fuel and electricity) consumption, especially fuel consumption of construction machinery and vehicles, while electricity would be used at construction compounds, temporary lighting and other equipment.

- Construction materials also contain 'latent' greenhouse gas emissions associated with their products and transport. The quantity of GHG emissions is dependent on the form of production and its distance from the production site.

The pumping of water through the proposed pipeline would require the use of electricity and this would be sourced from the main electricity grid increasing demand for burning of fossil fuels and consequent greenhouse emissions. The level of emissions generated per year would depend upon the decided trigger values for pumping water from Wingecarribee to Goulburn *i.e.* the lower threshold level of water within the Goulburn storage facilities which, once reached, would trigger pumping of water from Wingecarribee to Goulburn.

Table 13 Summary and prioritisation of Greenhouse Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction and Operation	Greenhouse gas emissions associated with construction and operation.	C

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.10.2 Considerations for Environmental Assessment

The Environmental Assessment would consider various elements of design for efficient energy use, including:

- Ecological Sustainable Development (ESD): The EA would give consideration to how the Proposal and its elements address the principles of ESD.
- Sustainability in Design: Advice would be provided to the Design Team as to how sustainability considerations can be incorporated into the Proposal design.

7.11 Landscape and Visual Amenity

7.11.1 Existing Environment

The visual envelope of the study area is characterised by expanses of open, undulating, rural land. Farming activities, predominantly grazing, water storage dams and rural homesteads are scattered throughout the landscape.

7.11.2 Potential Impacts

The pipeline would be buried and generally would not be visible. Some air valves, a pump station and a water balance tank) would be above ground. As such visual impacts are expected to be mainly limited to the construction phase of the project. Construction activities, including security fencing, plant and stockpiles may impair the visual amenity of surrounding lands. These impacts would be relatively short (approximately one year for the entire pipeline and, therefore, significantly less for each constructed section) and are considered to be minor.

Table 14 Summary and prioritisation of Visual Amenity Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Temporary loss of visual amenity during construction due to introduction of plant and equipment and land disturbance	B
Operation	Permanent loss of visual amenity due to above ground structures.	C

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.11.3 Considerations for Environmental Assessment

The visual amenity impacts of the discharge structure would be considered in the design phase. Issues relating to visual amenity would be considered during detailed design. There would be early authority and public consultation of the proposed design solution:

- The stakeholder engagement and community consultation program would account for issues relating to the amenity of satellite sites. Responses would be incorporated in the database and considered in site design and location.
- Architect and landscape architect skills would be integrated in the design team to provide input on the aesthetics of the above ground structures.
- In assessing visual amenity impacts, consideration would be given to land use, heritage, recreational and precinct character, and open space networks.
- Urban and landscape vision and design objectives would be documented where appropriate.

7.12 Land Use

7.12.1 Existing Environment

Eco Logical (2009) undertook a search of agricultural land classification (NSW Agriculture, 2002) and identified that the proposed pipeline mainly intersects land capable of supporting grazing and cropping systems. It is anticipated that the pipeline route would mostly utilise existing infrastructure easements that have previously been cleared and either remain cleared or have regenerating vegetation present, with potentially:

- 53.9 km (67%) within an existing 30 m wide easement associated with an underground gas pipeline
- 15.1 km (18%) situated within an easement associated with 330 kilovolt overhead power lines

7.12.2 Potential Impacts

In general, the proposed pipeline would not interfere with capability of land for agriculture as 85 % of the pipeline route is through or parallel to existing easements where agricultural capabilities would remain unchanged. The remainder of the pipeline (*ca.* 11.7 km; 15%) would include some agricultural lands and roadside easements.

Temporary visual impacts would relate to the introduction of plant and equipment, and earthworks during the construction period. These impacts are likely to be exacerbated by the semi rural nature of the landscape, clearing of vegetation and lack of screening, in areas characterised by large open spaces.

Once the Proposal is operational, impacts would be minimal.

Table 15 Summary and prioritisation of Landuse Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction and Operation	Construction of pipeline may impact in suitability or availability of land for current purposes	B

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.12.3 Considerations for Environmental Assessment

The EA would discuss the following with regard to the land uses and properties potentially affected by the Proposal:

- The properties and land uses directly affected by and adjacent to the Proposal route, including identification of any areas identified as regional and State significant farmland.
- The potential impacts on the viability of these land uses (such as from land sterilisation and severance impacts) caused by the Proposal.
- Impacts on connectivity and access resulting from the Proposal.
- Rehabilitation measures to address potential impacts on land use and properties.

7.13 Traffic

7.13.1 Existing Road and Rail Infrastructure

There would be several road crossings, including across some major traffic ways such as:

- Illawarra Highway
- Nowra Road
- Mount Broughton Road
- Exeter Road
- Hume Highway
- Inverary Road
- Wollumbi Road
- Crookwell Road

There are also rail crossings:

- Moss Vale Unanderra Railway
- Main Southern Railway

- Goulburn Crookwell Railway

7.13.2 Potential Impacts

Safety issues and increases in traffic movements within the vicinity of residential areas (and associated noise) need to be considered and appropriate management practices emplaced before works are undertaken.

Table 16 Summary and prioritisation of Traffic Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Road haulage may place pressure on the local and regional road networks, potentially resulting in delays and delineation of alternative routes.	C

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.13.3 Considerations for Environmental Assessment

A Traffic Assessment would be undertaken in accordance with RTA and AUSTROADS standards as appropriate. Traffic management and works scheduling plans would be required prior to construction to ensure minimal disturbance to traffic on local and regional roads, and for town access, throughout the construction phase. Safety would be a significant factor to take into account if there is to be a mix of local traffic and construction traffic, particularly through the presence of large vehicles where there have not previously been.

- A traffic management plan would be developed and implemented.
- There would be further ongoing consultation with residents and road authorities regarding traffic and access alternatives and issues.
- Where oversized vehicles are used, suitable controls and management would be put in place and heavy vehicle permits would be obtained as required.
- Transport movements would be timed to minimise impacts in during certain hours as determined through consultation.

7.14 Resource and Waste/Spoil Management

7.14.1 Existing Environment

The existing land use pattern is predominantly rural residential, with some urban areas near Goulburn. Existing waste in the vicinity of the corridor is largely from wind-blown litter scattered around the Proposal area and waste generated from livestock.

7.14.2 Potential Impacts

The construction of the Proposal would entail ground excavation and earthworks involving the movement and exposure of spoil. Possible waste streams generated during the construction phase are presented in Table 17.

Table 17 Waste Generated During Construction Phase

Waste Source	Composition	Classification per DECC *Waste Classification Guidelines*[7]
Site clearing and ground preparation Site excavation and bulk earthworks	Foliage, excess fill materials, excavated material (spoil) such as soil or rock.	General Solid Waste (Non Putrescible)
Construction of pipeline and associated facilities Erection of security fencing along the working width and the installation of safety measures	Scrap wood, metals and concrete spills. Packaging from materials received at facility, such as foam, strapping and lumber. Concrete, metal rods/pipes and timber.	General Solid Waste (Non Putrescible)
Construction phase liquid waste from plant and machinery maintenance	Fuels, oils, paints and chemicals.	Could be hazardous or non hazardous
Wastewater from various construction activities	Water from concrete mixing and curing, site clean up, etc.	Non-Hazardous
Site Office	Used paper, boxes, cartridges, toners.	General Solid Waste (Non Putrescible)
Kitchen waste from site canteen or food preparation area	Food waste.	General Solid Waste (Putrescible)

Table 18 Summary and prioritisation of Resource Use and Waste Generation Issues

Process/Activity	Potential Impacts	Risk category[a]
Construction	Construction waste from ground excavation and earthworks.	B
Operation	Contamination from hydrocarbons used during pump station maintenance	C
Construction	Potential for contamination from past land use or activities.	C

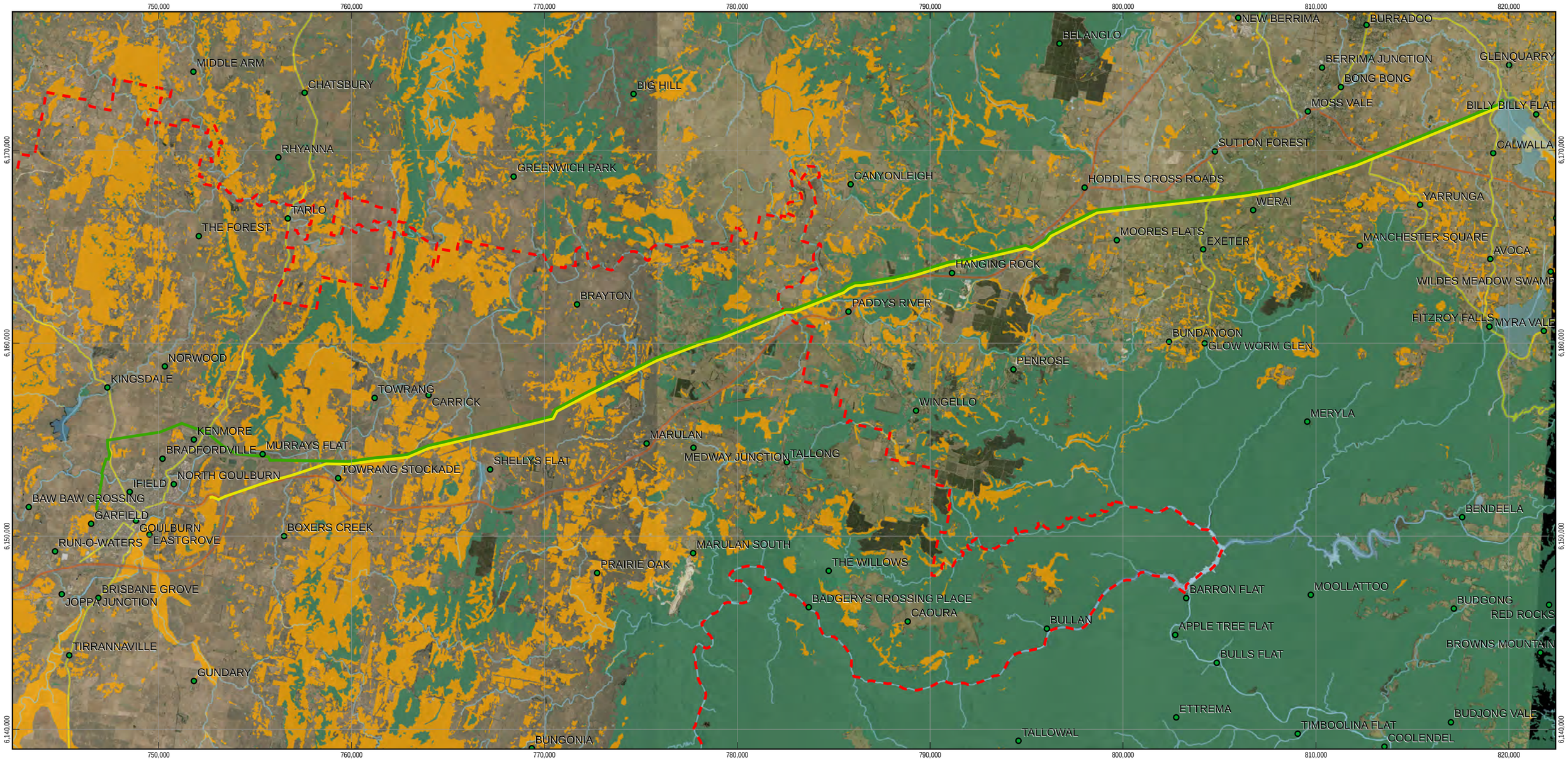
[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest)

7.14.3 Considerations for Environmental Assessment

The *Waste Avoidance and Resource Recovery Act 2001*, the *POEO Act 1997* and relevant regulations and applicable industry guidelines would be used to classify the wastes and where possible, determine measures to handle, store and appropriately dispose of the waste. Proper waste handling and management minimises the risk of causing harm or loss of vegetation, animal, aquatic or human life or contamination of the environment.

[7] As listed at http://www.environment.nsw.gov.au/waste/classification.htm and accessed on 14 October 2009

Mitigation measures would include a recommendation to prepare a detailed Waste Management Plan (WMP) as part of the Construction Environmental Management Plan (CEMP). The WMP would classify and quantify all the wastes likely to be produced and recommend appropriate handling, storage, recycling and disposal methods.



Legend

- Original Route (Raw Water)
- Original Route (Treated Water)
- Locality
- PrimaryRoad
- ArterialRoad
- Rivers, Creeks
- Lakes, Dams
- GMC / WSC LGA Boundary

Vegetation Classification

- EEC Vegetation
- Non EEC Vegetation

1:200,000 (at A3)

0 1 2 4 6 8

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

CLIENTS | PEOPLE | PERFORMAN

Goulburn Mulwaree Council
Highlands Source Project

Preliminary Environmental Assessment

Wingecarribee to Goulburn Pipeline - EEC vegatation areas

Job Number	23-13312
Revision	A
Date	16 OCT 2009

Figure 3

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Data source: WSC, GSC, Department of Lands, GHD Created by: trbellwood

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8. Proposed Environmental Assessment Scope

A summary of the potential scope of investigative work for an Environmental Assessment of the Proposal is outlined in Table 19. For further details, refer to Sections 7.2-7.14.

During the development of the route option design process the issues listed below would be considered and potential impacts would be avoided wherever possible. Where impacts as a result of the Proposal are unable to be avoided, mitigation measures would be identified to reduce the potential impacts. These measures would be identified in the Environmental Assessment for the Proposal.

Additionally, the EA document would include:

- Consideration of planning and statutory requirements.
- Strategic justification for the project.
- Description of the project.
- Discussion of project options.
- Outline of construction activities.
- Consideration of the principles of sustainability in the context of the project.
- The scope, methods and results from the investigations (such as those tabulated below).
- An interpretation of the results from the investigations to develop:
  - Management actions;
  - A list of the risk mitigation actions and activities that would be relevant for inclusion in the Construction and Operational Environmental Management Plans; and
  - A Statement of Commitments.

The Category A and B issues listed below would be investigated and the results would be documented in dedicated chapters in the EA. Category C issues would be considered by way of a more broad environmental risk assessment, which could incorporate other environmental risks as well.

Table 19 Scope of Investigative Work for Environmental Assessment

Issue	Highest Allocated Risk Category[a]	Scope for Environmental Assessment
Flora and Fauna	**A**	*Undertake the following flora and fauna assessment (including terrestrial and aquatic):* Validate the extent of impact to ecological communities in areas where clearing is required Identify the location and condition and validate the extent of impact to threatened ecological communities listed under the TSC Act and EPBC Act Identify known and potential areas for threatened flora species and where appropriate conduct targeted species-specific field surveys to identify individual threatened flora populations that are likely to occur in the subject site Identify habitat types within the subject site and study area in order to conduct targeted fauna investigations in suitable habitat types Identify the flora and fauna species occurring within the study area at the time of survey and determine the habitat potential within the study area for any additional flora and fauna species including threatened species listed under the TSC Act and EPBC Act Identify the potential direct and indirect impacts of the proposed activity on fauna and biodiversity values of the area Develop mitigation measures to reduce the potential direct and indirect impacts of the proposed activity on flora and fauna species in the study area Determine if the biodiversity principles of 'improve or maintain' would be met as a result of the proposed construction and operation of the works and in line with the accepted mitigation measures of the project
Surface and Groundwater	**B**	*Identify and comment on the actions to be taken to ensure surface and groundwater quality is maintained during the construction phase:* Review the location and size of required waterway crossings. Provide comment on the impact of the proposed waterway crossings. Review the proposed pipeline alignment and the potential location of additional waterway crossings. Comment on the potential hydrologic and hydraulic impact of the Proposal on adjacent properties. Desktop assessment to identify groundwater aquifers in the corridor region and comment on measures to avoid disturbing them
Drinking Water Quality	**B**	*An examination of the impacts on the Goulburn WTP performance due to obtaining water from a new source:* Compare water quality data between Wingecarribee Reservoir and the untreated Goulburn water supply* Review treatment processes employed at Goulburn WTP and consider whether they would be adequate to meet any new treatment challenges brought about by the new water source* Identify potential changes in aesthetic nature of the treated water that may be supplied to Goulburn and measures that may be required to warn the public or industrial users of the water * NB: if a decision is made by GMC to provide treated water from the Wingecarribee WTP to the Goulburn reticulation, these steps may not be required

Issue	Highest Allocated Risk Category[a]	Scope for Environmental Assessment
Soils, Geology and Contamination	A	*Desktop investigations in two broad areas:* Identify and discuss salinity and erosion risks associated with excavating through the Garland soils area, and potential impacts on pipeline infrastructure Identify any potential localised contamination spots (*e.g.* in vicinity of chemical / machinery storage sheds) that could be disturbed during construction
Traffic and Transport	C	Describe and provide a comment on traffic patterns that may be disturbed by construction activities, particularly when constructing across the Hume Highway, for input to a Traffic Management Plan
Social and Economic	A	*A comprehensive community engagement and stakeholder management program has been implemented. Additionally:* A review of socio-economic issues for the area to more fully assess the impacts of the project and to determine a profile of the pipeline corridor and the surrounding local area Survey stakeholder views and community responses to be considered in the assessment.
Noise and Vibration	B	*A construction noise and vibration assessment would be undertaken for the project. Occupants of noise sensitive properties would be consulted as part of this assessment. This would involve:* Identification of noise sensitive receivers and commentary on potential noise impacts and the severity of those potential impacts. Further investigations may include - - Noise monitoring for baseline noise levels (if required). - Modelling and predictions of noise levels (if required).
Air Quality	B	Desktop assessment of ambient air quality along the corridor, and provide comment on the air quality commitments to be met during the construction phase
Landscape and Visual Amenity	B	*Identify community requirements in relation to visual amenity issues (as part of the stakeholder engagement strategy):* Urban and landscape vision and design objectives would be documented where appropriate. Architect and landscape architect skills would be integrated in the design team to provide input on the aesthetics of the above ground structures.
Land use	B	*The EA would discuss the following with regard to the land uses and properties potentially affected by the Proposal:* The properties and land uses directly affected by and adjacent to the Proposal route, including identification of any areas identified as regional and State significant farmland. The potential impacts on the viability of these land uses (such as from land sterilisation and severance impacts) caused by the Proposal. Comment on potential mitigation measures to address potential impacts on land use and properties. Describe rehabilitation objectives and methods.

Issue	Highest Allocated Risk Category[a]	Scope for Environmental Assessment
Aboriginal and Non-Indigenous Heritage	A	*Detailed cultural heritage impact assessment of the items within the path of the project:* Review of existing data (such as the Heritage Office State Heritage Inventory / Aboriginal Heritage Information Management System) for records of known heritage sites and issues. Field investigations and comprehensive survey of the investigation corridor (with a focus on registered heritage items) by archaeologists. Issue of letters and newspaper advertisements to identify Aboriginal stakeholders with an interest in the Proposal to be involved with field investigations. Field investigations of the study area by archaeologists and representatives of the registered Aboriginal stakeholders. Provide input to design team on significance of the heritage items and issues associated with impacting on the items. Prepare a report assessing the significance of any identified and affected items, the significance of any impacts and recommending mitigation measures.
Greenhouse Gases	C	*Identify measures to provide for an efficient pipeline design that would minimise energy demands during pumping:* Ecological Sustainable Development (ESD): The EA would give consideration to how the Proposal and its elements address the principles of ESD. Sustainability in Design: Advice would be provided to the Design Team as to how sustainability considerations can be incorporated into the Proposal design. Quantification of potential greenhouse gas emissions associated with the Proposal's operation.
Resource Use and Waste/Spoil Management	B	Identify relevant waste management guidelines and actions for inclusion in the Construction Environmental Management Plan

[a] in accordance with the risk categories described in Section 6.4 (Category A the highest priority issue, C the lowest) and the assessments provided in Sections 7.2-7.14

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