



Volume 1

Environmental Assessment

Young to Wellington Gas Pipeline
On behalf of ERM Power Pty Ltd

Application Reference No. 09_0143



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Version	Date	Author	Reviewed By	Details
Draft 1	26 August 2009	Lisa King	Ray Keable	Internal review
Draft 1	26 August 2009	Lisa King	Larry Kramer	Client review
Draft 2	5 November 2009	Lisa King	Ray Keable	Internal review
Draft 2	5 November 2009	Lisa King	Larry Kramer	Client review
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1	23 April 2010	Lisa King	Larry Kramer	Amendment following adequacy assessment
2	19 May 2010	Lisa King	Larry Kramer	Amendment following second adequacy assessment

Executive Summary

ERM Power Pty. Ltd. proposes to construct a 219 kilometre natural gas pipeline from the Young gas hub centre on the Moomba to Sydney gas pipeline to the, newly approved, yet to be constructed, gas turbine peaking power station at Wellington.

LandPartners has been engaged by ERM Power to prepare a major project application for the proposal.

The Director-General of the Department of Planning, as delegate of the Minister for Planning, formed the opinion on 11 May 2009 that the project is one to which Part 3A of the Environmental Planning and Assessment Act 1979 applies. This Environmental Assessment has been prepared in response to the Director-General's Environmental Assessment Requirements issued on 22 July 2009 pursuant to Section 75F(2) of the Act.

Project approval under Part 3A is sought. It is necessary for the approval to endorse a corridor 100 metres wide, to allow route realignment in response to site specific environmental constraints, construction considerations, cultural heritage issues or additional landowner requirements that may arise during construction.

The proposed pipeline will:

- Have a route that minimises environmental, social and economic impacts on the locality;*
- Be designed and constructed in accordance with the Australian Standard and all applicable legislation and policy;*
- Operate bi-directionally; and*
- Be operated safely, efficiently and sustainably.*

The pipeline route was located as far as was practicable to avoid significant vegetation, dwellings, public land, sensitive waterways, known heritage sites, known threatened species, endangered ecological communities, towns or villages, infrastructure, steep land, known caves, pre-existing landuses etc. Several iterations of the route were revised after route inspections and cultural heritage survey.

The proposed route is located almost entirely on cleared, privately owned agricultural land. Vegetation of the catchment areas affected by the pipeline is over 90% cleared.

The proposed route requires several crossings of waterways, roads, railways and other infrastructure lines. These will be constructed with consideration of the environmental, stakeholder and construction requirements of each crossing.

The demographic attributes of each Local Government Area (LGA) through which the proposed pipeline passes are summarised below.

LGA	Area (km²)	Pipeline Length (km)	Population	Indigenous	Unemployed
Wellington	4,100	48	9,500	1,520	741
Cabonne	6,026	84	12,600	290	378
Cowra	2,810	56	13,000	793	637
Young	2,694	31	12,500	325	600
TOTAL	15,630	219	47,600	2,928	2,354

All affected landowners have been contacted regarding the proposal and to date 96% have agreed to provide access for further survey. A detailed program of consultation with Indigenous stakeholders has been undertaken prior, during and after the cultural heritage survey and assessment and this will be ongoing. Consultation with all other relevant stakeholders, such as government departments and other agencies, has also been commenced and will continue as required.

The pipeline will be designed, constructed, operated and maintained in accordance with AS2885 Pipeline gas and liquid petroleum and other relevant legislation and guidelines.

A number of key issues have been assessed in this Environmental Assessment and recommendations for their ongoing management, mitigation and monitoring provided. A general environmental risk analysis has shown that there are no additional issues of relevance.

The cultural heritage survey found eighteen sites of heritage significance. These have been registered in the Aboriginal Heritage Information Management System. Only eleven of these sites are located within the proposed construction corridor. The pipeline route will be realigned to avoid all sites. Monitoring of sites during construction will ensure their protection.

An ecological assessment has been undertaken for the proposed pipeline corridor and has determined that there is no likelihood of significant impact on threatened species, populations, communities or their habitats. Accordingly referral to the Commonwealth Minister for the Environment is not required.

A range of other matters can only be resolved in the detailed design process, with specific construction methods devised in response to site-specific environmental conditions. The draft Statement of Commitments identifies works and processes to be completed in the design, construction and operation stages.

The proposed pipeline is needed to supply a cost effective and more secure supply of adequate gas to the Wellington power station. The Alectown to Wellington gas supply pipeline proposed in the power station application is not sufficient to enable future expansion of the power station.

The project as proposed is justified on economic, social and environmental grounds. It is in the public interest that it proceeds. Detailed assessment indicates that the potential for adverse impacts can be minimised or mitigated through a range of construction methods.

Approval of the project is warranted, subject to conditions which reflect a reasonable need for additional assessment prior to construction and for appropriate mitigation and management measures during construction.

1. Introduction

1.1 Background

ERM Power Pty. Ltd. (ERM Power) proposes to construct a 219 kilometre natural gas pipeline from the Young gas hub centre on the Moomba to Sydney gas pipeline to the, newly approved, yet to be constructed, gas turbine peaking power station at Wellington (File No.: S06/01062, refer Figure 1).

LandPartners has been engaged by ERM Power to prepare a major project application for the proposal.

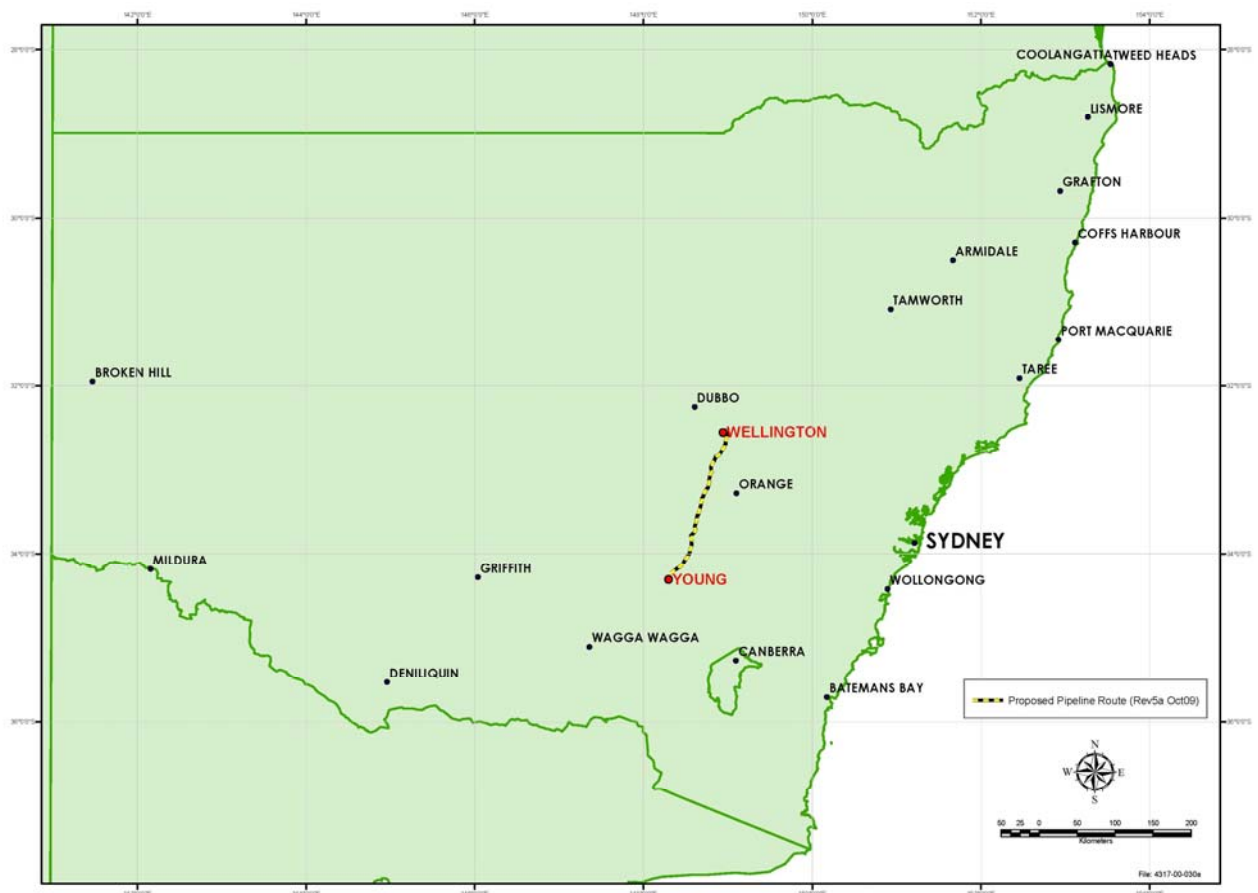


Figure 1. Locality Plan.

1.2 The Proponent

ERM Power has a history of more than 25 years in the energy sector. The business was founded as a small business in 1980, and has grown into an integrated energy company with high-performing business streams in gas exploration, transportation, generation, and electricity retail. ERM Power is one of the largest privately owned, vertically integrated, energy companies in Australia.

Currently, ERM Power has the following four distinct business streams:

1. Building and Financing Power Stations
2. Fuel Exploration (natural gas)
3. Transporting Gas to Power Stations
4. Selling Power to Large Customers (retail)

ERM Power's current power generation projects are summarised in Table 1. Each project also has an associated custom-built high pressure transmission and storage pipeline.

Table 1. ERM Power Pty Ltd – Planned and Proposed Projects

ERM Power Generation Project					Ownership	
Station Name	State	Status	Gas-Fired	MW	ERM	Balance
Oakey	QLD	Operating	Open Cycle Gas Turbine	303	12.5%	Contact Energy and other Babcock & Brown Origin Energy
Braemar 1	QLD	Operating	OCGT	450	0%	
Uranquinty	NSW	Operating	OCGT Combined Cycle Gas Turbine	450	0%	
Kwinana	WA	Operating	Turbine	320	30%	Sumitomo ANZIS Arrow Energy
Neerabup	WA	Operating	OCGT	330	50%	
Braemar 2	QLD	Operating	OCGT	450	50%	
Planned		Subtotal		2,303		
Braemar 3	QLD	DA submitted	OCGT	450	100%	
Wellington 1	NSW	DA approved	OCGT	600	100%	
Proposed		Subtotal		1,050		
		Total		3,353		

1.3 Approval Process

The Director-General of the Department of Planning (DoP), as delegate of the Minister for Planning, formed the opinion on 11 May 2009 that “the Young to Wellington Pipeline (YWP) is development of a kind that is described in Schedule 1 of State Environmental Planning Policy (Major Projects) 2005 – namely clause 26A “Development for the purpose of a pipeline in respect of which a license is required under the *Pipeline Act 1967*”, and is thus declared to be a project to which Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) applies for the purpose of Section 75B of that Act.”

A Planning Focus Meeting was held on 29 June 2009 to discuss the project. The meeting included a discussion of the main issues pertaining to the proposal, assessment requirements and included a route inspection. Representatives of relevant stakeholder agencies, the proponent and the consultant team attended the meeting. Minutes of the meeting are included in Appendix A.

ERM Power is seeking Project Plan approval for the construction and operation of the YWP. A 100 metre wide route corridor is proposed. This Environmental Assessment has been prepared in response to the Director-General’s Environmental Assessment Requirements (DGRs) issued on 22 July 2009 pursuant to Section 75F(2) of the EP&A Act. The DGRs are included in Appendix B of this report.

Project approval under Part 3A is sought for (as per the DGRs):

- Construction and preparation of temporary compounds, laydown yards, site offices etc.;
- Clearing and grading a right-of-way (RoW);
- Land access and surveying;
- Traffic management, including pipe haulage;
- Easement widths for construction of the pipeline;
- Trenching;
- Bored or directional drilling;
- Pipe stringing, welding, coating and laying;
- Backfilling and compacting;
- Hydro-testing;
- Revegetation and rehabilitation;
- Fencing and placing of marker signs;
- Routine operation and maintenance.

The proposed pipeline route and 100 metre corridor is indicated on the map series in Appendix C. Flexibility for the approved route is sought so as to enable the final route alignment to respond to site specific environmental constraints, construction considerations, cultural heritage issues or additional landowner requirements that may arise during construction.

This report has been amended following adequacy assessment in December 2009 and April 2010.

1.4 Structure of this Report

The DGRs are addressed in separate sections of this report as summarised below.

Requirement	Section of this Report
General Requirements	
Executive Summary	Executive Summary
Description of the proposal including construction, operation and crossings	2
Consideration of relevant statutory provisions	4
Key issues	5
Draft Statement of Commitments	6
Justification for the project including consideration of impacts, suitability of the site and public interest	7
Certification by the author	8
Key Assessment Requirements	
Strategic Planning and Project Justification	5.1
Land Use Planning Impacts	5.2
Ecological Impacts	5.3
Heritage Impacts	5.4
Human Amenity Impacts	5.5
Socio-Economic Implications	5.6
Hazard and Risk Impacts	5.7
Surface and Groundwater Impacts	5.8
Infrastructure Impacts	5.9
Traffic and Transport Impacts	5.10
Consultation	5.12
General Environmental Risk Analysis	5.13

This report is in two volumes; Volume 1 is the Environmental Assessment and Volume 2 contains the Technical Reports. The various report sections include the following information:

Volume 1			
Section 1	Introduction		Background to the project; overview of the proponent; description of the approval process and report structure
Section 2	Description of the Proposal		Project objectives and need; overview of route selection, description of pipeline construction, operation, maintenance and decommissioning activities
Section 3	Description of the Locality		Description of the social, economic and natural environment in which the project is proposed
Section 4	Regulatory Interaction		Overview of the regulatory framework that pertains to the proposal
Section 5	Key Issues		Identification of potential impacts on the key issues listed in the DGRs; assessment of the significance of any impacts on the social, economic and natural environment described in Section 3; recommended management measures
Section 6	Statement of Commitments		The measures the proponent is committed to undertake to mitigate any impacts (potential or otherwise) of the proposal
Section 7	Project Justification and Conclusion		Summary of the project benefits and impacts; assessment of the suitability of the site for the proposal, identification of any impacts on the public interest
Section 8	Certification		Certification of the report by the author
Section 9	References		
Section 10	Glossary		
Appendices	A to T		Supporting information and illustrations for the various sections of the report
Volume 2			
Technical Report 1	Preliminary Hazard Analysis by Sherpa Consulting		Specialist report addressing the hazards and risks to human health and safety from the proposed pipeline
Technical Report 2	Ecological Assessment By LandPartners Limited		Specialist report describing the natural environment and assessing the impacts of the proposal on native flora and fauna
Technical Report 3	Cultural Heritage Assessment and Consultation by CNC Project Management (Colin Pardoe)		Specialist report describing the cultural landscape of the locality, outlining the Indigenous consultation to date, preliminary findings and the ongoing investigations to be undertaken
Technical Report 4	Landholder Consultation Report by CNC Project Management		Specialist report summarising the results of landowner consultation to date
Technical Report 5	Indicative Groundwater Assessment by Rangott Mineral Exploration Pty. Ltd.		Assessment of the risk of encountering groundwater and recommended mitigation measures
Technical Report 6	Noise Assessment by Wilkinson Murray		Assessment of impacts of construction noise on sensitive receivers

2. Description of the Proposal

2.1 Project Objectives

The YWP will:

- Have a route that minimises environmental, social and economic impacts on the locality;
- Be designed and constructed in accordance with the Australian Standard and all applicable legislation and policy;
- Operate bi-directionally; and
- Be operated safely, efficiently and sustainably.

2.2 Project Need

The proposed pipeline is needed to supply a cost effective and secure supply of gas to the Wellington power station.

Wellington power station was expected to operate with a 5% capacity factor. With the increasing demand for gas-fired generation primarily arising from Australia's need to limit its carbon dioxide emissions, extended operation is now forecast earlier rather than later. In this context ERM Power has lodged an application to modify the power station approval (modification to the Project Approval No. 06_0315 lodged 5 March 2010) to include more flexible operation including as an intermediate plant with up to a nominal 40% capacity factor. ERM Power has concluded that it would be more efficient to obtain gas directly from the gas hub at Young rather than via the Central West Pipeline at Alectown because there is a limit as to how much gas can flow per hour, day and week on the Central West Pipeline. There is also possibility that an increase in gas demand from customers along the Central West and Central Ranges Pipelines all the way to Tamworth could further restrict the gas flow into the proposed Alectown Pipeline.

The proposed pipeline will have a larger diameter (406-508mm) than the approved Wellington to Alectown line so it can flow the expanded quantities of gas necessary compared to the existing Central West Pipeline which is only 219.1 mm for 130 km from Marsden to Alectown and only 168.3 mm for the remaining 125 km.

2.3 Pipeline Route

2.3.1 Route Selection

The pipeline route was chosen to minimise impacts on a suite of issues. Detailed constraints mapping was undertaken using high resolution satellite imagery and existing datasets pertaining to a suite of site characteristics including:

- Location of Communities & Residences
- Flora and Fauna

- Heritage
- Topography
- Vegetation
- Creeks and Rivers
- Property Boundaries
- Land use – existing and potential
- Existing Services & Infrastructure
- Land Tenure
- Geology
- Landscapes
- Mining Tenure

The route was located as far as was practicable to avoid significant vegetation, dwellings, public land, sensitive waterways, known heritage sites, known threatened species, endangered ecological communities, towns or villages, infrastructure, steep land, known caves, pre-existing landuses etc. Several iterations of the route were revised prior to route inspection.

Separation distances between dwellings and the pipeline, recommended after completion of a Preliminary Hazard Analysis (refer Volume 2: Technical Report 1), were also taken into account when selecting the route (refer Section 4.1.3 and 5.7 for further details).

The preliminary route was inspected on several occasions (October 2008, April 2009, June 2009, July 2009, September 2009 and October 2009) and further refinement of the route made in consideration of constraints confirmed on the ground and through landowner feedback.

2.3.2 Preferred Route

The preferred pipeline route is shown at Figure 2. This route may be further refined at the detailed design stage in response to specific site constraints and/ or additional landowner issues. Accordingly the route is located within a 100 metre corridor to allow for realignment if required. It is the route corridor for which approval is sought. The route corridor is shown on the map series in Appendix C.

Flexibility for the final pipeline alignment is requested to enable management of site specific environmental constraints, construction considerations, cultural heritage issues or additional landowner requirements that may arise during construction.

The constructed pipeline alignment will be located within a 20 to 30 metre wide easement which will be negotiated with each individual landowner. The pipeline is generally offset to one side of the easement to allow access down the other side for operational and maintenance activities.

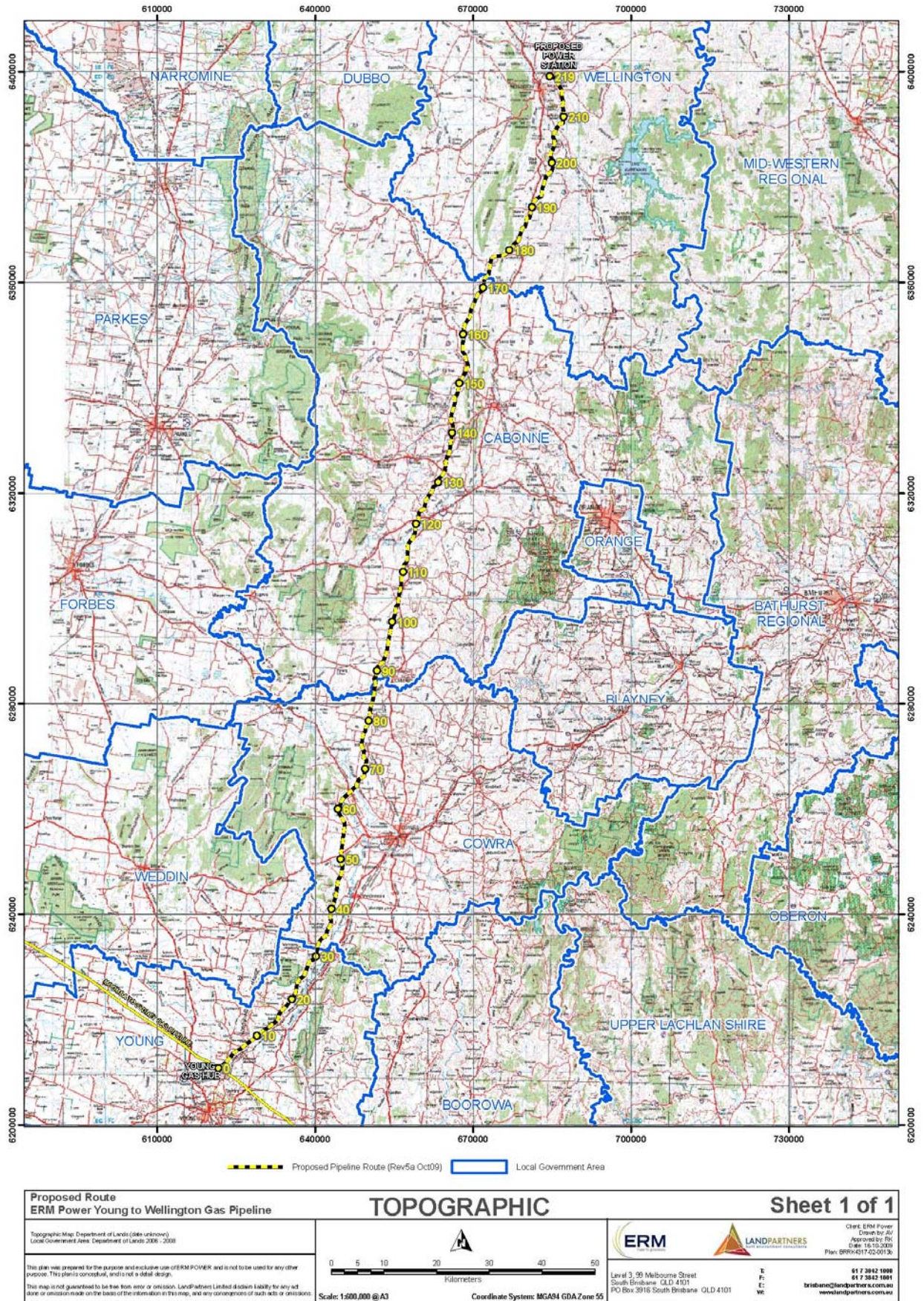


Figure 2. YWP Route – October 2009.

2.4 Pipeline Design

The pipeline will be designed in accordance with *AS2885 Pipeline gas and liquid petroleum*, in particular Part 1: Design and construction. Preliminary design parameters are summarised below. These are subject to change during the detailed design stage.

Parameter	Value
Maximum design pressure	15.3 MPa
Maximum operating pressure	15.3 MPa
Minimum operating pressure	2.5 MPa
Length	219 km
Outside diameter	Up to 508 mm
Wall thickness (for 508mm)	Standard – 9.0 mm (minimum) Heavy Wall – at crossings and other higher risk areas at locations to be confirmed at design stage and as directed by AS2885
Coating	HDPE fusion-bonded epoxy or tri-laminate
Burial depth	Minimum 750 – 1200 mm. Increased depth may be required at crossings, in proximity to dwellings etc.
Weighting	- Pipe weighting with concrete coating, saddle bags, or concrete weights in areas prone to flooding or inundation - Locations and weighting technique to be confirmed at design stage
Corrosion protection	- External coating protection; - Anode cathodic protection system - Post-construction Direct Current Voltage Gradient surveys (DCVG); - Ongoing potential monitoring; - If unexpected induced currents or telluric effects are indicated then an impressed current cathodic protection system may be installed.
Induced AC control	- Pipeline isolated from upstream and downstream facilities - Earthing systems where pipeline is required for high voltage powerlines
Corrosion monitoring	Cathodic test points at intervals to be confirmed at design stage.
Trench Breakers	Concrete Trench Breakers surrounding the pipe within the pipe trench to prevent trench erosion in steep areas at locations to be confirmed at design stage.
Marker tape (buried)	Installed at crossings and other higher risk areas at locations to be confirmed at design stage.
Marker signs	Generally 200m intervals, additional location requirements as per AS2885 (clause 4.4).
Mainline valves	Approximately 7 (using a Semi-Rural classification of 30 km intervals).
Valve station area	To be confirmed, location contained within pipeline easement boundaries.
Other	Scraper stations, P.I.G. launchers etc. as required for routine operation and maintenance.

2.5 Pipeline Construction

2.5.1 Construction Activities

The pipeline will be constructed in accordance with *AS2885 Pipeline gas and liquid petroleum*, in particular Part 1: Design and construction. Pipeline construction will encompass a range of activities such as:

Land acquisition

Negotiations will be undertaken with each landowner to facilitate land access and registering of the final pipeline easement. Landowner negotiations will also determine any specific landowner requirements for access, construction and restoration on each lot.

In due course landowners will be compensated for disturbance to cropping, livestock, and infrastructure on their land, including compensation for the easement area. The compensation assessment will take into account all claimable heads of compensation under the *Land Acquisition (Just Terms Compensation) Act 1991*. Landowner compensation will be determined by a Certified Practising Valuer.

Survey

Prior to construction a detailed route survey will be completed to prepare the final detailed design. This will include final location and survey of the pipeline alignment and pipeline bend points.

During construction, the boundaries of the construction RoW, typically 30 metres wide, are surveyed and marked. Special features such as valves, compound sites etc., will also be set out. Once the pipe is laid and prior to back fill an "As Constructed" location of the pipeline is surveyed and documented.

During and/or after restoration is completed a final easement will be surveyed with easement plans prepared for registration by the Land and Property Management Authority (LPMA).

Fencing

The RoW may be fenced prior to construction work commencing if required by individual landowners. Compound sites, laydown yards etc. may also be fenced as required. Fencing is predominantly used to restrict access of stock and individuals but will consider any required access by landowners. In exceptional circumstances fencing may form part of the final easement agreement.

Ancillary facilities

Ancillary facilities will be set up or constructed along the route. These include compound sites, laydown yards, site offices and construction camps (refer Plate 1). Ancillary facility areas will be located and prepared in the initial stages of the project.



Plate 1. Pipe laydown yard.



Plate 2. Pipe delivery.

Traffic management

A Traffic Management Plan (TMP) will be prepared as required for all project traffic movement. Consultation will be required with the NSW Roads and Traffic Authority (RTA) and Councils during preparation of the TMP.

Traffic movements will be sequential and concurrent. As the ancillary facility areas are prepared in the preliminary stages of the project, initial traffic movements will consist predominately of heavy earth moving machinery.

Pipe will then be delivered to laydown yards as it is manufactured and coated (refer Plate 2). The pipe manufacturing, if done locally, is expected to be at the rate of 20,000 to 25,000 metres per week.

Pipes will be transported to and from the laydown yards and to the RoW by semi-trailers from Australian mills and coating facilities or from ports if the pipe is imported. The pipes and other associated materials will be transported to laydown yards along the pipeline route and/ or local roads. Some pipes and materials may be moved by rail and then by road.

The number of truck movements will vary depending on the pipe weight (a factor of the diameter, thickness and length) and the road weight limits. In addition, some of the construction equipment, not available locally, will be transported by road.

Staff movements will be by light vehicle or bus on a daily basis from the camp/accommodation centres to the area of work for each crew. Supervising staff movements will typically be by light vehicles from the site offices along the RoW as required.

The TMP will be prepared when construction details are known, in the next stage of the process.

Clear and grade of the RoW

The RoW will be cleared, levelled and graded using graders, excavators and bulldozers.

Typically a 30 metre width is cleared to provide sufficient space to enable the project to be constructed in a safe and efficient manner. The width may be increased where necessary, such as adjacent to watercourses, to provide additional room for stockpiling vegetation and soil away from the watercourse; or minimised in sensitive areas to reduce the amount of clearing.

The actual width required will be based on:

1. Stockpiling topsoil and trench spoil separately;
2. Providing width for the trench construction;
3. Pipe placement, fabrication, welding, and coating space requirements; and
4. Safe vehicle and machinery access during work activities.

Large mature trees and other significant vegetation will be preserved where practicable. These will be marked prior to clear and grade. All other vegetation will be removed and stockpiled to one side of the RoW. Topsoil and subsoil will be stockpiled separately and not mixed. Any vegetation that can be salvaged and replanted will be stockpiled separately for use in restoration. Stockpiles will be adjacent to the area from which the material was cleared so as to allow reinstatement in the original location (refer Figure 3). Other cleared vegetation will be mulched and used in revegetation works.

To the extent practical, root stock will be left in the ground to stabilise the area and reduce erosion. Breaks will be left in stockpiled vegetation to allow continued access to stock, fencelines, tracks, and drainage lines.

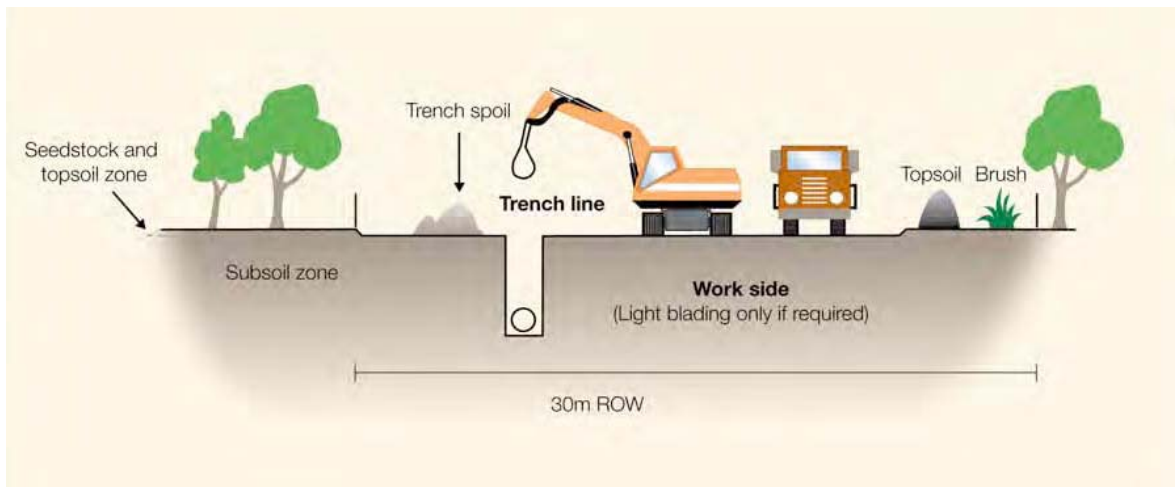


Figure 3. Indicative pipeline RoW showing stockpiles and work areas (source: Manidis Roberts, 2008).

Pipe stringing

Pipes are stored along the RoW on raised skids to protect the pipe coating from damage. Pipes are then laid out (strung) along the RoW in continuous lengths or strings (refer Plate 3) in preparation for welding. In order to match the vertical or horizontal profile of the trench some pipe lengths are bent in this phase prior to welding.

Trenching

The trench will be excavated to an appropriate depth to allow adequate coverage of the pipe. The depth of the trench is increased at roads, railways, in close proximity to residences, farm tracks that support heavy machinery and or traffic, areas of deep farm ripping, crossings of existing buried services and infrastructure, deep drains, and waterways crossings as required. Trench spoil (subsoil) is stockpiled on the RoW, separately to topsoil and vegetation, for use in backfilling (refer Plate 4).

A wheel trencher, rocksaw or excavator will be used to dig the trench. In hard rock terrain where the use of this equipment is not feasible, controlled blasting may be used. Should blasting be required, a Blasting Operation Procedure will be prepared, detailing the proposed method of blasting, including safety, drill pattern, charges, explosives, detonation methods and debris control, prior to commencement. Blasting activities are strictly controlled by legislation and standards and are only undertaken by suitably qualified personnel. Prior notice will be given to all affected landholders, construction crew and other potentially affected parties.

The distance covered per day by trenching will be dependent on terrain, equipment availability and weather conditions but typically an average production rate of approximately two to three kilometres per day will be achieved. The minimal practicable distance of trench will be left open, depending on the land use.

Breaks in the trench will be left to facilitate stock and wildlife crossing, agricultural vehicle movements, and at fences and drainage lines. In addition, various methods will be adopted to prevent fauna entrapment (e.g. trench breakers, ramped ends of trench, fauna ladders). Fauna egress points in the trench will be no more than 500 metres apart.



Plate 3. Pipe stringing.



Plate 4. Trenching.

Erosion and sedimentation control

Erosion and sedimentation control (ESC) is implemented wherever required along the RoW. Stockpiles may also require ESC depending on their location. A range of techniques can be employed including silt fencing, earth berms, gabions, sediment matting and revegetation (refer Plate 5).



Plate 5. ESC – sediment weir and silt fence.

Pipe welding and coating

Pipes will be welded together into strings, typically one to 1.5 kilometres in length, ready for laying. Joined pipe lengths may be reduced for difficult or sensitive sections. The pipe girth welds will be examined by Non-destructive Testing methods (NDT) in accordance with the requirements of AS2885.2 and repaired if necessary. After welding and inspection, pipes will be cleaned by grit blasting and a protective coating applied.

Pipe laying

Joined pipe lengths are lifted off skids, inspected and lowered into trenches using specially fitted side-boom tractors or excavators. Pipes may be laid on sand bags or other supports in the trench (refer Plates 6 & 7).



Plate 6. Pipe laying.



Plate 7. Pipe laying.

Backfilling, compacting and reinstatement

The trench is backfilled using subsoil stockpiled on the RoW (refer Plate 8). Backfill is compacted in the trench between layers (refer Plate 9). Pre-existing contours are then reshaped across the RoW and stockpiled topsoil reinstated. Prior to back fill an "As Constructed" location of the pipeline is surveyed and documented.



Plate 8. Backfilling.



Plate 9. Compacting.

Hydrostatic testing

Once the pipe is laid and the trench backfilled, hydrostatic testing can be undertaken. Hydro-testing is undertaken in accordance with the requirements of AS2885 by pumping water through the pipeline at a pressure greater than the maximum operating pressure to verify the integrity of the pipeline. The pipe is tested in isolated sections (i.e. between closed valves) and water reused for the following sections.

Hydro-testing procedures, including water sourcing and disposal, will be determined during the detailed design and construction phase. Water is normally sourced from existing water sources in the area such as dams or watercourses. Initial contact has been made with the Councils along the proposed pipeline route to ascertain their preferences for sourcing hydro-test and construction water. Wellington Council has responded that water can be provided on a cost recovery basis if required.

Restoration, revegetation and rehabilitation

Land disturbed by construction activities will be restored as closely as practicable to the condition it was in prior to construction. Restoration activities will commence as soon as practicable after the pipe is installed in the trench, and will be completed as soon as practicable after the RoW is no longer required for hydrostatic testing or other construction activities.

Restoration and rehabilitation measures will be applied to the RoW, access tracks and ancillary sites in consultation with the relevant landholder/owner. Generally restoration and rehabilitation will involve removal of foreign material (construction material and waste), surface contouring, respreading topsoil, respreading vegetation and reseeding (typically with native grass or other approved species).

Pre-existing contours and natural drainage lines will be restored and protected (if required). In certain cases rehabilitation is tailored to site specific conditions in consultation with the landholder. To promote vegetation regrowth and protect against the loss of topsoil the RoW surface will normally be lightly scarified prior to respreading of topsoil.

Rehabilitation will be undertaken in accordance with current best practice and landowner requirements and will ensure that:

1. Topsoil cover is re-established and all land and waterways disturbed by project activities are returned to a stable condition as soon as possible after construction;
2. Land is returned as close as possible to its previous productivity;
3. Stable landforms are re-established to original topographic contours;
4. Natural drainage patterns are reinstated;
5. Erosion control measures (e.g. contour banks, filter strips) are installed in erosion prone areas; and to the extent able; and
6. The pre-construction environment is reinstated and disturbed habitats will be recreated.

Final cleanup

Prior to commissioning and operation, a final cleanup of the pipeline RoW is undertaken. At this stage, restoration is reviewed to determine if additional works are required. ESC devices may be removed or left insitu/ re-established if erosion potential is still evident. Removal of RoW fencing is undertaken and any repairs or additional landowner requirements completed. Marker signs are installed and all remaining construction material removed.

2.5.2 Special Crossings

Waterway crossings

The proposed route includes approximately 177 watercourse crossings (refer Appendix D). The majority of these are minor and/ or non-perennial waterways or drainage gullies.

Watercourse crossings will be constructed using the method most appropriate to the crossing, having regard to the protection of the riparian zone, erosion potential and construction difficulty. Crossing methods will include:

- Minor watercourses, ephemeral streams and gullies will be crossed using an open cut construction method with appropriate erosion controls.
- Watercourses with standing or flowing water will be crossed by horizontal directional drilling, or if possible by an open cut method with water flow controls to minimise environmental impacts and conflict with water users.

In addition to pipe laying, temporary vehicle crossings may also be constructed to facilitate the movement of construction vehicles over watercourses.

To minimise the period of construction and subsequent environmental disturbance, watercourse crossings will be completed within the shortest period practicable. Significant watercourses will be constructed separately from the main line construction as major crossings with a specialist crew and specialised techniques to minimise time and disturbance.

Preferred methods for watercourse crossings will be finalised during the detailed design phase of the project, in response to conditions and requirements each of the crossings.

The two common methods for crossings are standard open cut and horizontal directional drilling, described below.

Standard open cut

Most watercourse crossings are expected to be constructed using standard open cut (trenching) construction. This technique is most suited to dry or low flow conditions. If water is present, flow diversion techniques can be employed to aid construction and minimise sediment.

The standard open cut method involves establishing a stable working platform either side of the watercourse and creating a trench using excavators. Tie-in points will be located on high ground well away from any water flow.

Watercourse bed and bank material and trench spoil will be stockpiled separately. Pipe string welding and concrete coating will generally occur prior to placement in the trench. The pipe may be concrete wrapped, sand bagged, or anchor weighted at watercourse crossings to protect the external coating and prevent the pipe from “floating” once in place.

Horizontal directional drill

Horizontal directional drilling (HDD) is employed to manage conditions such as soil instability, steep slope, permanent watercourses, areas of permanent inundation, swamps, subsurface rock, lack of access or available workspace and to minimise impacts on areas of environmental significance.

HDD involves drilling a pre-determined arc in both a horizontal and vertical direction beneath the waterway bed or area of environmental significance, and pulling the pipe through the drilled hole. The extent and depth of the arc is determined after detailed investigation of the waterway geotechnical attributes, the physical profile and groundwater profiles. Drilling is conducted by a specially designed drill rig, operated by a specialist contractor. A variety of associated equipment and infrastructure is also required. The HDD work area (equipment layout) usually exceeds the RoW width, being typically in the region of 50 metres. Pipe may be strung out along the RoW behind the drill entry point if there is a sufficient length of flat terrain behind the drill entry point.

Although directional drilling may reduce impacts to the bed and banks of watercourses, the technique introduces additional environmental considerations. These include drill site sediment control, drill mud (water based bentonite) management, potential for drill mud seepage through alluvial materials and waste management. Access for vehicles and equipment around the watercourse will be required resulting in the additional use, or creation of, access tracks. To address these issues site specific management procedures will be prepared prior to drilling.

The construction method for waterway crossings is determined with consideration of a range of criteria including, but not limited to:

- Watercourse depth and width and water flow;
- Weather;
- Riparian vegetation;
- Environmental significance;
- Landowner/ stakeholder concerns;
- Geology and soils;
- Occupational health and safety;
- Regulatory requirements;
- Heritage values;
- Traffic; and
- Construction constraints.

The final method, design and requirements of each waterway crossing will be determined at the detailed design stage in consultation with the relevant authorities. However, the Macquarie, Belabula, Bell and Lachlan River crossings will be undertaken using HDD.

Road or rail crossings

The proposed route includes 123 road or rail crossings (refer Appendix E), however only 28 of these are sealed roads of two or more lanes. There are five rail crossings.

Road or rail crossings can be undertaken using either an open cut or bored method. Paved road crossings may be bored reducing impacts on traffic flow and ensuring no damage to road pavement integrity. Boring is a low impact technique involving drilling short distances from below ground within an enlarged trench area (bore pit) either side of the road or rail within the RoW. The feasibility of using a bore is limited by site conditions including depth required, width of crossing, geology, landform, soil type and service / infrastructure locations.

Minor roads (including minor roads that are paved) will be crossed using open cut construction methods.

The most appropriate method for each crossing will be determined at the detailed design stage in consultation with local Councils and the RTA.

Other infrastructure crossings

The pipeline may also cross other infrastructure easements such as powerlines and easements, other gas lines, water supply lines, phone lines, optic fibre lines etc. The location of all infrastructure crossings buried and above ground will be surveyed and located during detailed route survey and design. Prior to construction all buried services will be physically located by pot holing or by controlled excavation.

Known infrastructure crossings are listed in Appendix F. As for road and rail crossings, other infrastructure crossings will use either an open cut or bored method. The most appropriate method for each crossing will be determined at the detailed design stage in consultation with the infrastructure service provider.

2.5.3 Construction Management

Construction hours

Construction hours will generally be between 6am and 6pm seven days per week. If work is to occur outside of these hours nearby residents will be notified.

In general pipeline construction projects are undertaken on a 24 hour a day, seven days a week basis. This is so that experienced construction personnel, usually working remotely, can be scheduled for work and rest effectively e.g. three weeks on, one week off etc. Also some activities, such as tunnelling or boring, must be completed once

commenced. Other activities, such as moving equipment and pipes by major roads, are best implemented after hours to reduce other impacts e.g. on traffic and safety. A shorter project duration, on balance, may be more acceptable than a short burst of noise. In addition, construction laydown areas and/or campsites, by their very nature, will have some activity 24 hours a day, seven days a week.

The general philosophy of the project will be to limit construction activity to between 6am and 6pm where work is being undertaken in proximity to human receptors. Where there are no receptors close by, work will be undertaken, if required, on a 24 hour basis. This is in keeping with standard construction practise such as that employed by road authorities and pipeline contractors.

Construction workforce

A construction workforce peak of approximately 200-250 personnel is expected during the construction period. It is anticipated that a construction camp will be required although some workers may also be accommodated in the various towns. The location and design of the camp, if required, will be finalised at the detailed design stage in consultation with relevant landowners and consent authorities. There may be the requirement for two construction camps along the route to reduce travel times and to accommodate various construction activities spread out over the pipeline length.

Construction plant and equipment

A variety of plant and equipment will be required over the life of the project, including (but not limited to):

- Four wheel drive vehicles
- Graders
- Dozers
- Excavators
- Backhoes
- Trenching machines
- Drilling rigs
- Padding machines
- Tip trucks
- Tray trucks
- Semi-trailers
- Front-end Loaders
- Water trucks
- Cranes
- Tractors

Construction timing

Construction activity from the time of RoW clearing through to rehabilitation is expected to take approximately four to five months. The pipeline is required to be operational prior to commencement of the plant testing of the Wellington power station.

Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) will be prepared for the project. The CEMP will address all environmental management requirements of approval as well as outlining best practise environmental management for the project overall. An example table of contents for the project CEMP is included in Appendix G. The CEMP will be prepared during the detailed design stage of the project; prior to the commencement of construction.

2.6 Commissioning and Operation

The pipeline will be operated in accordance with AS2885 Pipeline Gas and Liquid Petroleum, in particular Part 3 – Operation and maintenance.

2.6.1 Commissioning

Commissioning encompasses a range of activities including:

Instrumentation calibration

All instrumentation will be calibrated in accordance with relevant standards, guidelines and manufacturer's instructions.

Performance testing

All equipment will be tested to ensure performance is in accordance with design specifications, and/ or relevant standards and guidelines. Repairs and retesting are undertaken if required.

Baseline inspection

A baseline inspection of the pipeline using a Pipeline Inspection Gauge (PIG) will be undertaken to inspect the pipeline for defects and collect initial data for comparison during regular maintenance pigging.

Pipeline drying

Specialised PIGs are used to dry any remaining hydro-test water in the pipeline prior to loading.

Purging and loading

The pipeline may be purged of air prior to loading. Alternatively, loading may be done without purging under strictly controlled conditions.

2.6.2 Operation

As the pipeline is buried, pre-existing land use activities can be resumed during pipeline operation as per the easement agreements. Restriction on land use activity during operation applies to any excavation activities and/or buildings on the pipeline.

Pipeline operation is not noticeable by the public or land users. Gas flows entering and exiting the pipeline are nominated on a daily basis, depending on fluctuations in the demands of the power station. Gas flow is controlled electronically by a Supervisory Control and Data Acquisition (SCADA) system which monitors gas movements and the status of the pipeline including pressure, temperature, valves, flows and system integrity. The SCADA system is an interactive system that allows remote opening and closing of valves and other activities. These pipeline activities would be done either at the Young MSP office or at the Wellington power station as part of their daily activities.

Operational monitoring and maintenance activities focus on the pipeline and the easement. The main risk to a buried pipeline is inadvertent damage by third parties. Prevention measures installed during the construction phase such as burying the pipe, marker signs, buried marker tape, concrete slab covers, fencing, etc., help mitigate against the potential for damage.

An important proactive activity during the operating phase is monitoring existing local activities such as construction, earthmoving or excavation, in proximity to the pipeline.

The Operation Environmental Management Plan (OEMP) will address how to monitor and control such issues as weed control, impacts on native flora and fauna, pipeline subsidence, erosion, heritage management, bushfire, gas leakage or explosion, noise, disturbance of landuse, soil/ water/ air pollution etc.

Long term monitoring of pipeline corrosion is an industry standard. Pipeline corrosion is prevented by external pipeline coating and cathodic protection systems.

Monitoring activities would include regular inspections of:

- The cathodic protection system
- Easement revegetation/ rehabilitation success
- Gas flow metering
- Easement erosion, weed outbreak or landuse incursions
- Above ground infrastructure

Maintenance activities will include:

- Painting or lubricating of above ground infrastructure such as signs, fences, valves etc.
- "Pigging" of the pipeline (running a Pipeline Inspection Gauge)
- Corrosion repair
- Replacement of Pipeline Markers
- Easement clearing and slashing

2.7 Decommissioning

The design operational lifetime of gas pipelines is currently 40 years, at which time decommissioning is required. The Moomba to Sydney and the Roma to Brisbane pipelines are both over 40 years old and still operating. Pipeline decommissioning is generally undertaken using one of two main methods:

- Suspension – the pipeline is depressurised, capped and filled with an inert gas such as nitrogen. The pipeline cathodic protection system is maintained to ensure the pipeline does not corrode.
- Abandonment – the pipeline is disconnected from all infrastructure, purged and plugged at predetermined intervals. All above ground structures are removed including the cathodic protection system. The pipeline is left to corrode in the ground. A stable material, such as concrete, may be inserted into the pipeline at some locations such as waterway or road crossings.

Whatever method is employed, the pipeline easement is returned to its pre-existing condition, as much as practicable. Physical removal of a pipeline is not normally undertaken due to the environmental impacts and cost involved.

A Decommissioning Plan will be prepared prior to decommissioning of the pipeline. Consultation with relevant stockholders and landowners would be undertaken to inform the Plan.

3. Description of the Locality

3.1 Regional Context

3.1.1 Business Regions

The NSW Department of State and Regional Development (DSRD) identifies 15 business regions in the State, including Sydney. Regional Business Growth Plans have been developed for most of these regions by the DSRD. These Business Plans are required under the NSW State Plan and assist to meet the objectives of that plan.

The proposed pipeline passes through the business regions of Orana (48km or 22%), Central West (140km or 64%) and South Eastern (31km or 14%) (refer Figure 4). Development of infrastructure is identified as a regional opportunity in the Orana and Central West Regional Business Growth Plans. A Business Growth Plan has not yet been prepared for the South Eastern Business Region.



Figure 4. NSW Business Regions (source: http://www.business.nsw.gov.au/NR/rdonlyres/46AF3EB8-507C-4834-803A-7266A64DBB80/0/LIVE_WORK_SYDNSW_072008.pdf)

The Orana Region

The Orana Region is the largest business region by land area in NSW covering 199,078 square kilometres. It encompasses 13 Local Government Areas (LGAs). The Wellington LGA is within the Orana Region. The major centres of the Region are Cobar, Dubbo and Mudgee. The main industry of the region is agriculture with food processing, tourism, mining and wine production also important (DSRD, undated).

The Central West Region

The significant majority of the pipeline passes through the Central West Region. Both the Cabonne and Cowra LGAs are within this region. With an area of 63,262 square kilometres, the Central West Region has the largest population of any western region and encompasses 12 LGAs. The main towns are Bathurst, Cowra, Forbes, Lithgow, Orange and Parkes. The main industries of the region are agriculture, mining, food processing, manufacturing and tourism (DSRD, undated).

The South Eastern Region

The South Eastern Region stretches 52,138 square kilometres south from Crookwell to the Victorian border, east along the Far South Coast and west to Young. There are 13 LGAs within the Region and over 200,000 people. Young LGA is within this region. The region supports a wide range of primary industries including beef, lamb and sheep products, dairy, wineries, as well as fishing and forestry (DSRD, undated).

3.1.2 South Western Slopes Bioregion

Australia is delineated into 85 bioregions that capture the large scale geophysical patterns across the landscape. There are 17 bioregions within NSW; two of these lie wholly within the state while the other 15 share area with neighbouring states (DECC, 2003).

The proposed pipeline route falls within the South Western Slopes Bioregion (SWSB). The SWSB extends from north of Wellington through southern NSW into central Victoria. The Bioregion covers an area of 8,657,426 hectares with about 8,070,608 hectares or 93.22 per cent occurring in NSW (refer Figure 5) (DECC, 2003). The proposed pipeline corridor (220km x 0.1km) covers an area of 22 hectares or 0.00025% of the bioregion.

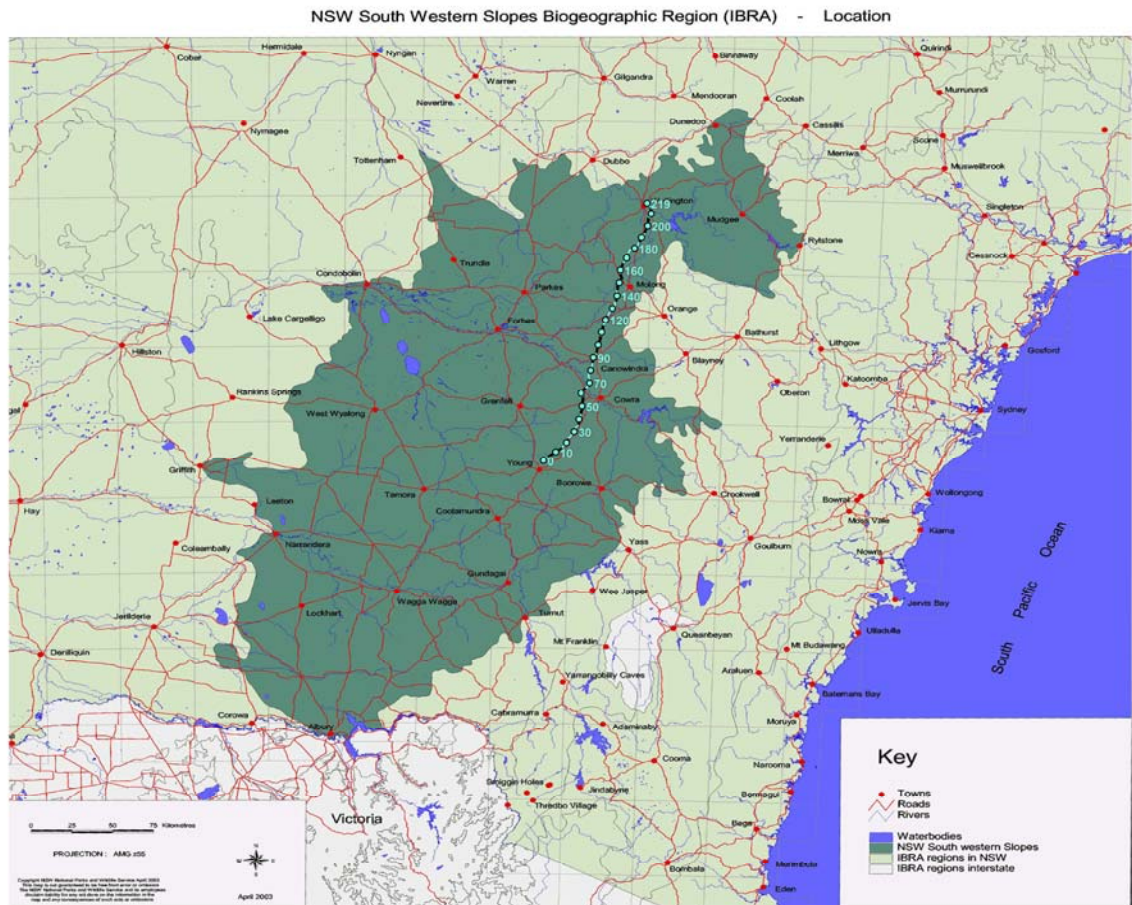


Figure 5. South Western Slopes Bioregion – NSW portion (source: DECC, 2003).

The SWSB is characterised by extensive areas of foothills and isolated ranges comprising the lower inland slopes of the Great Dividing Range. The Bioregion includes parts of the Murray, Murrumbidgee, Lachlan and Macquarie River catchments (DECC, 2003).

3.1.3 Catchment Management Authority Areas

The proposed pipeline route falls within the Catchment Management Authority (CMA) areas of the Central West and Lachlan (refer Figure 6). One hundred and fifty-three kilometres or 70% of the pipeline route falls within the Lachlan CMA area; with the remainder (66km or 30%) found within the Central West CMA area.



Figure 6. CMA areas including Lachlan and Central West (source: <http://www.cma.nsw.gov.au/>).

Central West CMA

The Central West catchment includes the Castlereagh, Bogan and Macquarie River valleys. The proposed pipeline intersects the Macquarie River about ten kilometres south of Wellington. The Macquarie River is formed by the joining of the Campbell and Fish Rivers, which drain a high plateau area centred near Oberon with a general elevation above sea level of 900 to 1000 metres. The river flows northward through steep gorge areas in the Hill End area and is impounded by Burrendong Dam upstream of Wellington (Central West CMA, 2008).

Temperatures in the east of the catchment vary from a winter average minimum of zero degrees Celsius to a summer average maximum of 25 degrees Celsius. Average annual rainfall is about 900 millimetres in the eastern part of the catchment (Central West CMA, 2008).

Most of the land surface in the upper part of the Macquarie Valley upstream of Dubbo is formed on and underlain by ancient fractured rocks, both igneous and sedimentary. These rocks were deposited more than 350 million years ago, and have been folded, faulted, metamorphosed and intruded by granites (Central West CMA, 2008).

Soils of the catchment vary from sandy textured soils that are susceptible to erosion on the Tablelands to colluvial and alluvial soils that are less fragile and have higher nutrient levels on the slopes, and alluvial and Aeolian soils, higher in fertility, cation exchange capacity and clay content, in the valleys (Central West CMA, 2008).

Vegetation of the catchment, now 90 percent cleared, includes a complex mosaic of forests, temperate and semi-arid woodlands, wetlands, shrublands, heaths and grasslands (Central West CMA, 2008).

Lachlan CMA

The Lachlan CMA area encompasses the Lachlan River valley and covers an area of approximately 84,700 square kilometres. The proposed pipeline intersects the Lachlan River about 12.5 kilometres northwest of Cowra. The landform of the Lachlan valley varies from the headwaters and tablelands, to the slopes and plains. Soils are old and very weathered and, therefore, fragile, chemically infertile and with relatively low levels of organic matter (Lachlan CMA, undated).

Geology is complex, which has a significant impact on salinity. Broad vegetation types include forests, woodlands, mallee, riverine communities, shrublands, heaths and grasslands, with over 114 different plant communities recognised. Over 32 amphibians, 109 reptiles, 337 birds and 78 mammals have been recorded across the catchment (Lachlan CMA, undated).

Climate varies from relatively hot summers to cool winters. Rainfall is variable across the catchment. The Lachlan River is intermittently connected to the Murrumbidgee River when both rivers are in flood. The River terminates in wetlands and effluent (diverging) creeks in the lower part of the catchment. These effluent streams include the Willandra, Merrowie and Middle Creeks (Lachlan CMA, undated).

3.2 Local Context

The proposed pipeline passes through four LGAs. The majority of the pipeline is within the Cabonne LGA (84km or 38%). Fifty-six kilometres (26%) is within the Cowra LGA, 48 kilometres (22%) is within the Wellington LGA and 31 kilometres (14%) is within the Young LGA. LGA boundaries are shown on Figure 2 and on the map series in Appendix C.

3.2.1 Wellington LGA

Wellington LGA is the northernmost LGA affected by the proposed pipeline and is located 362 kilometres northwest of Sydney and covers an area of approximately 4,100 square kilometres. Just over 9,500 people (DSRD, undated) live within the Wellington LGA, while the town of Wellington has a population of approximately 4,100 people (ABS, 2009). Wellington is situated at the foot of Mt Arthur and at the junction of the Bell and Macquarie Rivers. Wellington is the second oldest town west of the Blue Mountains (WC, undated). Agriculture (wheat, wool, beef, fat lambs) is the main industry in the Wellington LGA. Tourism is also important to the area.

3.2.2 Cabonne LGA

The pipeline also passes through the Cabonne LGA, which is located approximately 350 kilometres west of Sydney. The Cabonne LGA has an area of 6,026 square kilometres and a population of over 12,600 people. The main industry is agriculture with mining, wine production and tourism also important. The area is known locally as the “food basket of Australia” due to the variety of food it produces (Cabonne Country, 2009). The main administrative centre for the Cabonne LGA is Molong with a population of around 2,000 (ABS, 2009).

3.2.3 Cowra LGA

The Cowra LGA is 310 kilometres west of Sydney, has an area of approximately 2,810 square kilometres and has a population of around 13,000 people (CSC, undated). The administrative centre of Cowra Shire is the town of Cowra with a population of approximately 8,400. The main industry of the Cowra LGA is agriculture and mining (ABS, 2009).

3.2.4 Young LGA

The Young LGA is located approximately 350 kilometres southwest of Sydney. The LGA has a population of around 12,500 people while the township of Young accommodates just over 7,000 people. The young LGA encompasses an area of approximately 2,694 square kilometres and the main industry is agriculture, mainly sheep, beef cattle, pigs and cereals (ABS, 2009).

3.3 Existing Environment

3.3.1 Geology, Soils and Landform

Geology

The SWSB lies within the eastern section of the Lachlan Fold Belt which is a series of north to northwest trending folds of Cambrian to Early Carboniferous sedimentary and volcanic rock. Granite is common and occurs as large scale upfolded bodies of rock in central basins surrounded by hills of metamorphics or plateaus with rocky outcrops. The Bioregion features hilly landscapes of sedimentary or volcanic rocks with valleys of granite or softer rocks such as shale or slate (DECC, 2003).

In the west and north of the Bioregion, wide valleys with Quaternary alluvium and lakes dominate. Some areas of Tertiary basalt overlaying river gravels and sand also occur. At the very western edge of the SWSB, the alluvial fans of the Darling Riverine Plains Bioregion overlay bedrock (DECC, 2003).

The Bioregion also contains several limestone outcrops and associated karst topography. Wellington Caves, for example, contain an abundance of extremely important Tertiary and Quaternary vertebrate fossils (DECC, 2003).

Soils

Soils of the SWSB are predominately shallow and stony on ridges and hills while valley soils consist of weathered rock overlaid by coarse material from slopes. Subsoils may have poor drainage and soluble salt. Alluvial sands and loams are more common than clays except nearer the Riverine Plain. A considerable quantity of wind-blown silt and clay has accumulated across the landscape from western NSW during the Quaternary (DECC, 2003).

Landform

Landform in the SWSB is comprised of the foothills and ranges of the Great Dividing Range along its eastern boundary graduating to the Riverine plains to the west (DECC, 2003). The topography of the Bioregion is depicted on Figure 7.

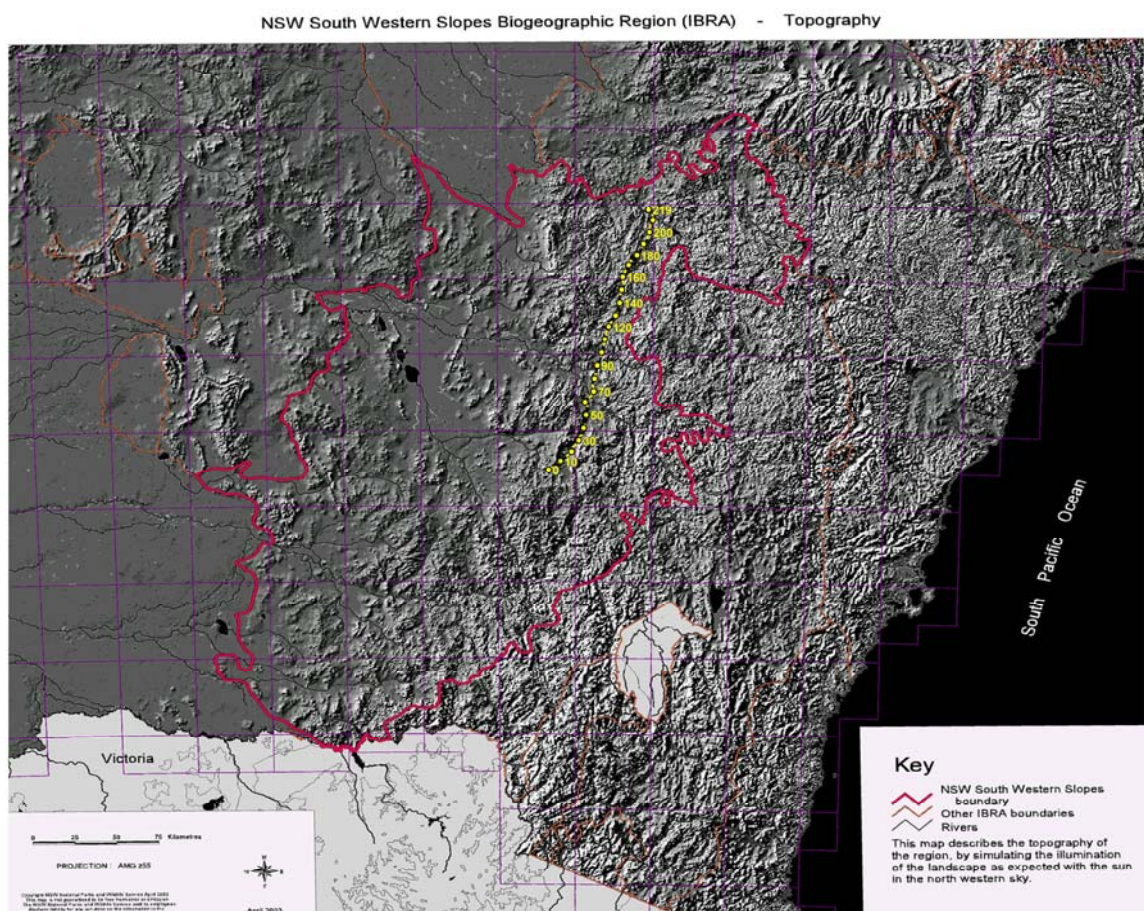


Figure 7. Topography of the South Western Slopes Bioregion (source: DECC, 2003).

Geology and Landform (landscape) maps for the pipeline length are included in Appendices H and I.

Contaminated land

All four Councils were contacted regarding locations of known contaminated sites within their LGA. There are no known contaminated sites within or in proximity to the pipeline route.

Mineral resources

The pipeline passes through several areas of mining tenure (refer Appendix J). Potential resources include predominantly Group 1 (metallic) minerals such as antimony, arsenic, bismuth, cadmium etc. and some Group 2 (non-metallic) minerals such as agricultural lime, apatite, asbestos, barite, bauxite etc.

3.3.2 Air Quality

Meteorology

Air quality is affected by various meteorological conditions including primarily wind speed and direction as well as local topography. Long term data (1971-2000) held by the Bureau of Meteorology (BoM) for the locality can be accessed at <http://www.bom.gov.au/climate/averages>. This data, recorded at Young and Wellington, indicates that wind speed is reduced in winter and is predominantly from the southeast.

Ambient air quality

Parsons Brinckerhoff undertook a detailed Air Quality Impact Assessment for the proposed (now approved) Wellington power station and Alectown to Wellington pipeline project (PB, 2008). The Assessment utilised background air quality data from Bathurst, Bargo and Bringelly recorded by the NSW Department of Environment and Conservation (DEC) in 2004 and 2005 (see Appendix K). The data can be extrapolated to depict the area between Wellington and Young (as it was for Wellington to Alectown) to show that existing air quality is within recommended limits.

Minor exceedances recorded in PM₁₀ and O₃ during this period were likely site specific and due to traffic emissions during the summer months. There is no evidence to suggest these exceedances would be found in air quality data for the Wellington to Young area, if it existed. Therefore the assumption is that ambient air quality in the area of the proposed pipeline is in compliance with all relevant air quality goals.

3.3.3 Noise Environment

Existing noise environment

Parsons Brinckerhoff undertook a detailed Noise and Vibration Assessment for the proposed (now approved) Wellington power station and Alectown to Wellington pipeline project (PB, 2008). The Assessment included the collection of background noise levels at four sites surrounding the Wellington power station site. These are summarised below:

Time	Rating Background Level (RBL) Range – All Sites
Daytime (7am – 6pm)	23.5 – 47.5 dB(A) L_{Aeq}
Evening (6pm – 10pm)	22.5 – 42 dB(A) L_{Aeq}
Night-time (10pm – 7am)	22 – 36.5 dB(A) L_{Aeq}
Source: PB, 2008	

The above data was collected using both attended and unattended monitoring methods.

The above noise levels are classified as rural, the quietest classification possible according to the Industrial Noise Policy (EPA, 2000). These findings are taken to represent the noise environment over the entire length of the proposed pipeline route.

3.3.4 Biodiversity

South Western Slopes Bioregion

The SWSB is dominated on the upper slopes in the east by woodlands and open woodlands of white box (*Eucalyptus albens*) and in the west and north by vegetation communities dominated by grey box (*Eucalyptus microcarpa*) and white cypress pine (*Callitris glaucophylla*). Other tree species characteristic of the upper slopes of the Bioregion include:

- red stringybark (*Eucalyptus macrorhyncha*) on higher slopes,
- black cypress pine (*Callitris endlicheri*),
- kurrajong (*Brachychiton populneum*),
- red ironbark (*Eucalyptus sideroxylon*),
- white gum (*Eucalyptus rossii*),
- yellow box (*Eucalyptus melliodora*),
- Blakely's red gum (*Eucalyptus blakelyi*) on lower slopes,
- rough-barked apple (*Angophora floribunda*) on flats, and
- river oak (*Casuarina cunninghamii*),
- river red gum (*Eucalyptus camaldulensis*) along streams (DECC, 2003).

The lower slopes of the Bioregion are characterised by Dwyer's mallee gum (*Eucalyptus dwyeri*) communities on granite, red ironbark on sedimentary rocks, and hill red gum (*Eucalyptus dealbata*), white cypress pine and red stringybark in the ranges. Grey box woodlands with yellow box, white cypress pine and belah (*Casuarina pauper*) are found in lower areas. Other tree species characteristic of the lower slopes of the Bioregion include:

- poplar box (*Eucalyptus populnea*),
- kurrajong,
- wilga (*Geijera parviflora*),
- red box (*Eucalyptus intertexta*) in the north,
- bull mallee (*Eucalyptus behriana*),
- blue mallee (*Eucalyptus polybractea*),
- green mallee (*Eucalyptus viridis*),
- congoo mallee (*Eucalyptus dumosa*) in the central west,
- myall (*Acacia pendula*),

- rosewood (*Heterodendrum oleifolium*),
- yarran (*Acacia homalophylla*) on grey clays,
- yellow box,
- poplar box,
- belah on alluvial loams,
- river red gum on all streams, with
- black box (*Eucalyptus largiflorens*),
- lignum (*Muehlenbeckia cunninghamii*),
- river cooba (*Acacia stenophylla*) in the west (DECC, 2003).

There are 36 threatened flora species listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act) in the SWSB. Thirteen of these are endangered, 22 are listed as vulnerable and one species, *Euphrasia arguta*, is considered extinct (DECC, 2003).

There are 67 threatened fauna species listed under the TSC Act in the SWSB. Thirteen of these are listed as endangered and 54 are listed as vulnerable (DECC, 2003).

There are three bioregionally significant wetlands in the SWSB; the Barmedman/Yiddah Creek Floodplain, Lake Burrendong Reservoir and Wiesners Swamp in the Weisners Swamp Nature Reserve (DECC, 2003).

Only 2.28 percent of the Bioregion has conservation tenure, with approximately half of that (1.2%) as nature reserve or national park (under the *National Parks and Wildlife Act 1974*). The remainder is either Crown reserve (0.02%), private landowner agreement (0.99%), Aboriginal site (0.0003%) or flora reserve (under the *Forestry Act 1916*) (0.06%). A further 1.43 percent of the Bioregion is managed State forest (DECC, 2003).

Vegetation mapping

Vegetation maps, drawn from vegetation mapping undertaken by the Department of Environment and Climate Change (DECC) in 2008, are included in Appendix M. The proposed pipeline route traverses predominantly cleared agricultural land. Other vegetation communities encountered (i.e. adjacent to or traversing), according to the DECC mapping, include:

- Sand Plains Mulga Shrubland
- Floodplain Transition Woodland
- Western Slopes Dry Sclerophyll Forest
- Aeolian Chenopod Shrubland
- Semi-Arid Sandplain Woodland
- Southern Tablelands Wet Sclerophyll Forest
- Western Slopes Grassy Woodland
- Inland Riverine Forest

Endangered ecological communities

A review of the existing vegetation mapping (refer Appendix M) and the descriptions within the scientific determinations for the endangered ecological communities (EECs) listed under the TSC Act found that there are six EECs occurring in the SWSB. They are:

- White box – yellow box – Blakely’s red gum woodland;
- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions;
- Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt bioregions;
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions;
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions; and
- *Acacia loderi* shrublands.

A search of threatened ecological communities listed under the EPBC Act via the online environmental reporting tool (<http://www.environment.gov.au/erin/ert/index.html>) identified that there are three such communities recorded within 30 kilometres of the site. They are:

Community:	Status:
• Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered
• Weeping Myall Woodlands	Endangered
• White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered

There are also two aquatic EECs listed under the *Fisheries Management Act 1994* (FM Act) within the locality; they are:

- Aquatic ecological community in the Natural Drainage System of the Lowland Catchment of the Darling River” (‘Darling River EEC’).
- “Aquatic ecological community in the Natural Drainage System of the Lowland Catchment of the Lachlan River” (‘Lachlan River EEC’).

Threatened species

A search of the NSW National Parks and Wildlife Service (NPWS) Atlas of NSW Wildlife (Atlas) identified nine plants listed as threatened under the TSC Act recorded within a 30 kilometre radius of the proposed pipeline. Seven of these species are also listed under the EPBC Act.

There are 42 animals listed as threatened under the TSC Act recorded on the NPWS Atlas within a 30 kilometre radius of the proposed pipeline. Eight of these species are also listed under the EPBC Act. The list of threatened flora and fauna is included in Appendix N.

A search of flora and fauna listed as threatened under the EPBC Act via the online environmental reporting tool (<http://www.environment.gov.au/erin/ert/index.html>) identified that there are 30 threatened species recorded within 30 kilometres of the site. The threatened species and other matters protected under the EPBC Act (eg migratory species, marine species, commonwealth lands etc.), are found in the report from the environmental reporting tool included in Appendix O.

There are four threatened aquatic species listed under the FM Act in the locality. These are also listed in Appendix N.

3.3.5 Hydrology and Water Quality

Rainfall

Long term rainfall data held by the BoM for Young and Wellington is summarised below. Rainfall is highly variable over time but average rainfall is similar for all months.

Location	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Mean rainfall (mm) - Wellington Agropflow (1881 - 2008)	59.2	51.8	48.8	45.5	47.4	50.8	49.0	49.7	44.0	56.3	57.8	54.5
Mean rainfall (mm) - Young Airport (1995 - 2008)	46.6	40.3	28.0	25.8	37.3	65.7	61.8	54.1	54.9	49.2	57.9	47.9

Source: <http://www.bom.gov.au/climate/averages/>

Surface water

The major river systems draining the SWSB are, from north to south; the Macquarie River, the Lachlan River, the Murrumbidgee River and the Murray River. These river systems are depicted on Figure 8.

NSW South Western Slopes Biogeographic Region (IBRA) - Rivers



Figure 8. Rivers systems in the South Western Slopes Bioregion (source: DECC, 2003).

The proposed pipeline will cross the major waterways of the Macquarie River (including a major tributary – the Bell River) and the Lachlan River (including a major tributary – the Belabula River). The Macquarie River/ Darling River system supports an irrigation network in the Orana Region that covers 164,556 hectares. The Lachlan Valley River system supports approximately 90,000 hectares of land licensed for irrigation use (DSRD, undated).

Macquarie River

There are two main dams on the Macquarie River – the Windamere Dam on the Cudgong River upstream of Mudgee and the Burrendong Dam at the junction of the Macquarie and Cudgong River just upstream of Wellington. There are also several weirs on the Macquarie River including at Dubbo, Narromine, Gin Gin and Warren (Central West CMA, 2008).

Lachlan River

The main infrastructure on the Lachlan River is the Wyangala Dam, at the junction of the Lachlan and Abercrombie River, 50 kilometres upstream of Cowra. There are several other water storages on the River, including the Carcoar Dam, Lake Cargelligo and Lake Brewster, and a number of weirs (Lachlan CMA, undated).

Groundwater

The location, accessibility and quality of groundwater in NSW varies across the state. Groundwater quality can be measured in terms of salinity, with salinity levels across NSW ranging from that of rainwater to concentrations ten times greater than that of sea water. Groundwater quality is generally deteriorating across the state, however over 130 communities in NSW are reliant on groundwater for their water supply. Figure 9 depicts the location and quality of groundwater resources in NSW (DLWC, 1998).

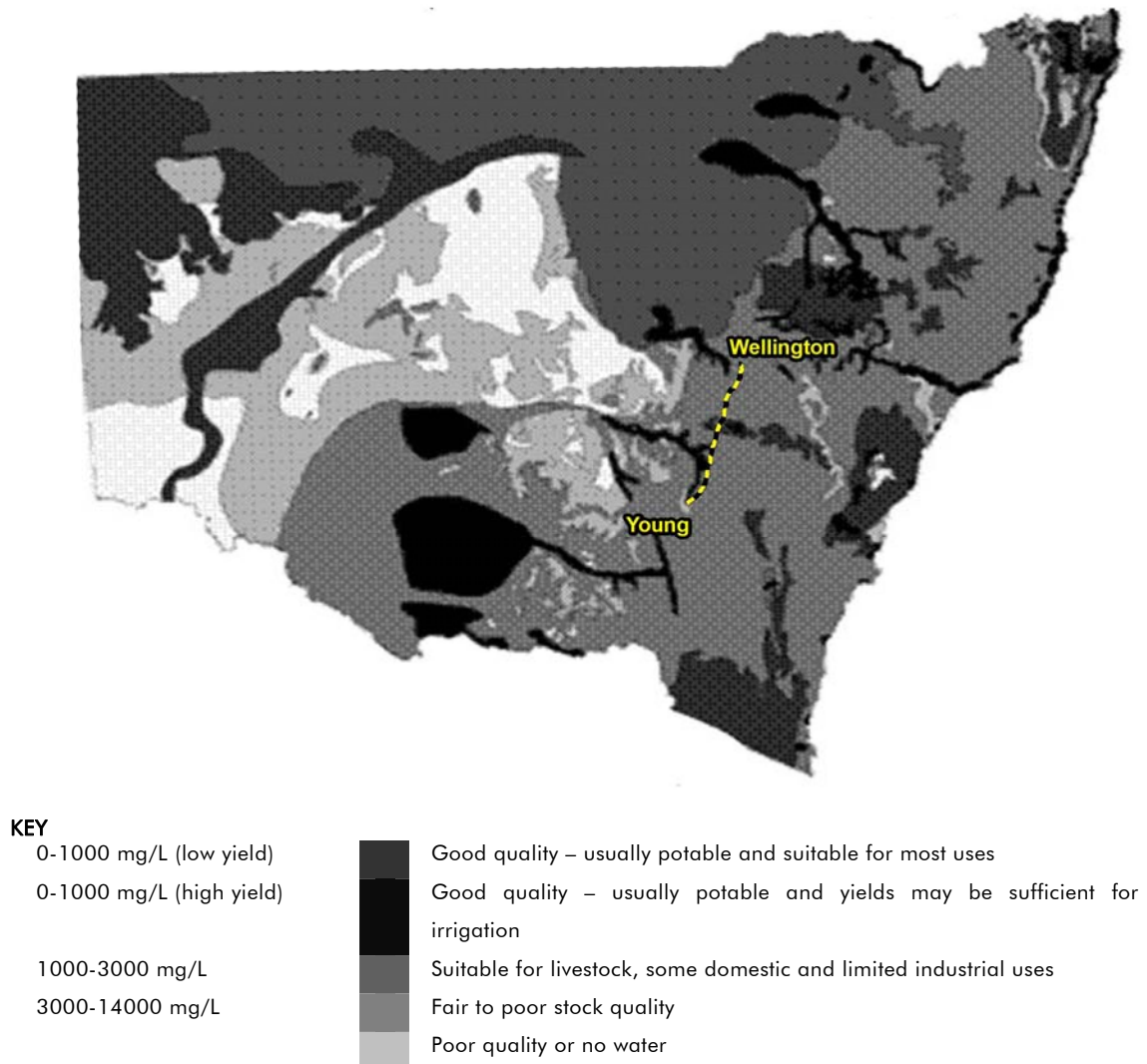


Figure 9. Groundwater in NSW (source: DLWC, 1998).

Water quality

Water quality and river flow objectives

The DECC has published water quality and river flow objectives for all major catchments in NSW (DECC, 2006). The objectives for the two catchments affected by the proposed pipeline, the Macquarie-Bogan River and the Lachlan River catchments, are the same (i.e. for uncontrolled streams) and are summarised in Appendix P. The full detail for the water quality and river flow objectives can be found at <http://www.environment.nsw.gov.au/ieo/index.htm>

Water sharing plans

Five “water sharing plans” (under the *NSW Water Management Act 2000*) cover the majority of NSW’s surface and groundwater resources. Plans that pertain to the waterways in the vicinity of the proposed pipeline are for the Macquarie and Cudgegong Regulated Rivers and Lachlan Regulated River. These Plans, which commenced in 2004, are currently suspended due to the recent drought conditions (DWE, 2009 & 2009a).

The proposed pipeline does not traverse the regulated parts of the Macquarie River system therefore this Water Sharing Plan is not relevant. Part of the pipeline route falls within the regulated section of the Lachlan River.

Surface water quality

The Australian Water Resources Assessment 2000 (AWRA) found both the regulated and unregulated portions of the Macquarie and the Lachlan River systems to be overdeveloped i.e. 100 percent of surface and groundwater is allocated (DEWHA, 2009).

The AWRA found the following general water quality results for the Macquarie-Bogan River Basin:

- Salinity good with a decreasing trend
- Total phosphorus poor to fair with an increasing trend
- Turbidity poor with an increasing trend
- No data for total nitrogen, pH or blue green algae

Results for the Lachlan River basin were:

- Salinity good with a decreasing trend
- Total phosphorus poor to fair with no obvious trend
- Turbidity poor with an increasing trend
- No data for total nitrogen, pH or blue green algae

The Lachlan River has the highest density of carp (*Cyprinus carpio*) in NSW. Carp have a significant detrimental impact on river water quality and the Lachlan CMA has been implementing a program of eradication since 2007 (Lachlan CMA, undated).

Groundwater quality

As depicted on Figure 9, groundwater supplies across NSW are of varying quality. Groundwater management in NSW is addressed in the water sharing plans referred to above, where applicable, or in “macro plans” which cover the remainder of the state.

The AWRA referred to above provides groundwater quality data, expressed as average salinity, for the Lachlan Groundwater Province. Groundwater Management Units within the Province that are in the vicinity of the proposed pipeline (i.e. the Bell, Lachlan and Macquarie River valleys) exhibited an average salinity between 500 and 1,000 mg/L, which is generally described as being good quality (DEWHA, 2009).

Waterway crossings

The proposed route includes approximately 177 watercourse crossings. The majority of these are minor and/ or non-perennial waterways or drainage gullies. Crossings will be undertaken using either an open cut or HDD method (refer Section 2.5.2). Final design will be determined at the detailed design stage in consultation with relevant stakeholders.

3.3.6 Heritage

Aboriginal heritage

The proposed pipeline route falls within a region known as Wiradjuri country based on the shared language spoken by people who define themselves as 'people of the three rivers', these rivers being the Macquarie (or Wambool) the Lachlan (or Kalare) and the Murrumbidgee (or Murrumbidjeri).

There are four Local Aboriginal Land Councils along the proposed pipeline route. There are 31 stakeholder groups and individuals who have registered their interest.

A search of the Aboriginal Heritage Information Management System database (AHIMS) shows no existing recorded sites within 200 m of the proposed pipeline alignment.

There are no Aboriginal sites, registered on the Register of the National Estate, within the proposed pipeline corridor.

Searches of the National Native Title Tribunal (NNTT) Registers for the LGAs encompassing the overall study area [Wellington, Cabonne, Cowra and Young] were undertaken.

A search of the NNTT register within the Wellington LGA identified one claimant group. Wellington Valley Wiradjuri People Native Title Claimants have submitted a claim which is being processed. It is currently identified for Registration testing [NNTT no. NCO9/4].

Gallanggabang Aboriginal Corporation, acting for Wellington Valley Wiradjuri People Native Title Claimants, provided notification of their application for registration and this was confirmed by their solicitor, Philip Teitzel.

A search of the NNTT register for Cabonne LGA confirms that the boundary of the Wellington Valley Wiradjuri People Native Title Claim [NNTT no NC09/4], discussed above, extends into Cabonne LGA. There are currently no other claimant applications.

A search of the NNTT register within Cowra LGA identified one Registered Native Title Group, Gundungurra Tribal Council Aboriginal Corporation #6 [NNTT no NC97/7]. Gundungurra Tribal Council and Gundungurra Aboriginal Heritage Association were both contacted but declined to register as stakeholders, the Secretary of the GAHA advising that the pipeline fell outside their traditional lands.

A search of the NNTT register within the Young LGA shows no Native Title claimant applications.

The Registrar of the Register of Aboriginal Owners advised by letter [17 August 2009] that a search of the Register for the subject land did not record any registered Aboriginal Owners pursuant to Division 3 of the *NSW Aboriginal Land Rights Act 1983*.

Non-Aboriginal heritage

A search of the online database of the State Heritage Register (accessed at http://www.heritage.nsw.gov.au/07_subnav_04.cfm) identified 160 sites of heritage significance within the Wellington, Cabonne, Cowra and Young LGAs. The search results are included in Appendix Q. These sites are either listed under the *NSW Heritage Act 1977* or by Local Government, i.e. in the Schedules of the Local Environmental Plan, or State Agencies, eg RailCorp or Roads and Traffic Authority (RTA) registers. There are no sites within the proposed route corridor.

A search of the online database of the Australian Heritage Places Inventory (accessed at <http://www.heritage.gov.au/ahpi/index.html>) identified 148 sites of heritage significance within the Wellington, Cabonne, Cowra and Young LGAs. These are sites either listed or recorded under the:

- Commonwealth Heritage List
- National Heritage List
- NSW Heritage Register
- Overseas Places of Historical Significance List
- Register of The National Estate
- World Heritage List

The search results are included in Appendix R. There are no sites within the proposed route corridor.

3.3.7 Visual Environment

Existing visual landscape

The visual landscape along the proposed pipeline route is comprised of flat to gently undulating land used for predominately agricultural purposes. There are hilly areas primarily used for grazing in the northern section of the pipeline from around Kilometre Point (KP) 182 to KP 206. There are some vegetated areas but most areas are cleared of vegetation for grazing or cropping. The broader visual landscape of the locality includes the lower slopes and upwards to the surrounding ranges to both the east and west.

Plates 10 to 35 give a pictorial overview of the pipeline route.



Plate 10 & 11. Proposed pipeline route near Bendick Murrell (KP14).



Plate 12 & 13. Road crossing north of Bendick Murrell (KP21).



Plate 14 & 15. Pipeline route road crossing west of Koorawatha (KP32).



Plate 16 & 17. Road crossing northwest of Wattamondara (KP46.5).



Plate 18 & 19. Lachlan Valley Way crossing (KP 64).



Plate 20 & 21. Road crossing west of Billimari (KP75).



Plate 22 & 23. Fish Fossil Drive crossing west of Canowindra (KP 87.5).

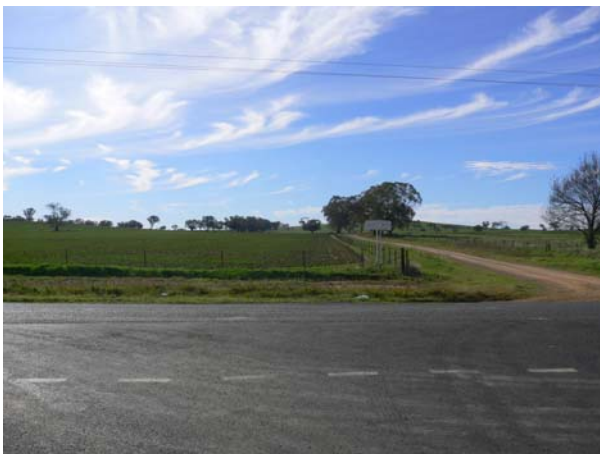


Plate 24. Looking north along proposed route from Fish Fossil Drive crossing west of Canowindra (KP 88).



Plate 25. View north along proposed route from crossing of The Escort Way west of Cudal (KP 121).



Plate 26 & 27. Road crossing at KP 131.5.



Plate 28 & 29. Mitchell Highway crossing at Bakers Swamp (KP186.5). Route runs alongside the western side of the Highway for approximately eight kilometres from the south (Plate 28) and then alongside the eastern side of the highway to the north (Plate 29).



Plate 30 & 31. Road crossing at KP 201.



Plate 32 & 33. Burrendong Way crossing at KP 206.5.



Plate 34 & 35. Wellington power station site (existing substation in the background) at KP 218.

3.3.8 Landuse

Predominant landuse

The landuse along the entire proposed pipeline length is agricultural. Landuse zone maps are included in Appendix S.

Agricultural pursuits in the region include both grazing and cropping. Due to the area's situation on a series of fertile river valleys, a diversity of crops are grown including wine grapes, a variety of fruit and vegetables, fodder crops and flowers. Sheep, beef and dairy cattle grazing is also undertaken.

The majority of the route is privately owned land apart from some road, rail, external creeks and river crossings that comprise State and Local Government owned land. Land tenure maps are contained in Appendix T.

3.3.9 Socio-economic Environment

Wellington LGA

Just over 9,500 people (DSRD, undated) live within the Wellington LGA. The town of Wellington has a population of approximately 4,100 people (ABS, 2009). The majority of the population is either young, i.e. under 14 years (close to 25%) or older i.e. over 55 years (over 30%). The proportion of Indigenous residents in the LGA is around 16% (ABS, 2009).

Agriculture (wheat, wool, beef, lamb) is the main industry in the Wellington LGA. Tourism is also important to the area (DSRD, undated).

Wellington LGA had an unemployment rate of 7.8 percent in 2006, a decrease from previous years though higher than the state and national average. The majority of employed residents are labourers or related worker, with professional and sales/service workers the next most prevalent (ABS, 2009).

Cabonne LGA

The Cabonne LGA has a population of over 12,600 people. The majority of the population is under 14 years of age or over 55 years. The proportion of Indigenous residents in the LGA is around 2.3%. The main administrative centre for the Cabonne LGA is Molong with a population of around 2,000 (ABS, 2009).

The unemployment rate in the Cabonne LGA is around 3 percent. As for Wellington LGA, labourers and related workers comprise the majority of those employed with professional, sales/ service workers and tradespersons the next most prevalent (ABS, 2009).

Cowra LGA

The Cowra LGA has a population of around 13,000 people (CSC, undated). The administrative centre of Cowra Shire is the town of Cowra with a population of approximately 8,400. The proportion of Indigenous residents in the LGA is around 6.1% (ABS, 2009).

The main industry of the Cowra LGA is agriculture (cereals, sheep, beef and pigs) and mining. Significant employment is also found in the retail and manufacturing sectors in the region. The unemployment rate is around 4.9 percent (ABS, 2009).

Ratio Consultants (2008) prepared an Issues Paper for Cowra Council to inform their Land Use Strategy and Local Environmental Plan. The Issues Paper was prepared following a process of extensive community consultation which identified the following socio-economic issues for the Cowra LGA:

- The township of Cowra is experiencing some population growth;
- The LGA is experiencing growth in its ageing population and a decline in younger residents;
- A large proportion of new settlement is in rural areas at the expense of the Cowra township. This may create conflict between landuses and result in loss of good agricultural land;
- Cowra is seen to rank lower than neighbouring towns in the socio-economic factors contributing to lifestyle;
- Agricultural production is the mainstay of the Shire's industry, however it is under threat from increasing costs, varying commodity prices, water shortages etc.;
- Mining is becoming an increasingly important component of the local economy;
- There is significant tourism potential for the Cowra township and surrounding region; and
- There is growing demand for industrial development within the Cowra township and surrounds.

While similar data is not readily available for the Wellington, Cabonne or Young LGAs, it is likely that comparable socio-economic issues also pertain to those areas.

Young LGA

The Young LGA has a population of around 12,500 people, and the township of Young accommodates just over 7,000 people (ABS, 2009). The proportion of Indigenous residents in the LGA is around 2.6% (ABS, 2009).

The main industry of the Young LGA is agriculture, mainly sheep, beef cattle, pigs and cereals. The unemployment rate is around 4.8 percent. The majority of workers are employed as labourers or related workers (ABS, 2009).

3.3.10 Transport and Traffic

Transport

The region in which the pipeline is proposed is serviced by major east-west and north-south road and rail networks. These networks provide both passenger and commercial services. Major roads and rail lines crossed or paralleled by the proposed pipeline route include the:

Crossed:

- Sydney to Broken Hill (Indian Pacific) rail line
- Highway (HW) 24 - Mid Western Highway (national road)
- Escort Way
- MR 90 (Boree to Parkes section)
- MR 32 - Mitchell Highway (national road)
- Lachlan Valley Way

Adjacent/ paralleled:

- Main Road (MR) 41 - Olympic Highway (national road)

The Indian-Pacific rail service travels through the region, departing Sydney on Wednesday and Saturday each week and arriving in Perth on Saturday and Tuesday respectively. Perth departures are on Wednesday and Sunday, arriving Sydney on Saturday and Wednesday.

Local options for public transport are limited in most areas. Bus services are available but most local traffic is reliant on private vehicles.

The proposed pipeline will require crossings of the road or rail network at 123 locations. The majority of these are minor or local roads. Crossings will be undertaken using either an open cut or bored method (refer Section 2.5.2). Final design will be determined at the detailed design stage in consultation with relevant stakeholders.

Traffic

Traffic volumes for the major roads nominated above, as close as possible to the expected pipeline crossings, are summarised below.

Road	Location	2002 AADT*
Mid Western Highway (HW 24)	East of MR56 (Cowra), Forbes Road	2,190
The Escort Way	No data	
MR90	No data	
Lachlan Valley Way	No data	
Mitchell Highway (MR32)	Bell River Bridge, south of township	1,289
	Macquarie River Bridge, north of township	7,154

* AADT = annual average daily traffic; Source: RTA

4. Regulatory Interaction

4.1 NSW Environmental Planning and Assessment Act 1979

4.1.1 Objects

The consistency of the proposed pipeline with the Objects of the EP&A Act is addressed as follows:

a) to encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,

Comment: the proposed pipeline route is located so as to minimise impacts on natural and artificial resources, agricultural land, natural areas, forests, mineral deposits, water bodies and waterways, towns and villages. Potential impacts on these areas and proposed mitigation is addressed further in Section 5.

(ii) the promotion and co-ordination of the orderly and economic use and development of land,

Comment: the development of land for the provision of a natural gas energy supply is proposed. Provision of infrastructure to support natural gas, without adverse impacts on the environment or on agricultural or other human activities, is an orderly and economic use of land.

(iii) the protection, provision and co-ordination of communication and utility services,

Comment: the proposed pipeline involves the provision of a utility service to safeguard and augment existing energy supplies for the region.

(iv) the provision of land for public purposes,

Comment: the proposed pipeline does not negatively impact on, or involve the provision of, public land.

(v) the provision and co-ordination of community services and facilities, and

Comment: the proposal does not negatively impact on or involve the provision or co-ordination of community services or facilities. The gas pipeline proposed will provide the community with an alternative energy supply.

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and

Comment: the proposed pipeline is located so as to minimise impacts on native plants and animals. This issue is further addressed in Section 5.3.

(vii) ecologically sustainable development, and

Comment: there are many definitions of “ecologically sustainable development” (ESD). This Environmental Assessment refers to two peak authorities: Australia’s National Strategy for Ecologically Sustainable Development 1992 (NSED) which has been endorsed by Council of Australian Governments, and the EP&A Act itself.

The NSED defines ecologically sustainable development as:

‘using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased’.

The Goal of the NSED is:

“Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.”

The Core Objectives of the NSED are:

- *to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;*
- *to provide for equity within and between generations ; and*
- *to protect biological diversity and maintain essential ecological processes and life-support systems.*

The Guiding Principles of the NSED are:

- *decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations;*
- *where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*
- *the global dimension of environmental impacts of actions and policies should be recognised and considered;*
- *the need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised;*
- *the need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised;*
- *cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms; and*
- *decisions and actions should provide for broad community involvement on issues which affect them.*

The proposed pipeline is consistent with the above goal, objectives and principles.

The EP&A Act defines ecologically sustainable development by reference to the Protection of the Environment Administration (PEA) Act. The PEA Act describes ESD as *"requiring the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:*

- *The precautionary principle;*
- *Inter-generational equity;*
- *Conservation of biological diversity and ecological integrity; and*
- *Improved valuation, pricing and incentive mechanisms."*

The proposed pipeline is consistent with the above definitions and principles. The proposal has addressed ESD principles:

- there are no "threats of serious or irreversible environmental damage";
- the needs of future generations for safe and sustainable provision of energy as well as environmental protection have been considered;
- the construction and operation program will incorporate relevant environmental management measures to conserve biodiversity and minimise environmental impacts;
- social, environmental and economic factors have been taken into account.

(viii) the provision and maintenance of affordable housing, and

Comment: the proposal does not negatively impact on, or involve the provision or maintenance of, affordable housing.

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

Comment: the preparation and consultations undertaken for this application, including the focus meeting convened by the Department of Planning have involved State and local government. This issue is further addressed in Section 5.12.

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

Comment: this application has been subject to a professional consultation process and has provided appropriate opportunities for public involvement and participation. Exhibition of the application will provide further opportunity for public input. This issue is further addressed in Section 5.12.

4.1.2 Part 3A

Clause 75B of the EP&A Act identifies projects to which Part 3A applies:

*(1) General This Part applies to the carrying out of development that is declared under this section to be a project to which this Part applies:
(a) by a State environmental planning policy...*

State Environmental Planning Policy (Major Development) 2005 identifies gas pipelines as a type of major project to which Part 3A applies. This SEPP is addressed specifically in the following section 4.1.3.

The proposal is not designated as critical infrastructure.

Project approval is sought under Part 3A.

4.1.3 Environmental Planning Instruments

The following Environmental Planning Instruments (EPIs) pertain to the site and the proposal:

- State Environmental Planning Policy No. 33 - Hazardous and Offensive Development (SEPP 33)
- State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)
- State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)
- State Environmental Planning Policy (Major Development) 2005 (SEPP Major Development)
- State Environmental Planning Policy (Infrastructure) 2007 (SEPP Infrastructure)
- State Environmental Planning Policy (Rural Lands) 2008 (SEPP Rural Lands)
- Young Local Environmental Plan 1991-Urban Lands (Young LEP – Urban Lands)
- Young Local Environmental Rural Plan 1993 (Young LEP-Rural)
- Cowra Local Environmental Plan 1990 (Cowra LEP)
- Cabonne Local Environmental Plan 1991 (Cabonne LEP)
- Wellington Local Environmental Plan 1995 (Wellington LEP)

The pipeline is permissible under all LEPs. SEPP Infrastructure permits pipelines without consent, but the subject development is a type of development to which SEPP Major Development applies and for which approval is required under Part 3A.

These EPIs are addressed in greater detail in the following sections.

State Environmental Planning Policies

SEPP No. 33 – Hazardous and Offensive Development

SEPP 33 provides a systemic approach to planning and assessing developments that are potentially hazardous or offensive. If a development is classified as “potentially hazardous industry” a preliminary hazard analysis (PHA) must be undertaken to determine the risk to people, property and the environment. A development with excessive risk may not be permissible. “Potentially offensive industry” must meet certain licensing requirements or it may not be permissible.

The proposed pipeline likely meets the definition of “potentially hazardous industry” which is as follows:

potentially hazardous industry means a development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

*(a) to human health, life or property, or
(b) to the biophysical environment,
and includes a hazardous industry and a hazardous storage establishment.*

A Preliminary Hazard Analysis (PHA) has been carried out and is contained in Volume 2: Technical Reports (Technical Report 1). The PHA found that potential hazardous incidents could include external pipeline interference and gas release, pipeline corrosion and weld/ material defects. To minimise risk from these incidents various separation distances depending on the type of development, in accordance with relevant risk criteria, are recommended (refer Table 1.1 in PHA).

There are 15 residential dwellings that do not comply with the recommended minimum separation distance (refer Appendix L). A Final Hazard Analysis (FHA) will be prepared to determine the relevant management for these sites (and any other relevant issues) prior to construction.

SEPP No. 44 – Koala Habitat Protection

SEPP 44 encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free living populations will be maintained over their present range. The policy applies to 107 LGAs including Cabonne Shire. It does not apply to the LGAs of Young, Wellington or Cowra.

Development cannot be approved in an area affected by the policy (i.e. Cabonne Shire) without an investigation of core koala habitat. An investigation of the presence or absence of koalas and their habitat over that part of the route to which the policy applies has been undertaken in the Ecological Assessment (Volume 2: Technical Reports (Technical Report 2)).

The SEPP 44 process has resolved as follows:

Does the land contain areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15 percent of the total number of trees in the upper or lower strata of the tree component?

Two tree species listed under Schedule 2 of the Policy occur along the proposed pipeline route – White Box and River Red Gum. Some areas containing these species have a canopy exceeding 15% of the total canopy cover.

Is the land potential Koala habitat?

White Box woodland and River Red Gum forest along the proposed pipeline route within the Cabonne LGA are both considered potential Koala habitat.

Is there core habitat on the subject land?

The Policy defines core koala habitat as "...an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is females with young) and recent sightings of and historical records of a population".

No dedicated Koala survey was completed along the proposed pipeline route. However given the scarcity of records within the NPWS Wildlife Atlas (i.e. 15 documented records within the entire Cabonne LGA, the majority of which are from areas of consolidated habitat within State Forests and Nature Reserves), it is highly unlikely that core Koala habitat occurs within the proposal area.

Is there a requirement for the preparation of a Plan of Management for identified core Koala habitat?

No. Core Koala habitat is unlikely to occur, therefore a Plan of Management is not required.

SEPP No. 55 – Remediation of Land

SEPP 55 provides a state-wide planning framework for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use due to contamination. If the land is unsuitable, remediation must take place before the land is developed.

The presence or absence of known contaminated sites has been investigated with each Council. The pipeline will not disturb or encroach on known contaminated land. If remediation is required it will be prescribed in accordance with the *Managing Land Contamination: Planning Guidelines* (DUAP & EPA, 1998).

SEPP (Major Development) 2005

This SEPP defines specified types of development as major projects. Clause 6 of the SEPP identifies Part 3A projects as:

*(1) Development that, in the opinion of the Minister, is development of a kind:
(a) that is described in Schedule 1 or 2...*

Schedule 1 identifies the classes of development that are Part 3A projects. Item 26A of Schedule 1 states:

Development for the purposes of a pipeline in respect of which:

- (a) a licence is required under the Pipelines Act 1967, or*
- (b) an application for a licence is made under that Act on or after the commencement of this clause, or*
- (c) a licence was granted under that Act before the commencement of this clause.*

A license is required for the proposal under the *Pipelines Act 1967*. An application will be made by ERM Power after Part 3A approval is received.

Under Part 3A of the EP&A Act the Minister for Planning is the determining authority.

On 11 May 2009 the Director-General of the Department of Planning formed the opinion that the development is of a kind described in Schedule 1 of SEPP Major Projects (now SEPP Major Development), and is subject to clause 26A "Development for the purposes of a pipeline in respect of which a licence is required under the *Pipelines Act 1967*".

A Preliminary Environmental Assessment and Part 3A Application for project approval was submitted to the Department on 12 May 2009. A Planning Focus Meeting was held on 29 June 2009. Director-General's environmental assessment requirements were issued on 22 July 2009.

SEPP (Infrastructure) 2007

SEPP Infrastructure provides a consistent planning regime for infrastructure and the provision of services across NSW. The Aim of this SEPP is to "*facilitate the effective delivery of infrastructure across the State.*"

The SEPP supports greater flexibility in the location of infrastructure and service facilities, and provides regulatory certainty and efficiency in the development process. Consistent with this aim, clause 53 of SEPP Infrastructure provides that pipelines are permissible without consent if the pipeline is "subject to a licence under the *Pipelines Act 1967*." The proposed pipeline is not yet licensed although a licence will be sought in due course. Therefore, SEPP Infrastructure facilitates the construction of pipelines without development consent under specified circumstances.

However, the subject proposal is a project to which SEPP Major Development applies, therefore approval under Part 3A is required.

SEPP (Rural Lands) 2008

SEPP Rural Lands facilitates the orderly and economic use and development of rural lands for rural and related purposes. The policy applies to LGAs that are not listed in clause 4 of the SEPP. Wellington, Young, Cabonne and Cowra Shires are not listed in clause 4, therefore the SEPP applies.

The Rural Planning Principles under clause 7 of the SEPP apply to plan making and are subject to Local Planning Direction 1.5 under s117(2) of the Act. Plan making is not proposed.

The Subdivision Principles under clause 8 of the SEPP do not apply to the subject proposal.

No provisions of SEPP Rural Lands apply.

Regional Environmental Plans

None applicable.

Local Environmental Plans

The following Local Environmental Plans (LEPs) apply to the pipeline route:

- Young Local Environmental Rural Plan 1993
- Cowra Local Environmental Plan 1990
- Cabonne Local Environmental Plan 1991
- Wellington Local Environmental Plan 1995

The project is permissible under all LEPs. Details of specific LEP zones are described in following sections.

Young Local Environmental Rural Plan 1993

The pipeline traverses land zoned 1(a1) General Rural under Young Local Environmental Rural Plan 1993. The pipeline is permissible with consent in this zone.

An extract of the Young Rural LEP 1993 zone table for 1(a1) General Rural zone I as follows:

2 Without development consent

Agriculture (other than aquaculture or mariculture or intensive livestock keeping establishments).

3 Only with development consent

Any purpose other than a purpose included in item 2 or 4.

4 Prohibited

Motor showrooms; residential flat buildings; shops (other than general stores not exceeding 100 square metres in gross floor area).

The Young Local Environmental Plan 1991 applies only to the town of Young. The pipeline commences approximately seven kilometres outside the town boundary, so this LEP does not apply to the proposal.

Cowra Local Environmental Plan 1990

The pipeline traverses land zoned 1(a) Rural Zone under Cowra LEP 1990. The pipeline is permissible with consent in this zone.

An extract of the Cowra LEP zone table for 1(a) Rural Zone is as follows:

2 Without consent

Agriculture (other than pig keeping establishments, poultry farming establishments or feed lot establishments); forestry; any purpose ordinarily incidental or subsidiary to agriculture or forestry.

3 Subject to conditions

Nil.

4 Only with consent

Any purpose other than a purpose included in item 2 or 5.

5 Prohibited

Motor showrooms; residential flat buildings.

Cabonne Local Environmental Plan 1991

The pipeline traverses land zoned 1(a) General Rural under Cabonne LEP 1991. The pipeline is permissible with consent in this zone.

An extract of the Cabonne LEP zone table for 1(a) General Rural zone is as follows:

2 Without development consent

Agriculture (other than dwellings and intensive livestock keeping); forestry (other than ancillary dwellings and plantation forests).

3 Only with development consent

Any purpose other than a purpose included in item 2 or 4.

4 Prohibited

Motor showrooms; residential flat buildings; shops (other than general stores, wineries or craft shops).

Wellington Local Environmental Plan 1995

The pipeline traverses land zoned 1(a) Rural under Wellington LEP. The pipeline is permissible with consent in this zone.

An extract of the Wellington LEP zone table for 1(a) Rural zone is as follows:

2 Without development consent

Development for the purpose of: agriculture (other than intensive livestock keeping); exempt development.

3 Only with development consent

Development other than that included in Item 2 or 4.

4 Prohibited

Development for the purpose of: boarding houses; manufactured home estates; motor showrooms; residential flat buildings; shops (other than general stores).

4.1.4 Environmental Planning and Assessment Regulation 2000

Part 1A (clauses 8A to 8P) of the Regulation states:

8F Owners consent or notification:

- (1) The consent of the owner of land on which a project is to be carried out is required for a project application unless:*
 - (a) The application is made by a public authority, or*
 - (b) the application relates to a critical infrastructure project, or*
 - (c) the application relates to a mining or petroleum production project, or*
 - (d) the application relates to a linear infrastructure project, or*
 - (e) the application relates to a project on land with multiple owners designated by the Director-General for the purposes of this clause.*
- (2) Any such consent may be obtained at any time before the determination of the application.*
- (3) If the consent of the owner of the land is not required under this clause, then the proponent is required to give notice of the application:*
 - (a) in the case of a linear infrastructure project or a project designated under subclause (1) (e)—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, or*
 - (b) in the case of a project that comprises mining or petroleum production (other than a project that also comprises a linear infrastructure project)—to the public by advertisement published in a newspaper circulating in the area of the project before the end of the period of 14 days after the application is made, or*
 - (c) in the case of a critical infrastructure project (other than a project that also comprises a linear infrastructure project or mining or petroleum production project)—to the owner of the land before the end of period of 14 days after the application is made, or*
 - (d) in any other case—to the owner of the land at any time before the application is made.*
- (4) In this section:*

***linear infrastructure project** means development for the purposes of linear transport or public utility infrastructure.*

mining or petroleum production includes any activity that is related to mining or petroleum production, but does not include a project on land that is a state conservation area reserved under the National Parks and Wildlife Act 1974.

The pipeline is a “linear infrastructure project”.

Public notification of the proposal is required under Reg 8F(3)(a) by “*advertisement published in a newspaper circulating in the area of the project before the start of the public consultation period for the project.*”

The proposal will be advertised in local newspapers before the start of the public exhibition period of this report and affected landowners and the general public have been consulted in accordance with the Regulation. Consultation methodology and outcomes are discussed in more detail in Section 5.12.

4.2 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act actions that have, or are likely to have, a significant impact on a matter of national environmental significance (NES) require approval from the Commonwealth Minister for the Environment, Heritage and the Arts. The Minister will decide whether assessment and approval is required under the EPBC Act.

There are seven matters of NES that are protected under the EPBC Act, these are:

- 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).

Other matters protected under the Act include:

- The environment, where actions proposed are on, or will affect, Commonwealth land and the environment.
- The environment, where Commonwealth agencies are proposing to take an action.

In deciding whether or not the action proposed is likely to have a significant impact, the following is considered:

1. The environmental context;
2. Potential impacts from the proposed pipeline;
3. Whether mitigation will avoid or reduce these impacts; and
4. Whether the impacts are likely to be significant.

The above assessment is addressed in detail in the Ecological Assessment in Volume 2: Technical Report 2. The findings of this assessment are summarised below in Table 2.

Table 2. Summary of Impacts on NES and Other Matters

Matter	Impact
Matters of National Environmental Significance	
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Significance	None
Threatened Ecological Communities	None
Threatened Species	None
Migratory Species	None
Commonwealth Marine Areas	None
Nuclear Actions	None
Other Matters	
Commonwealth Land	None
Commonwealth Heritage Places	None
Places on the Register of the National Estate	None
Commonwealth Reserves	None
Commonwealth Proponent	None

In light of the above, the proposed pipeline is not a controlled action and referral to the Commonwealth Minister is not required.

4.3 Other NSW and Commonwealth Legislation

Other State and Commonwealth legislation may apply to the route or to the proposal. The application and relevance of several pieces of legislation are commented on in Table 3.

Table 3. Application and Relevance of Various State and Commonwealth Legislation

LEGISLATION	APPLICATION	RELEVANCE
NSW		
<i>Contaminated Land Management Act 1997</i>	Requires notification of known contaminated land.	The presence of known contaminated sites has been investigated in consultation with local Councils. The route does not intercept any known contaminated sites.
<i>Environmentally Hazardous Chemicals Act 1985</i>	Licenses use or disposal of environmentally hazardous chemicals or declared chemical wastes.	Licenses will be sought prior to and during construction if required.
<i>Fisheries Management Act 1994</i>	Protects aquatic threatened species, populations or ecological communities, and their habitats.	Pursuant to Section 75U(1)(b) of the EP&A Act approval is not required under the <i>Fisheries Management Act 1994</i> .

LEGISLATION	APPLICATION	RELEVANCE
		Waterway crossings will be assessed for the presence of any threatened aquatic species and the route realigned or appropriate mitigation implemented if necessary.
<i>Heritage Act 1977</i>	Requires consideration of indigenous and non-indigenous heritage issues.	Pursuant to Section 75U(1)(c) of the EP&A Act approval is not required under Section 139 the <i>Heritage Act 1977</i> . Known heritage sites have been avoided. The route will be assessed as part of the final design process for the presence of any heritage items and the route realigned or appropriate mitigation implemented if necessary.
<i>National Parks and Wildlife Act 1974</i>	Protects native flora and fauna, NPWS estate and Aboriginal sites and objects.	Pursuant to Section 75U(1)(d) of the EP&A Act a permit is not required under Section 87, and consent is not required under Section 90, of the <i>National Parks and Wildlife Act 1974</i> . The route does not traverse any NPWS estate. Impacts on native flora and fauna and cultural heritage will be assessed as part of the detailed design process, and mitigation measures implemented if required.
<i>Native Vegetation Act 2003</i>	Regulates the clearing of native vegetation.	Pursuant to Section 75U(1)(e) of the EP&A Act authorisation is not required under Section 12 of the <i>Native Vegetation Act 2003</i> . The route selection process, including flora survey and environmental assessment, has minimised the need to clear native vegetation.
<i>Noxious Weeds Act 1993</i>	Controls the spread and management of noxious weeds.	The control and potential spread of noxious weeds will be addressed during construction.
<i>Occupational Health and Safety Act 2000</i>	Promotes and regulates the health, safety and welfare of workers.	OH&S will be incorporated into project planning and the construction phase. Construction safety has been factored into route selection.

LEGISLATION	APPLICATION	RELEVANCE
<i>Pesticides Act 1999</i>	Controls and regulates the use of pesticides.	Pesticide use, if required, will be addressed during construction.
<i>Pipelines Act 1967</i>	Requires licensing of certain pipelines.	A license is required and will be sought by ERM Power prior to construction.
<i>Protection of the Environment Operations Act 1997</i>	Regulates and licenses pollution.	Licenses will be sought prior to construction if necessary.
<i>Roads Act 1993</i>	Regulates the carrying out of activities on public roads.	The NSW Roads and Traffic Authority (RTA) and/or local Councils will be consulted if work is required in public road reserves.
<i>Rural Fires and Environmental Assessment Legislation Amendment Act 2002</i>	Regulates development affected by bushfire hazard.	Pursuant to Section 75U(1)(g) of the EP&A Act a bush fire safety authority is not required under Section 100B of the <i>Rural Fires Act 1997</i> . The route is not mapped as bushfire prone land. Fire risk will be addressed during construction.
<i>Soil Conservation Act 1938</i>	Provides for the conservation of soil resources and farm water resources and for the mitigation of erosion.	Erosion and sedimentation control will be incorporated into construction works.
<i>Threatened Species Conservation Act 1995</i>	Conserves threatened species, populations and ecological communities (and their habitats) of animals and plants.	Ecological Assessment has determined that it is unlikely that threatened species, populations or communities will be impacted upon by the proposal.
<i>Waste Avoidance and Resource Recovery Act 2001</i>	Promotes waste avoidance and resource recovery.	Waste will be managed in accordance with the NSW Waste Avoidance and Resource Recovery Strategy 2007.
<i>Water Act 1912</i>	Licenses and permits use of water. Regulates water pollution.	Extraction of water is unlikely. Relevant licences or permits will be sought if necessary.
<i>Water Management Act 2000</i>	Protects, enhances and restores water sources, their associated ecosystems, ecological processes and biological diversity and their water quality.	Pursuant to Section 75U(1)(h) of the EP&A Act approvals are not required under Sections 89, 90 or 91 of the <i>Water Management Act 2000</i> .
<i>Wilderness Act 1987</i>	Enables research, protection and management of wilderness areas.	No declared wilderness areas will be affected.

LEGISLATION	APPLICATION	RELEVANCE
Commonwealth		
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	Protects Aboriginal and Torres Strait Islander heritage.	The route has been selected so as to avoid any recorded sites of cultural heritage significance. Other unrecorded sites or items in the locality will be identified through ongoing consultation with the local Aboriginal community and other stakeholders and route survey.
<i>Australian Heritage Council Act 2003</i>	Protects non-Indigenous heritage.	The route has been selected so as to avoid any recorded sites of heritage significance. Unrecorded sites or items in the locality, if present, will be identified through consultation with the local community and other stakeholders and managed appropriately.
<i>Native Title Act 1993</i>	Enables native title claims over relevant lands.	The status of native title claims will be continually monitored over the life of the project. All claimants will be appropriately consulted.

4.4 Australian Standard and Code of Practice

4.4.1 AS2885 Pipelines - Gas and liquid petroleum

The Australian Standard prescribes in detail best practise requirements for design, construction, operation and maintenance of pipelines in Australia. All works will comply with the Standard, where relevant.

4.4.2 APIA Code of Environmental Practise – Onshore Pipelines

The *Code of Environmental Practise – Onshore Pipelines* (March 2009) was prepared by Ecos Consulting (Aust) Pty. Ltd. for and with the guidance of the Australian Pipeline Industry Association (APIA). The Code establishes uniform standards that encourage a consistent approach in the onshore pipeline construction, operation and decommissioning phases. The Code includes guidelines for the development and implementation of environmental management systems, planning and approval processes, as well as construction, operation and decommissioning activities. Project works will be undertaken with consideration of the recommendations of the Code.

5. Key Issues

5.1 Strategic Planning and Project Justification

The proposed pipeline is needed to:

1. Enable the newly approved Wellington power station to operate at peak load;
2. Transport sufficient quantities of natural gas for use in the Wellington power station;
3. Store natural gas to enable the power station to operate effectively; and
4. Deliver natural gas to the power station at the necessary pressure.

5.1.1 Existing Gas Pipeline Network

The existing gas pipeline network in Australia is shown at Figure 10. The proposed pipeline will supply natural gas from the Young gas hub centre, which is on the Moomba to Sydney gas pipeline, to the Wellington power station.

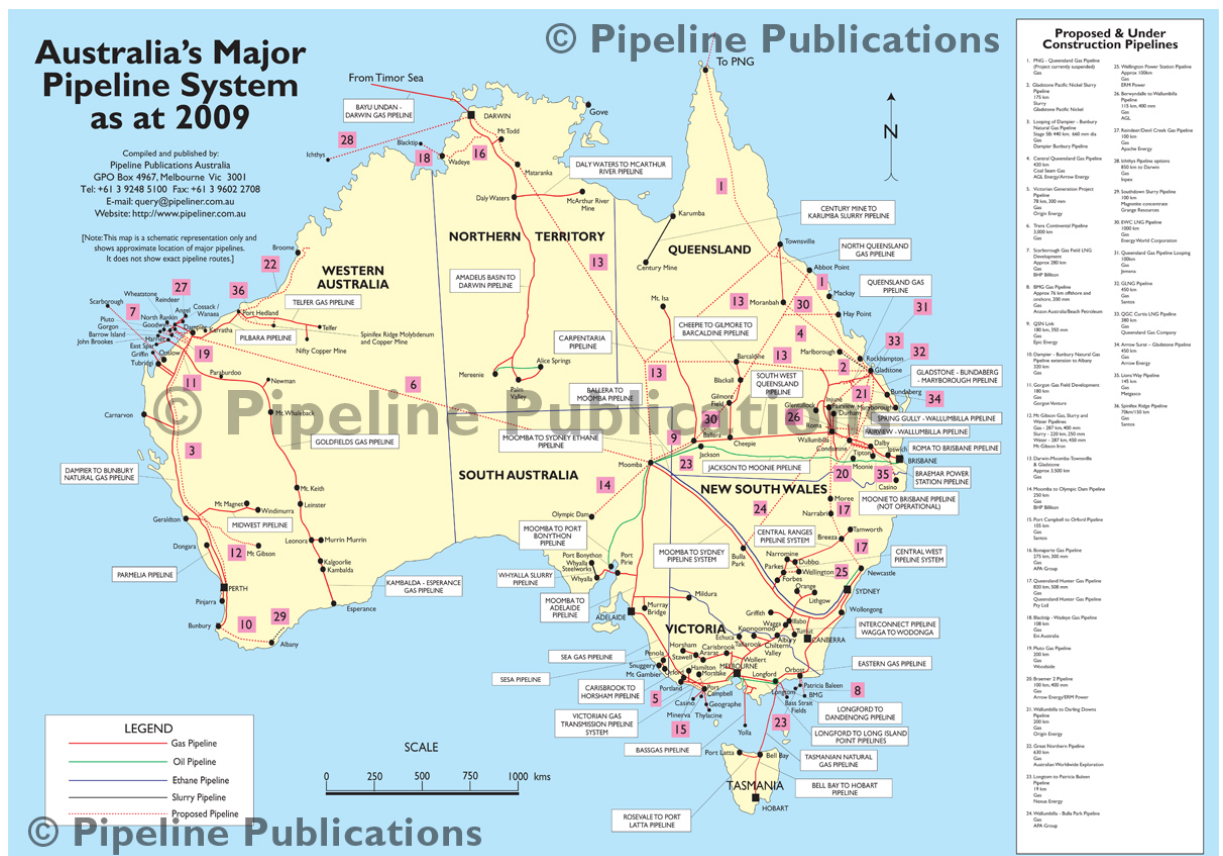


Figure 10. Location of major pipelines in Australia.

5.1.2 Location of Gas Reserves

Australia has rich reserves of both conventional natural gas and coal seam gas.

In June 2008 *"proved plus probable reserves... (reserves calculation is an estimation; proved plus probable indicates there is a 50% likelihood of more reserves being present) of conventional natural gas totalled slightly over 40,000 PJ, with 75% located in the offshore Carnarvon Basin in northwest Australia, 4.5% located in offshore Northern Territory waters and 20.5% located in the Eastern Australian fields ranging from offshore Victoria to onshore South Australia and Queensland."* (Energy Quest, 2008).

Coal seam gas (natural gas) is a relatively new source of gas. The majority of the coal seam gas reserves are located within Queensland, although some fields are being developed in NSW: *"current proved plus probable reserves of coal seam gas are about 12,000 PJ, with 94% being located in the Surat Bowen Basin of Queensland and the remainder in New South Wales"* (Energy Quest, 2008).

5.1.3 Current and Expected Growth in Gas Demand

In 2005/06 gas fired electricity generation accounted for approximately *"15% of Australia's total electricity production"* (ABARE, 2007). Western Australia is the largest consumer of natural gas followed by Victoria, NSW/ACT, Queensland, and South Australia. Western Australia, South Australia and the Northern Territory, though not the largest consumers by volume, depend on gas for more than 40 percent of their primary energy demand.

The Australian Bureau of Agricultural and Resource Economics (ABARE, 2007) predict that natural gas could account for 24% of total electricity production by 2029/30.

5.1.4 Project Capacity

The proposed pipeline's primary purpose is to supply natural gas from the Young gas hub centre to the Wellington power station. The Wellington Power Station is a 600 megawatt open-cycle gas-fired power station that is intended to operate as a peaking plant to supply energy at short notice during periods of peak electricity demand. It is anticipated that the peaking capacity of the Wellington power station will increase from approximately five to ten percent of electricity supply to approximately 30-40 percent over the next five to ten years.

The proposed pipeline may also form part of an interstate network proposed by ERM Power which would travel a 900 kilometre route from Young through Wellington northward through Narrabri and on to Goondiwindi on the Queensland border. Moving 60-80 petajoules (PJ) of gas per annum improves the economics of gas transportation compared to transporting and storing 5 PJ of gas annually as originally proposed with the Central West/Alectown pipeline arrangement. In this context there is already significant interest in the next section of the interstate pipeline from Wellington to Gunnedah and Narrabri which would tap prospective coal seam gas

fields in the region, with potential further and substantial economic development for the State.

5.1.5 Potential Connections

The pipeline is part of a network that has the potential to provide connections to domestic, commercial and industrial users.

Opportunities for new connections will be considered on request, in the context of market conditions and on the understanding that the power station is the primary client and must be provided with resource security.

Management of the gas resource will also be subject to state directives regarding energy demands.

5.2 Land Use Planning Impacts

5.2.1 Land Use Planning Impacts

The proposed pipeline route traverses privately owned land that is zoned for agricultural purposes. Agricultural land uses, although potentially subject to minor restrictions over the RoW area in the short term during construction, will be able to substantially continue on individual properties during construction. Property access and residential amenity will be considered at all times.

Consultation with the four affected Councils has not identified any future land uses on any of the affected land parcels that could be compromised by construction and operation of the pipeline.

Consultation with affected landowners has identified common areas of concern, some of which pertain to long term farm development. These issues are subject to confidential commercial negotiations between landowners and the proponent.

Land use conflict is unlikely during pipeline operation. Access, inspection and management requirements will be negotiated with landowners prior to pipeline operation.

It is unlikely that there will be any long term or permanent land use conflicts as a result of the construction and operation of the pipeline.

Potential conflict with a range of different land use types is discussed in following sections.

Crown land

Apart from road reserves, the pipeline does not traverse any areas of Crown land. Approval from the LPMA will be sought prior to construction over any Crown land.

Mineral/ extractive reserves

The pipeline crosses several areas of mining tenure (refer Appendix J). The Department of Primary Industries (Minerals and Petroleum) compiles resource mapping from the results of the annual reports from mineral exploration licence holders. The DPI has reviewed its resource mapping and has found no other sites of significance other than a potential limestone resource area near Gregra (KP 137) (refer Mining Tenure map series in Appendix J). This has been discussed with DPI senior geologist Gary Burton who raised no concerns, but suggested further consultation with the relevant stakeholders.

Further liaison with DPI with regard to this resource should occur at final design stage, as advised in DPI's letter of 8 July 2009.

In addition all of the mineral exploration license holders have been contacted to elicit their concerns. No responses have yet been received; however ongoing consultation will be maintained with licensees.

Conservation areas

There are no conservation areas, as defined and regulated by the *National Parks and Wildlife Act 1974*, in the pipeline corridor.

Valuable agricultural land

The DPI advised in its letter of 8 July 2009:

- "Weed management will need to be considered, as efforts should be made to ensure they are not spread from property to property."
- "Rehabilitation is important to both curtail erosion, and weed germination."
- "With adequate notice by contractors, the proposed works should not inconvenience agricultural activities".

The potential for conflict with agricultural land uses can be mitigated through appropriate construction and rehabilitation methods, and negotiation with landowners regarding the terms and conditions attached to easements.

All Councils have been contacted to provide information on any significant agricultural land within their respective LGAs. No responses have been received to date but consultation will continue. Landholder negotiations have ensured that valuable land within each allotment has been avoided wherever possible.

Rehabilitation proposals

The Central West and Lachlan CMAs and the Regional Natural Resource Management (NRM) Facilitators at Orange and Cowra have been contacted for advice on known landcare and rehabilitation sites along the pipeline route. No responses have been received as yet but consultation with these authorities and individuals will continue.

Discussions with landowners has also identified and avoided where possible rehabilitation sites on individual lots.

Scenically or visually important land

No scenically or visually important landscapes have been formally identified along the route to date. Ongoing landowner liaison may identify areas of visual or scenic importance on individual lots.

There is only a very minor impact on the visual landscape during pipeline construction as the construction period is brief and the pipeline is then underground and invisible. Permanently visible items include valves, marker signs and any fencing remaining or constructed as part of a particular easement requirement.

Concessional lot development

As a result of investigations the route has been moved out of one property that contains a proposed concessional lot development.

Otherwise, contact with directly affected landowners has not revealed any proposed concessional lot subdivisions.

The preferred route has been chosen so as to minimise the number of affected properties. Affected properties will be subject to similar terms and conditions for use of land within easements, with regard to excavation, building, tree planting and the like.

The potential for further concessional lot subdivision is unlikely given current and anticipated planning requirements in NSW. In consulting with landowners, some raised concerns about impact on subdivision potential. This needs to be seen in the wider context of planning controls applying to subdivision. That is, the pipeline is unlikely to be a determining factor with regard to subdivision potential.

Future farming potential

There will be some long term restrictions on the use of the pipeline easement. Typically, these will include the restriction of the construction of new permanent structures, dams and pools, as well as the planting of deep rooted vegetation such as large trees. This will not affect either existing or future potential farming activities such as grazing and cropping. In addition, lot access will not be affected in the long term, as most vehicles and equipment (apart from some heavy, narrow wheeled vehicles) will still be able to cross the easement.

5.2.2 Impact Assessment

There will be a brief minor impact on the visual landscape during pipeline construction. There will be no long term impacts during operation and maintenance as permanent visible items such as valves and marker signs are relatively small and infrequent along the route.

Impacts on crown land, mineral reserves, conservation reserves, valuable agricultural land, scenic sites etc. are prevented by locating the pipeline route to avoid these areas.

To date the pipeline route is not known to intersect any conservation areas, valuable agricultural land, proposed concessional lot development, or scenically important land.

Where the route does cross road reserves or mineral license areas, ongoing consultation with the relevant organisations or individuals will be undertaken to minimise impacts and determine management requirements.

5.2.3 Mitigation, Management and Monitoring Framework

Land use conflicts can be minimised by:

- Effective and inclusive negotiation of easement agreements to ensure all future uses and restrictions are known and agreed to;
- Implementing a thorough program of ongoing stakeholder consultation to identify any issues of concern;
- Working with landowners, management agencies and the community to resolve any identified conflict;
- Managing, via the CEMP, any environmental impacts that may negatively affect existing land uses; and
- Ensuring that the RoW is reinstated as soon as practicable after construction and in accordance with landowner requirements.

5.3 Ecological Impacts

5.3.1 Threatened Species, Populations, Communities and Habitats

A detailed Ecological Assessment has been undertaken and is contained within Volume 2: Technical Reports (Technical Report 2). The findings of this report are summarised in the following sections.

Endangered ecological communities

Two areas of vegetation within the pipeline corridor are considered likely to qualify as EECs:

- Scenic Road (KP 2.5) contains a well-established area of vegetation mapped as Blakely's Red Gum – Yellow Box open-woodland. Survey completed at the proposed crossing point recorded a disturbed area of immature White Box woodland with occasional Tree Lucerne and Peach Trees in the midstorey and a mixed ground layer of native grasses and forbs (*Aristida* sp., *Austrostipa* sp., *Bulbine bulbosa*, *Plantago* sp., *Lomandra multiflora*, *Asperula conferta*, *Geranium solanderi*, *Wahlenbergia stricta*) with some exotic species (Oats, Patersons Curse, Wild Sage). Brief inspection of this community further to the north indicates a better developed mature canopy, but with much of the ground layer dominated by Oats and Brome Grass.

The proposed pipeline will be underbored under Scenic Road, and vegetation retained. The most easterly 25 metres of road reserve has been previously

cleared and is dominated by exotic grassland (Oats, Barley Grass, Brome Grass), as such none of the White Box community will require removal.

- An area of White Box woodland considered EEC under both the TSC Act and EPBC Act flanks the road reserve along the northern side of The Escort Way at KP 121.4. The predominant vegetation is White Box woodland with a grassy understorey (*Aristida* sp.), with occasional shrubs of Sifton Bush (*Cassinia arcuata*) and Western Boobialla (*Myoporum montanum*). The proposed pipeline will be underbored under The Escort Way to a width of 36 metres, however due to the width of the northern road reserve an area of approximately 0.07 ha. of native grassland (trees are absent) may be removed.

Threatened flora

No threatened flora species or populations listed under the TSC or EPBC Acts were recorded along the pipeline route.

Threatened fauna

Six threatened bird species listed under the TSC Act; the Brown Treecreeper, Diamond Firetail, Flame Robin, Little Lorikeet, Grey Falcon and Superb Parrot (also listed under the EPBC Act) were found within the vicinity of the proposed pipeline route.

A number of other threatened fauna species may also utilise habitat within proximity to the pipeline and include:

Fish	Woodland birds	Raptors/owls	Waterbirds	Mammals (arboreal /ground-dwelling)	Mammals (microchiropteran bats)
Trout Cod	Regent Honeyeater	Barking Owl	Blue-billed Duck	Spotted-tailed Quoll	Eastern Bentwing-bat
Silver Perch	Swift Parrot	Square-tailed Kite		Koala	Large-footed Myotis
Purple-spotted Gudgeon	Bush Stone-curlew	Black-breasted Buzzard			Yellow-bellied Sheath-tail-bat
	Speckled Warbler				Little Pied Bat.
	Black-chinned Honeyeater				
	Hooded Robin				
	Gilbert's Whistler				
	Turquoise Parrot				
	Painted Honeyeater				
	Major Mitchell's Cockatoo				

No threatened fauna populations are listed in the South Western Slopes Bioregion.

5.3.2 Other Species, Populations, Communities and Habitats

The habitat value of the site for the general fauna groups is described as follows:

Avifauna

The rural nature of the pipeline route and corridor is well suited to common species such as the Australian Magpie, Crested Pigeon, Magpie-lark, Black-shouldered Kite, Noisy Miner, Eastern Rosella and Galah. Areas of better quality habitat such as box-gum woodland provide resources for nectivorous species (e.g. Scaley-breasted and Little Lorikeet, Noisy and Little Friarbirds, various Honeyeater species) and passerines such as Fairy Wrens, Gerygones and Pardalotes. Rivers, creeks and farm dams provide habitat for waterfowl such as the Wood Duck, Pacific Black Duck and White-faced Heron.

Mammals

Bats

Flowering eucalypts along the route may be utilised as a seasonal food resource by the Grey-headed Flying-fox, while various species of microchiropteran bat (e.g. *Chalinolobus* sp., *Miniopterus* sp., *Vespadelus* sp.) are likely to forage within the pipeline corridor.

Arboreal mammals

Most arboreal mammals rely on tree hollows for den and breeding sites. Trees with hollows were occasionally observed within the pipeline corridor and are likely to be utilised by the Common Brushtail Possum (*Trichosurus caninus*) and the Feathertail Glider. The Common Ringtail Possum would also be expected to occur.

The primary Koala feed tree species White Box commonly occurs within the pipeline corridor and as such suitable habitat occurs, although the species is poorly recorded in the locality.

Terrestrial mammals

Due to the highly modified ground layer within much of the pipeline corridor, disturbance adapted, introduced species such as the Black Rat and House Mouse are expected to occur. Where better quality habitat occurs (i.e. greater flora species and structural diversity), species such as the Bush Rat (*Rattus fuscipes*) and Yellow-footed Antechinus (*Antechinus flavipes*) would be expected.

Reptiles

A variety of skink species (eg. *Egernia* sp., *Ctenotus* sp.) and snakes such as the Eastern and King Brown Snake are expected to occur in the region.

Amphibians

Dams and watercourses provide suitable habitat for common amphibian species such as Peron's Tree Frog (*Litoria peroni*), the Broad-palmed Rocket Frog (*Litoria latopalmata*) and Common Eastern Froglet (*Crinia signifera*).

5.3.3 Connectivity and Distribution

The proposed pipeline route and surrounding area has been significantly modified from past clearing and farming practices, such that areas of habitat are highly fragmented, simplified and reduced in size. Few habitat areas of any size and/or connectivity occur in proximity to the proposed route, with the best examples being:

- Road reserve and riparian vegetation from KP 2-5 along Scenic Way;
- Conimbla National Park to the west of KP 23-27;
- Scattered woodlands around Bourimbla Creek at KP 116;
- Scattered woodlands around KP 118;
- Consolidated rangeland vegetation running north-south at KP177-179;
- Scattered woodlands around KP 191-193;
- Woodland/open forest between KP197-200; and
- Scattered open woodlands from KP210-218.6.

5.3.4 Impact Assessment

Threatened species, populations, communities and habitats

An assessment under the (draft) *Guidelines for Threatened Species Assessment* (DEC & DPI 2005) has been completed (refer Volume 2; Technical Report 2). The assessment considered six threatened fauna species recorded along the route (Brown Tree creeper, Diamond Firetail, Flame Robin, Little Lorikeet, Grey Falcon, Superb Parrot) in addition to the threatened fauna species listed above that are considered as having potential to occur.

Additionally the assessment considered the implications of the development on the EEC "White Box – Yellow Box – Blakely's Red Gum woodland", Darling River EEC and Lachlan River EEC.

The Ecological Assessment (Volume 2: Technical Reports – Technical Report 2) concluded that the proposed pipeline would be unlikely to result in any significant impacts to threatened species or communities. It considered that the proposal adequately addresses the biodiversity principle of 'avoid, mitigate, compensate', by avoiding areas of conservation value, minimising vegetation loss by the adoption of appropriate construction methods and adopting mitigation measures which will minimise potential impacts on biodiversity values in the locality.

Other species, populations, communities and habitats

As the native species mentioned in Section 5.3.2 already inhabit a highly disturbed and largely agricultural landscape, it is unlikely that the proposed pipeline will have lasting negative impacts on their continued use and habitation of the locality. The mitigation, management and monitoring recommendations in Section 5.3.5 will ensure any temporary impacts are minimised.

Connectivity and distribution

The areas of habitat listed in Section 5.3.3 will not be negatively impacted upon by the proposed pipeline. As these areas are already isolated and the proposal does not involve the further fragmentation of any habitat, habitat connectivity will not be adversely affected. In addition, as construction of the pipeline is relatively brief and the landscape will be restored to its previous state once the pipeline is installed, any existing habitat or connectivity values of the agricultural landscape will not be permanently affected.

Key threatening processes

Key threatening processes (KTPs), as listed under the TSC Act, are assessed in the Ecological Assessment in Volume 2. Most KTPs are considered unlikely. The following KTPs are considered possible:

- Invasion and establishment of Scotch Broom
- Loss of Hollow-bearing Trees
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands
- Invasion of native plant communities by exotic perennial grasses
- Bush rock removal
- Removal of dead wood and dead trees

One KTP – “clearing of native vegetation” – is likely.

Implementation of appropriate management measures, such as those given below, will ensure that invasion of weeds is prevented, clearing is minimised and waterway integrity is preserved and restored. Accordingly, long term or irreversible impacts from KTPs are considered unlikely.

5.3.5 Mitigation, Management and Monitoring Framework

A range of mitigation measures is given in the Ecological Assessment (Volume 2: Technical Report 2), these include:

- Preparation and implementation of a Sediment and Erosion Management Plan (SEMP) prior to, during and post construction of the pipeline. Detail will need to be provided on specific methodologies including, but not limited to managing erosion in watercourses requiring open cutting, heavily eroded watercourses requiring bank re-instatement and works on steep slopes.

- To minimise impacts on fauna which may utilise riparian and aquatic environments, open cut construction across watercourses will be completed during dry periods where possible. Use of a reduced RoW construction width, specialist crews and techniques will also minimise time and disturbance.
- A Weed Management Plan (WMP) will be developed prior to, during, and after construction to minimise the potential for the spread of weed species. Implementation of the WMP will remain the responsibility of the Principal Contractor, and eventually the Pipeline Operator.
- Fauna mortality or injury from animals falling into trenches will be reduced by closing trenches as quickly as possible. Fauna ramps at a distance of no greater than 200 metres apart will also be installed in trenches. The length of trench left open at any one time will be minimised wherever possible.
- Fauna spotters/handlers will be present during the construction process to inspect trenches at the start and finish of each day, with the task of removing any fauna from the trench and seeking treatment if any animals are injured.
- Any dead timber or debris within the construction area will be stockpiled and re-scattered post construction.
- Any vegetation requiring removal will be mulched and stockpiled to be re-spread over the works area post construction. Weedy vegetation will be removed from the site.
- Mature trees which may contain hollows, and isolated mature paddock trees will be retained within the RoW wherever possible. These will be located and flagged prior to construction.
- All construction workers (and any other relevant project employees) must be briefed at induction on all relevant environmental management procedures. A comprehensive Construction Environmental Management Plan (CEMP) will be prepared and it will be mandatory for all pipeline personnel including the Principal, Principal Contractor, Sub-Contractors, associated Consultants and all visitors to abide by and implement all directions as specified in the CEMP.
- Stockpiling of soil to be completed in compliance with current best practice guidelines.
- Works will not commence during periods of heavy rain.
- Areas of bare soil following construction (other than cultivated croplands) will be sown with non-invasive grass seed to prevent erosion.
- Liaison with property owners will be completed prior to works to discuss appropriate areas for revegetation where tree planting projects are disturbed.
- Regeneration of the RoW post construction to be monitored and seeding and/or enhancement planting undertaken if natural regeneration is not successful.
- Appropriate dust control measures to be employed during construction to prevent impacts on native flora and fauna.
- Appropriate noise and vibration control measures to be employed during construction to prevent impacts on native flora and fauna.

It is anticipated that the above measures would be included in the CEMP. The CEMP would typically address a range of issues including sediment and erosion control, native flora and fauna, cultural heritage, weed management etc. (refer also Section 2.5.3).

5.4 Heritage Impacts

5.4.1 Aboriginal Heritage

ERM Power Pty Ltd engaged CNC Project Management to carry out an Aboriginal Cultural Heritage Assessment (CHA) for its proposed Young to Wellington Gas Pipeline Project (refer Volume 2, Technical Report 3). This Assessment was conducted in accordance with the consultation procedures outlined in the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) and the *Interim Community Consultation Requirements for Applicants* (DEC 2004) as well as the *Draft Community Consultation Requirements for Proponents* (DECC May, 2009) and taking account of *Ask First; A Guide to Respecting Indigenous Heritage Places and Values* (AHC 2002).

The CHA followed the principles and guidelines of the Burra Charter (Australia ICOMOS Charter for Places of Cultural Significance 1999). Best practice was followed in all parts of the assessment, relying on the appropriate DECCW legislation and guidelines. The Aboriginal Cultural Heritage Assessment fulfilled due diligence obligations.

A field survey was conducted between 8 – 19 February and 1 – 10 March 2010. Field survey involved relevant representatives of registered stakeholders; with feedback sought with respect to participation and methodology prior to commencement.

Field survey was conducted when crops had been harvested and following the heat of January. Since most of the ground was previously cleared agricultural land used for grazing or crops, visibility and exposure was at a maximum just after harvest. Unfortunately, summer rains from the northern cyclones brought large amounts of rain. While visibility was hampered to some degree, it was considered adequate for the ground survey.

The field survey resulted in the recording of 18 sites; listed in Table 4 below. All sites have been registered in AHIMS. Another two sites of personal significance were noted during the field survey (refer Section 9.3.5, Tech. Report 3).

Table 4. Results of Cultural Heritage Field Survey

No.	Site Name	AHIMS No.	KP	Approximate Distance to Proposed Alignment (m)	Within Pipeline Corridor	Route Requires Slight Realignment Within Corridor
1	Power station CMT 1	36-4-0117	219.4	235	No	No
2	Power station CMT 2	36-4-0118	219.4	285	No	No
3	Watson's Creek Open Site 1	36-4-0121	207.3	0*	Yes	Yes
4	Cooyong old well	36-4-0120	204.1	33	Yes	No

No.	Site Name	AHIMS No.	KP	Approximate Distance to Proposed Alignment (m)	Within Pipeline Corridor	Route Requires Slight Realignment Within Corridor
	CMT 2					
5	Cooyong old well CMT 1	36-4-0119	203.5	20	Yes	Yes
6	Sunnyside CMT 1	36-4-0122	202.1	8	Yes	Yes
7	Neurea Meadows Open Site	36-4-0123	194.7	37	Yes	No
8	Baker's Swamp Ridge Open Site 1	36-4-0124	189.3	22	Yes	No
9	Red Hill CMT 1	36-4-0125	181	20	Yes	Yes
10	Eurimbula CMT 1	36-4-0126	176.4	220	No	No
11	Dora Creek CMT 1	44-1-0101	156	360	No	No
12	Scenic Road CMT 1	44-1-0102	127.3	75	No	No
13	Bourimbla Open Site 1	44-1-0103	111.7	0*	Yes	Yes
14	Back Mogong Road CMT 1	44-4-0363	92.5	20	Yes	Yes
15	Belabula Palaeochannel Open Site 1	44-4-0364	86.2	0*	Yes	Yes
16	North Logan Road CMT 1	44-4-0365	74	144	No	No
17	Garrallan CMT 1	44-4-0366	67.8	3	Yes	Yes
18	Bendick Murrell CMT 1	50-3-0022	15	75	No	No

* proposed alignment runs through the open site but can be realigned to avoid the mapped extremity of the site.

Table 4 demonstrates that of the 18 sites recorded during field survey, only 11 sites are within the pipeline corridor and are therefore relevant to this report. The remaining sites listed in Table 4 are further than 50m from the proposed pipeline alignment and therefore outside of the corridor to which this Environmental Assessment applies. Eight of the 11 sites (three open sites and five scarred trees; 3,5,6,9,13,14,15,17 in Table 4) will require slight adjustment of the proposed alignment to avoid the open sites entirely and the scarred trees by the recommended 30m.

5.4.2 Non-Aboriginal Heritage

There are no recorded non-Aboriginal heritage sites within the pipeline corridor.

5.4.3 Impact Assessment

A management regime of avoidance, collection and monitoring is recommended in the CHA. Review of the 11 sites within the pipeline corridor has confirmed that the pipeline alignment can be realigned to avoid all eight sites that are in close proximity to the proposed route (refer Table 4 above). The final location of the alignment, with consideration of all site constraints including heritage sites, will be confirmed during the detailed design stage of the project.

ERM Power proposes to monitor approximately 72 km of the pipeline route. This will ensure that impacts on known sites within the construction corridor are avoided and that any additional sites are located if encountered.

In addition, ERM Power proposes to survey and assess the pipeline construction corridor where access had not yet been granted (approximately 9.8km of the route) during the initial survey prior to pipeline construction.

In light of the above, it is unlikely there will be any negative impacts on Aboriginal cultural heritage as a result of the proposed pipeline construction and operation.

5.4.4 Mitigation, Management and Monitoring Framework

Ongoing strategies to avoid or minimise harm to Aboriginal Heritage include:

- avoidance of all identified Aboriginal sites;
- further consultation with relevant stakeholders;
- monitoring of the construction RoW to ensure site protection and identify any additional sites or objects where present;
- survey and impact assessment of land to which access was not granted prior to construction commencing; and
- contingency plans for unexpected events.

Impacts on non-Aboriginal heritage will be avoided by ceasing work within 25 metres of heritage items if observed during construction and contacting the relevant heritage specialist and government authority.

A range of measures to protect Aboriginal and non-Aboriginal cultural heritage will be contained within a Cultural Heritage Management Plan (CHMP), which will be prepared prior to construction. The CHMP will form part of the CEMP.

5.5 Human Amenity Impacts

5.5.1 Human Receptors

Human receptors to potential amenity impacts can be classified as one of the following:

- Receptor areas – residential areas that may contain sensitive receptors such as schools or hospitals;

- Isolated receptors – individual buildings or groups of buildings which are likely to be permanently inhabited;
- Sensitive receptors – schools, hospitals, retirement homes/ villages, childcare centres, libraries, recreation areas etc.

The Noise and Vibration Assessment for the Wellington power station project (PB, 2008) found that noise criteria were exceeded up to 500 metres from the power station. Therefore human receptors (of the types described above) have been identified for an arbitrary 600 metres either side of the proposed pipeline route – see Appendix L. These receptors are also depicted on the land tenure map series in Appendix T.

Route alignment has been adapted to minimise adverse impacts on human receptors.

There are 199 isolated receptors (128 of these are dwellings, the remainder are sheds) within a 600 metre distance either side of the pipeline route. There are no sensitive receptors or receptor areas within proximity of the route. The closest receptor (an isolated small shed) is 9.5 metres from the pipeline (at KP 54.5). The closest dwelling to the pipeline is 73.7 metres from the proposed route (at KP 85.3).

5.5.2 Noise and Vibration

As stated in Section 3.3.3, the existing noise environment along the proposed route is “rural” with generally low ambient noise levels. Current noise generating activity is reasonably expected to be relatively brief and commonly expected, such as agricultural machinery, occasional construction works, traffic noise etc.

The project’s objective in regards to noise and vibration is to ensure that any impacts on public amenity are minimised. The intention is to minimise the intrusion of construction noise and/ or vibration on any individual’s wellbeing.

Noise and vibration impacts from the proposed pipeline will be the result of construction activity and in particular the use of various plant and heavy machinery; mostly for trenching and restoration. Detailed noise levels have not been monitored along the pipeline route due to the total length involved and the predominately rural nature of the route. Typical noisy plant and machinery that will be employed for various tasks during pipeline construction and their usual noise levels are summarised below:

Plant or Machinery	Task	Typical Noise Level (dB(A))
Truck and Dog	Pipe and sand haulage	107
Excavator	Trenching/ loading and unloading pipe/ pipe laying	97-117
Dump Truck	Sand, soil and other equipment haulage	117
Front End Loader	Sand, soil etc. loading and unloading	103-111
Dozer	RoW clear & grade, reinstatement	102-114

Plant or Machinery	Task	Typical Noise Level (dB(A))
Vibrator	Compacting trench fill, concreting	103-112
Crane	Loading and unloading pipe	88-113
Diesel Generator	Power source	84-113
Jackhammer	Breaking rock	121
Concrete mixer	Concreting	107-111
Pneumatic tools	General construction activities	114-117

Source: DECC, 2008

The Interim Construction Noise Guideline (DECC 2009) identifies the “highly noise affected level” as above 75 dB(A). In addition, the Guideline lists the following as “very annoying activities”:

- Use of beeper style reversing alarms
- Use of power saws
- Grinding metal, concrete or masonry
- Rock or line drilling
- Vibratory rolling
- Bitumen milling or profiling
- Jack-hammering, rock hammering or rock breaking
- Impact piling

Vibration impacts on nearby residences may be continuous, impulsive or intermittent. Acceptable values recommended in Assessing Vibration: a Technical Guideline (DEC 2006) for each of the three types of vibration are summarised below.

Vibration Type	Example	Time Period	Maximum Acceptable Value*
Continuous	Machinery, steady road traffic, tunnel boring	Day time	0.014
		Night time	0.010
Impulsive	Dropping heavy equipment, loading and unloading	Day time	0.42
		Night time	0.14
Intermittent	Construction activity, passing vehicles, pile driving, jack hammers	Day time	0.40
		Night time	0.26

*Values for continuous and impulsive vibration are expressed as values for different orthogonal axes representing where vibration may enter the body. As the orientation of the person receiving the vibration is unknown the most conservative value is given here.

Potential impacts due to noise or vibration will be minimised by the fact that, although construction of the entire pipeline will take four to five months, construction activities are unlikely to be at one location for longer than a few days.

5.5.3 Air Quality

As stated in Section 3.3.2, ambient air quality in the region is predominately within recommended limits. Potential air quality impacts during construction could occur from dust generation due to:

- Clearing and reinstatement of the RoW;
- Erosion of the cleared RoW or stockpiles;
- Handling, transfer and storage of sand, topsoil, spoil, mulch and other materials;
- Trenching and backfilling activities; and
- Vehicle movements along access roads and the RoW.

Emissions from construction vehicles and machinery are a source of potential air quality impacts. Vehicle emissions contain harmful pollutants such as carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOCs) and particulate matter (PM). With estimated traffic volumes of up to 20 trucks and light vehicles to the equivalent of a further two trucks per hour, emissions may add up to a substantial amount over the life of the project.

5.5.4 Visual Amenity

As stated in Section 3.3.7, the predominant existing visual landscape in the vicinity of the proposed pipeline route is agricultural with some residential and natural areas. The construction phase will be visually prominent in the immediate vicinity of the work, but this will be limited in duration to approximately 4 weeks.

5.5.5 Impact Assessment

Noise and vibration

The proposed construction hours for the project are outside the standard hours of work recommended in the Interim Construction Noise Guideline (DECC 2009). These increased hours of work are necessary to shorten the life of the construction project and to achieve maximum efficiency from the specialist construction crews that will be predominantly working remotely on a fly in fly out basis e.g. three weeks on and one week off. The Guideline (DECC 2009) identifies public infrastructure works that shorten the length of the project and are supported by the affected community as one of the five categories of work that may be undertaken outside of standard work hours. Community support will be achieved over the life of the project via a program of ongoing stakeholder liaison.

Noise impacts will be limited to certain activities such as land clearing and excavation. Once these are complete, impacts will be reduced. In addition, construction crews will aim to complete a kilometre of the route daily (can be up to 3km per day). This

means that noise producing activities will likely be undertaken in each location for a day or so only.

Potential sources of vibration impacts include bulldozing and rock breaking. It is likely that rock breaking will be required at some locations along the pipeline route. The level of vibration from rock breaking is affected by the excavation method (i.e. rock sawing or blasting), type of rock and depth at which the rock is located (trench depth will be 1.3 – 1.7m). As for noise impacts, vibration impacts will only occur for short periods and will not be continuous. Residents should not be affected for more than a day or two in any location.

There are some activities, such as during tunnelling or boring, filling the pipeline with water for hydro-testing and transporting equipment and pipe along main roads, where operating continuously is more beneficial to overall public amenity as it reduces construction time and long term impacts.

Based on past pipeline projects, the appointment of experienced pipeline contractors with experience in similar projects throughout Australia can minimise the impact of noise or vibration on landholders via effective consultation and the implementation of standard accepted construction techniques and mitigation measures.

The Interim Construction Noise Guideline (DECC 2009) recommends a quantitative noise assessment for public infrastructure projects. While the proposed pipeline fits the definition of an infrastructure project, it is comparatively minor due to the rapid progression of construction along the pipeline length and the relatively short construction timeframe, both in total and at each site. Nevertheless a desk-top quantitative assessment of potential noise impacts has been undertaken by Wilkinson Murray (refer Tech. Report 6 in Volume 2).

The Noise Assessment states that works involving dozers will emit the most noise (excavators, rock breakers, cranes etc. are also noisy). The Assessment (refer Section 6) sets noise goals for the project (based on an average RBL of 30 dB(A)) for works in and outside of the standard construction hours. Goals range from 40 dB(A) in standard work hours to 25 dB(A) at night. However it also sets a night time sleep disturbance goal of 45 dB(A). The Assessment (refer Section 6) sets a goal of 5mm/s for vibration.

The Noise Assessment (refer Section 8) has predicted noise levels for the project using generic attenuation due to spherical spreading, ground absorption and air absorption. In reality these levels are likely conservative as many other factors, such as local topography and vegetation, can attenuate noise. Nevertheless the Assessment has found that noise goals will be exceeded in proximity to receptors. The Assessment therefore has set buffers to construction activity for work outside of standard construction hours. These buffers range from 250m for low noise activities on weekends, evenings or at night; to 1400m at night for noisy activities that do not have justifiable benefits such as those previously referred to i.e. they can be rescheduled without any adverse impact to the project timeframe.

The Assessment concludes that works can be undertaken within the buffers if:

- Tonal reversing alarms on vehicles and plant are removed;
- Noisy plant is not used in the early morning period between 6-7am;
- Rock breaking is not undertaken at night;
- An audit of the noise emissions from the selected plant items once the detailed methodology is finalized is conducted and the assessment of buffer distances revised accordingly;
- Agreements are negotiated with landowners within the buffers to conduct noisy works outside the standard construction hours with the trade off being that the duration of exposure will be decreased; and
- A detailed, real-time complaints handling system is implemented with the commitment to investigated noise levels and stop work if required when complaints are received.

Other recommendations for the mitigation, management and monitoring of noise and vibration impacts are given in Section 5.5.6.

Operational noise and vibration will be minimal and similar in scale to existing landuse activities; therefore it is unlikely that there will be any adverse noise or vibration impacts during pipeline operation.

Air quality

Air quality impacts during operation should be minimal unless the easement is not vegetated in which case there is the potential for dust to be generated by vehicles travelling along the pipeline length. Management recommendations for reducing air quality impacts during operation will be addressed in the OEMP. There is little likelihood of gas leak during operation; this issue will also be addressed in the OEMP. Vehicle emissions during operation will be minimal.

Recommendations for the mitigation, management and monitoring of air quality impacts are given in Section 5.5.6.

Visual amenity

Construction activity will be visible to the isolated receptors listed in Appendix L, i.e. residences or buildings within 600 metres of the pipeline route. Any adverse visual impacts will be short term, i.e. typically no longer than four weeks in any one location. Once the pipe is laid and the RoW is reinstated, the pipeline will be largely invisible apart from above ground valves and marker signs and the easement will look again like the surrounding landscape. Accordingly impacts will be minor and reversible.

Recommendations for the mitigation, management and monitoring of visual amenity impacts are given in Section 5.5.6.

5.5.6 Mitigation, Management and Monitoring Framework

Noise and vibration

Recommended mitigation measures to minimise noise impacts include:

- Noise management to be specifically addressed in the CEMP. Measures prescribed may include, but are not limited to:
 - Regular contact with affected individuals during construction to provide progress updates and notify of any particularly noisy activities;
 - Training of all staff on actions to minimise noise during work activities;
 - Noise and/ or vibration monitoring either in response to complaints or as part of a regular monitoring program;
 - Scheduling of particularly noisy activities for less sensitive times of the day e.g. not early morning, late afternoon, or outside of standard work hours;
 - Undertake condition surveys prior to commencement of construction where required;
 - Consider use of respite times, where no noisy activities are undertaken, if construction is located in one place for longer periods;
 - Site noisy plant or machinery behind existing barriers such as earth mounds, vegetated screens etc.;
 - Operate noisy machinery separately rather than concurrently;
 - Maintain all plant and equipment regularly;
 - Avoid excessive idling of machinery or vehicles and minimise reversing of vehicles (reduce use of or use substitutes for reversing beeper);
 - Locate access roads and ancillary facilities away from residences to minimise traffic noise;
 - Restrict use of heavy vehicles on existing roads to standard work hours wherever possible;
 - Use mufflers or quiet technology wherever possible;
 - Construct noise enclosures or barriers for particularly noisy activities or plant where applicable; and
 - Consider temporary relocation or architectural treatments for particularly affected landowners.

Intended construction activities and impacts such as noise and vibration will be discussed as early as practicable once the project commences with all affected landowners.

Blasting, if required, will be undertaken in accordance with specific procedural guidelines and with reference to the Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC 1990).

Air quality

Recommended mitigation measures to minimise air quality impacts include:

- Air quality management to be specifically addressed in the CEMP. Measures prescribed may include, but are not limited to:

- Air quality monitoring near sensitive receptors either in response to complaints or as part of a regular monitoring program;
- Regular watering of the RoW and any relevant stockpiles;
- Road sweeping of dust accumulating on sealed roads;
- Disturbed areas to be revegetated and/ or stabilised as soon as possible after construction complete;
- Clearing, grading and excavating to be avoided wherever possible in windy conditions i.e. when wind speeds over 40 km/h are experienced or predicted;
- Speed limits to be imposed for all traffic on the RoW and access roads;
- Grids and/ or wheel wash facilities at RoW and ancillary facility exits;
- All loose material loads eg sand, mulch, spoil etc., to be covered;
- Vehicles and machinery to be regularly maintained and cleaned;
- Reduce vehicle and machinery idling and revving;
- Vehicles and machinery to be fitted or purchased with emission reduction technology wherever possible; and
- Encourage car pooling by employees to work and to site.

Visual amenity

Recommended mitigation measures to minimise visual amenity impacts include:

- Visual amenity management to be specifically addressed in the CEMP. Measures prescribed may include, but are not limited to:
 - The RoW to be reinstated and revegetated as soon as practicable after completion of construction;
 - The RoW and ancillary facilities to be kept orderly and clean at all times; and
 - Final cleanup to ensure all rubbish, construction materials, flagging tape etc. is removed from the easement.

5.6 Socio-Economic Implications

5.6.1 Socio-economic impacts

The main aspects of the existing socio-economic environment have been described in section 3.3.9 of this report.

The pipeline will be constructed in rural areas with low population densities. Residents of these farming areas are familiar with, and often interested in, the operation of heavy machinery.

Some landowners may experience restricted access to parts of their land affected by construction work for a short period of time, and there may be some disruption to normal rural activity due as a result of this.

Easements will be required to protect the pipeline, so there will be some restrictions on activities in the 20-30m wide easement such as tree planting, excavations, dams, and erection of farm structures. Landowners will be compensated for easements, either by negotiation with the proponent or through Just Terms Compensation.

Construction of the pipeline will require specialist equipment and trained personnel. The pipeline will also provide some employment opportunities for local residents to supply incidental and support services such as earthmoving or vegetation removal.

Towns and villages along the route will benefit from purchases and incidental expenditures by up to 250 construction personnel. Accommodation providers may benefit from the presence of construction crews in local towns for a few weeks at a time.

The pipeline will assist in attracting energy-based industries, and will contribute to local confidence in the energy security of the region and its economic and industrial future.

Potential impacts on amenity due to noise, visual impact, hazards, air quality etc. have been addressed in other sections of this report.

There will be no or negligible socio-economic impacts during operation.

5.6.2 Mitigation, Management and Monitoring Framework

The potential for adverse socio-economic impacts will be minimised through:

- Local and regional publicity regarding construction timeframes and works
- Fair compensation to landowners for easements
- Negotiation with landowners regarding access to private property
- Provision of local employment opportunities and purchase of local materials wherever possible

5.7 Hazards and Risks

5.7.1 Risk Assessment

State Environmental Planning Policy No. 33 applies to proposals that meet the policy's definition of "potentially hazardous industry" or "potentially offensive industry". For development classified as "potentially hazardous industry", a preliminary hazard analysis (PHA) must be undertaken to determine the risk to people, property or the environment. The PHA must accompany any application for development consent (including under Part 3A).

To determine whether a proposal is potentially hazardous or offensive industry, the activity must fit the description of "industry" or "storage establishment" under the relevant planning instrument. Neither term is specifically defined in any of the LEPs that pertain to the route. The *Environmental Planning and Assessment Model Provisions 1980* define "industry" as:

(a) any manufacturing process within the meaning of the Factories, Shops and Industries Act 1962, or

(b) the breaking up or dismantling of any goods or any article for trade or sale or gain or as ancillary to any business,

but does not include an extractive industry.

"Storage facility" is not defined in any relevant legislation. The Macquarie dictionary defines storage as "the act of storing, state or fact of being stored, space for storing" and facility as "building(s) designed for a particular purpose." The proposed gas pipeline fits the definition of a storage facility.

SEPP 33 defines "potentially hazardous industry" as:

"development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

(a) to human health, life or property, or

(b) to the biophysical environment,

and includes a hazardous industry and a hazardous storage establishment."

To further assist in the definition of potentially hazardous industry, a detailed checklist and risk screening procedure has been developed by the Department of Planning. If the screening identifies the proposal as a potentially hazardous industry then a Preliminary Hazard Analysis (PHA) must be undertaken. The guidelines for the preparation of the PHA are contained within *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis*.

A PHA has been undertaken in accordance with relevant guidelines (refer Technical Report 1 in Volume 2).

5.7.2 Impact Assessment

The PHA found that potential hazardous incidents could include external pipeline interference and gas release, pipeline corrosion and weld/ material defects. To minimise risk from these incidents various separation distances depending on the type of development, in accordance with relevant risk criteria, are recommended (refer Table 1.1 in PHA).

There are 15 residential dwellings that do not comply with the recommended minimum separation distance (refer Appendix L). A PHA will be prepared to determine the relevant management for these sites (and any other relevant issues) prior to construction.

Due to the low population densities and the absence of residential land within standard heat radiation exposure levels, the risk of injury was not required to be quantified.

5.7.3 Mitigation, Management and Monitoring Framework

The FHA will further define the management required once detailed pipeline design is finalised. The FHA will address impacts during construction, operation and decommissioning.

Public safety could potentially be impacted during construction of the pipeline. Restricting access to construction areas, effective communication to landowners and the general public and adequate management of increased traffic will reduce the risk of potential impacts. Easement agreements will ensure there is little risk to landowners during pipeline operation.

5.8 Surface and Groundwater Impacts

5.8.1 Waterway Crossings

There are 177 watercourse crossings identified along the pipeline route (refer Appendix D). Of these only nine are perennial waterways. The remainder are either non-perennial waterways or gullies. Four of the nine perennial watercourses – the Lachlan, Belabula, Bell and Macquarie Rivers - will be crossed using HDD techniques to minimise environmental impacts (refer Section 2.5.2).

Two other waterways, Bourimblah Creek and Booree Creek, are considered to have significant environmental value. Refer to the Ecological Assessment (Volume 2, Technical Report 2, Table 8) for further details. The appropriate method for crossing these Creeks will be determined after detailed site inspection and design. Crossing may be undertaken using HDD or open cut (with or without flow diversion) depending on site conditions.

All other waterways will be crossed using an open cut technique. The detailed method of crossing all waterways will be determined during detailed design, taking surface and groundwater resources and impacts into account.

Prior to detailed design of each crossing, a detailed assessment of the waterway will be undertaken to determine the following:

- Presence and status of native riparian vegetation
- Level of weed infestation
- Fish habitat class (as per Fairfull & Witheridge 2003)
- Stream order (as per Strahler 1957)
- Presence of threatened species or EEC
- Downstream uses or sensitivities eg waterholes/ wetlands etc.
- Bank stability and steepness
- Presence of rock
- Channel morphology
- Environmental flow requirements
- Landowner requirements

The above assessment will take the form of a specific site based risk assessment of each significant waterway prior to each crossing. The assessment will be undertaken by the construction environmental team or the construction team if delegated by the relevant environmental officer.

Following assessment of each waterway, detailed design and procedural guidelines will be prepared to direct construction and rehabilitation. These will also consider the requirements of the following:

- The NSW State Rivers and Estuaries Policy (NSW Water Resources Council 1993)
- Guidelines for Controlled Activities – Riparian Corridors (NSW Department of Water and Energy (DWE) 2008)
- Guidelines for Controlled Activities – Watercourse Crossings (DWE 2008)
- Guidelines for Controlled Activities – Laying Pipes and Cables in Watercourse (DWE 2008)
- Guidelines for Controlled Activities – In-stream Works (DWE 2008)
- *Managing Urban Stormwater: Soils and Construction* (NSW Landcom 2004)

5.8.2 Groundwater

The NSW Inland Groundwater Shortage Zones Orders 1 & 2 (gazetted under the *NSW Water Act 1912*) restrict extraction of groundwater in the various Groundwater Management Areas (GWMA) in inland NSW (refer Figure 11).

The pipeline passes through the GWMA of Upper Macquarie Alluvium, Bell Valley Alluvium, Lachlan Fold Belt, Orange Basalt, Upper Lachlan Alluvium and Young Granite. Orders 1 and 2 apply to different sections of the route. Both Orders allow dewatering so long as extraction does not exceed 10 megalitres per annum. It is not envisaged that dewatering amounts would exceed this requirement. Specific procedures for dewatering using current best practise will be developed during the design and construction phases.

5.8.3 Construction Water Supply

Construction water

The main use for water during construction is for dust suppression and camp facilities. Approximately 110m³ per kilometre (or 24,090m³) will be required. This water will be sourced from town water supplies, bores, dams or watercourses.

In anticipation, advice has been sought from local Councils regarding known or preferred water supplies. No preferences or recommendations have been received as yet but consultation will be ongoing with Councils and relevant stakeholders. Wellington Council has responded that water can be provided on a cost recovery basis if required. It is noted that availability of town water is subject to each LGA's licenced entitlement and allocation under the *Water Management Act 2000*.

If water is required from regulated watercourse an approval under the *Water Management Act 2000* will be sought. If water is to be extracted from unregulated rivers, creeks or dams, a permit under the *Water Act 1912* will be sought. If water is required from bores, a license replacement in accordance with the *Water Act 1992* will be sought.

Location and volumes of water to be accessed will be finalised at the detailed design stage and appropriate approvals sought prior to construction.

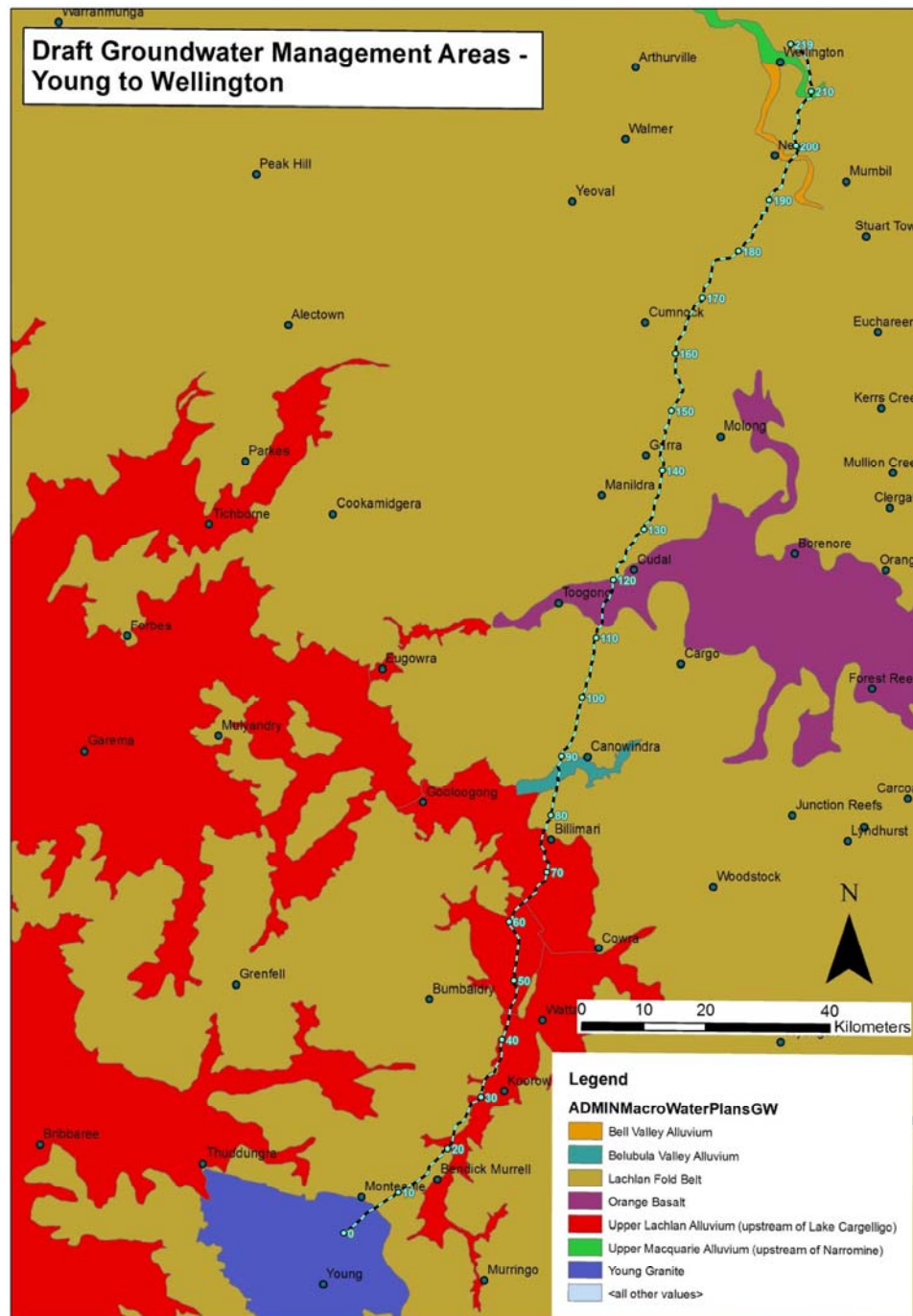


Figure 11 Groundwater Management Areas in the Young to Wellington region (Source: DECCW).

Hydro-test water

Approximately 9,217m³ of water will be required for hydrostatic testing of the pipeline. Hydro-test water can be recycled by testing sections of pipeline sequentially, so that water is reused in successive sections. This water will be sourced from town water supplies, bores, dams or watercourses.

Initial contact has been made with the Councils along the proposed pipeline route to ascertain their preferences for sourcing hydro-test and construction water. Wellington Council has responded that water can be provided on a cost recovery basis if required. It is noted that availability of town water is subject to each LGA's licenced entitlement and allocation under the *Water Management Act 2000*.

Use of water from regulated watercourses for hydro-testing is exempt from seeking approval under the *Water Management Act 2000*. However, if water is to be extracted from unregulated rivers, creeks or dams, a permit under the *Water Act 1912* will be sought. If water is required from bores, a license replacement in accordance with the *Water Act 1992* will be sought.

Location and volumes of water to be accessed will be finalised at the detailed design stage and appropriate approvals sought prior to construction.

Corrosion inhibiting chemicals may be added to the hydro-test water depending upon the quality of the available water and the length of time the water is required to be held in the pipe. These chemicals will be selected to minimise their potential to cause harm to the environment whilst adequately protecting against corrosion in the pipeline. Hydro-test water will not be discharged directly to natural water bodies. The quality of hydro-test water will be determined prior to its disposal and if appropriate the discarded water will be supplied for beneficial use in consultation with landowners. Water quality will be tested against the Australian and New Zealand Environment Conservation Council (ANZECC) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) (Guidelines). Where water is not suitable for beneficial use it will be disposed of to land typically through a settling basin with erosion control. This will be determined in consultation with landowners.

5.8.4 Impact Assessment

Waterway crossings

Crossings will be designed on a case by case basis to ensure minimum impact on water resources and other environmental values. Directional drilling will minimise impacts on the major crossings of the Lachlan, Belabula, Bell and Macquarie Rivers. The most appropriate techniques will be employed for the two other significant waterways i.e. Bourimblah Creek and Booree Creek. All other waterways will be crossed using an open cut method with or without flow diversion as required.

There should be no impact on waterways during pipeline operation.

Groundwater

The potential for adverse impacts on groundwater is currently mitigated by the operation of the NSW Inland Groundwater Shortage Zones Order 1 & 2.

An assessment of the likely risk of encountering and impacting on groundwater during construction of the pipeline has been undertaken (refer Technical Report 5, Volume 2). The assessment considered it highly unlikely that construction activities would disrupt groundwater systems. Recommended mitigation measures to avoid impacts on groundwater are included in Section 5.8.5.

There should be no impact on groundwater during pipeline operation.

Water supply

As described in Section 5.8.3, approximately 33,307 m³ of water will be required during construction of the pipeline. The water will be sourced from town water supplies, bores, dams or watercourses. Initial contact regarding supply of water has been made with the relevant Councils. This liaison will be ongoing. ERM Power accepts the commercial risk associated with the supply of water for the project.

There should be no impact on water supply during pipeline operation.

5.8.5 Mitigation, Management and Monitoring Framework

The following mitigation measures are recommended to prevent impacts on waterways, groundwater reserves and water supplies:

- Site specific assessments to be undertaken of each of the six significant waterway crossings prior to construction. The assessments to consider a range of relevant issues (refer Section 5.8.1). Following assessment, detailed designs and procedures to be prepared for each waterway crossing (or type) in accordance with all relevant policies, guidelines and legislation.
- Where significant groundwater hosted by a permeable lithology is encountered, i.e. a discharging spring, the trench immediately downslope from the discharge zone should be backfilled and sealed using bentonite or equivalent to prevent change in the groundwater flow.
- Areas of unconsolidated sediment found during trenching should be directionally drilled from points outside the unconsolidated unit to avoid disturbance of groundwater systems potentially present.
- That the trench be filled with material matching the porosity/permeability of the unit found in the section of trench. Ideally this material would be the spoil from the trenching operations in the affected section. If the trenched materials are layered (topsoil, subsoil, clays, gravels) efforts should be made to replace the different materials back in the trench in their original order.
- Ongoing liaison to be undertaken with relevant agencies regarding access to water supplies.
- Hydro-test water will not be discharged directly to natural water bodies.
- The quality of hydro-test water will be determined prior to its disposal and if appropriate the discarded water will be supplied for beneficial use in

consultation with landowners. Water quality will be tested against the ANZECC Guidelines. Where water is not suitable for beneficial use it will be disposed of to land typically through a settling basin with erosion control. This will be determined in consultation with landowners.

- The CEMP to include the relevant actions described above with respect to waterways crossings, groundwater breaches, dewatering, release of hydro-test water etc.
- No vehicle access over waterways during pipeline operation.

5.9 Infrastructure Impacts

5.9.1 Affected Infrastructure

Road and rail crossings

The proposed route includes 123 road or rail crossings (refer Appendix E), however only 28 of these are sealed roads of two or more lanes. There are five rail crossings.

Other infrastructure crossings

Known infrastructure crossings, namely gas and power lines, are listed in Appendix F. There are 18 known crossings. The location of other infrastructure within the pipeline RoW will be confirmed prior to construction.

5.9.2 Impact Assessment

The major potential impacts from road or rail crossings are disruption to traffic flow and road/ rail usage and damage to the infrastructure during construction. These issues may in turn impact on user safety.

Impacts from failed infrastructure crossings could include disruption of supply from accidental disconnection and potential human safety issues if lines are cut.

There should be no impact on crossed infrastructure during pipeline operation.

Road, rail and other infrastructure crossings will use either an open cut or bored method. The most appropriate method for each crossing will be determined at the detailed design stage in consultation with the infrastructure service provider.

5.9.3 Mitigation, Management and Monitoring Framework

The location of all infrastructure crossings buried and above ground will be surveyed and located during detailed route survey and design. Prior to construction all buried services will be physically located by pot holing or by controlled excavation.

Potential impacts at infrastructure crossings can be minimised by:

- Implementation of a Traffic Management Plan prior to construction to outline methods to manage any disruption to traffic and user safety;
- Crossings to be constructed as quickly as safely possible to reduce duration of potential impacts;
- Liaison with relevant authorities and stakeholders e.g. RTA, Councils, Transgrid, Country Energy, Telstra, landowners, neighbours etc.;
- Adequate notification of affected individuals and the general public prior to the commencement of crossings;
- Increased burial depth for crossings where relevant; and
- Reinstatement of crossings immediately on completion of construction.

5.10 Traffic and Transport Impacts

5.10.1 Proposed Routes

Construction traffic will use the existing network of highways and local roads including:

- Main Road (MR) 41 - Olympic Highway
- Highway (HW) 24 - Mid Western Highway
- Lachlan Valley Way
- Escort Way
- MR 90 (Boree to Parkes section)
- MR 32 - Mitchell Highway (national road)

Transport routes will depend on the source of pipe and the construction program. Routes will be based on efficiency, practicality (with regard to vehicle load clearances, turn radii, obstacles etc.), safety and other considerations identified during the design phase.

Laydown areas will be located for maximum operational convenience, efficiency and safety with regard to traffic management.

Access to the pipeline route during construction will utilise existing property gates wherever possible. Temporary gates may be required, subject to negotiation with landowners.

5.10.2 Timing

The pipeline will be laid in one full time work program extending over four to five months. Vehicle movements to and from any specific location will occur over periods of a few days to a few weeks.

During construction, weekly inspection patrols will monitor progress and construction issues.

Post-construction, there will be periodic inspection and maintenance patrols in vehicles (i.e. typically most inspections are done from the air).

5.10.3 Traffic Volumes

Specialised heavy machinery will need to be transported to the commencement location, and relocated at the end of the job. Movement of heavy machinery during construction will generate an increased volume of traffic, therefore traffic management will be required when this machinery is operating on public roads or is being transported between locations. Various materials eg pipe will also be delivered via road or rail.

In the construction stage, the majority of traffic will be generated by vehicle movements to and from accommodation for the construction crew of 200 to 250 personnel. The use of mini-buses will be considered in the detailed project design. Depending on accommodation arrangements and vehicle passenger capacity this could mean up to 50 additional vehicle movements per day on local road networks.

Routine inspections during construction will require a few vehicle movements per week along the 219km route.

As stated above, vehicle movements during operation will be negligible.

5.10.4 Traffic Noise

Noise targets for existing roads are as follows:

Road Type	Target dB(A)		Where Noise Criteria Already Exceeded
	Day	Night	
Arterial	60	55	Traffic should not lead to an increase in existing noise levels of more than 2 dB.
Collector	60	55	Traffic should not lead to an increase in existing noise levels of more than 2 dB.
Local	55	50	Traffic should not lead to an increase in existing noise levels of more than 2 dB.

Source: Environmental Criteria for Road Traffic Noise, EPA 1999

5.10.5 Impact Assessment

The potential for negative impact from traffic, such as increased noise, traffic disruptions etc., is confined to the construction stage.

Transport of oversized loads, including specialised machinery and overlength pipes, will require traffic management practices in accordance with existing RTA guidelines.

Local road users will experience an increase in the number of vehicles on local highways and roads for several weeks. The expected average daily traffic increase of 50 vehicle movements per day will be within the capacity of most public road systems.

On some minor roads the increased vehicle movements will be noticeable but this will be mitigated by the fact that the increase will be limited to a few weeks. Additionally, there will be a high level of public awareness of the project and its associated activities and traffic movements.

The frequency and total number of vehicle movements does not warrant any pre-construction improvements to road surfaces or alignments.

Once the pipeline is operational, the traffic involved in routine maintenance will have a negligible impact and will be well within the capacity of highways and local roads.

5.10.6 Mitigation, Management and Monitoring Framework

A Traffic Management Plan will be prepared prior to work commencing. This plan will provide all personnel involved in management and construction of the pipeline with systems and procedures for managing traffic including:

- Traffic route selection
- Hours of operation
- Scheduling movements of oversized vehicles, including specialised heavy machinery and pipes, to avoid peak times
- Reinstatement of excavated road surfaces and road shoulders
- Management of noise impacts and complaints
- Safe work practices

Many of the measures recommended to mitigate construction noise and vibration (refer Section 5.5.6) can be employed to minimise impacts from traffic noise. Publicity in local communities will increase local driver awareness of construction and the temporary increase in vehicle movements.

5.11 Waste and Hazardous Materials

5.11.1 Waste Management and Chemical Handling

Construction waste will be generated from materials packaging, surplus-to-requirements construction material, occasional maintenance of vehicles, and excavated material.

Overburden and spoil from excavations will be stored and reinstated as backfill over the pipe. Volumetric displacement by the pipe may result in small amounts of earth being relocated or dispersed on farmland (with the landowners' permission) or removed to landfill areas.

Bentonite slurry will be used to lubricate drilling equipment. Slurry will be disposed of in accordance with legislative requirements.

General waste from workers and work/ camp sites such as packaging, paper, food scraps, bottles etc. will be removed from the construction site and disposed of via existing mechanisms such as local waste management facilities. Recycling, such as the use of bottle and paper bins etc., will be encouraged wherever possible.

Typical chemicals and other potential contaminants used or produced during pipeline construction include fuels, oils, lubricants, pesticides/ herbicides/ bactericides and biological human waste, etc.

In NSW waste is classified into six categories in accordance with the Waste Classification Guidelines (DECCW 2009). Typical waste expected during construction of the proposed pipeline is summarised in Table 5 below for each waste class.

Table 5. Waste Class and Type for Construction Activities

Waste Classification	Waste Type	Activity Generated By:
Special Waste	Tyres	Maintenance of construction vehicles and machinery
Liquid Waste	Hydro-test water	Hydrostatic testing
	Concrete and Bentonite slurry	HDD
	Biological human or organic waste	Maintenance of ablution and kitchen facilities at camp or office sites
	Fuel, oil, engine coolant etc.	Maintenance of construction vehicles and machinery
Hazardous Waste	Lead-acid or nickel-cadmium batteries	Maintenance of construction vehicles, equipment and machinery
	Any other material that meets the definition of dangerous goods under the <i>Australian Code for the Transport of Dangerous Goods by Road And Rail</i> eg. explosives, flammable solids, corrosives, radioactive material etc.	Various activities such as rock blasting if required etc.
Restricted Solid Waste	None currently classified in the Guidelines	
General Solid Waste (Putrescible)	Food waste	Maintenance of ablution and kitchen facilities at camp or office sites
	Biological human waste	
General Solid Waste (Non-Putrescible)	Recyclables – glass, aluminium, PETs, scrap metal, paper and cardboard	General construction activities and operation of camp and office sites
	Concrete, brick, building rubble, soil, wood and timber products, washed or	

Waste Classification	Waste Type	Activity Generated By:
	drained liquid containers	
	Vegetation	Clearing of RoW
	Oily rags, filters, absorbent material (no liquid) etc.	Maintenance of construction vehicles, equipment and machinery
	General packaging	General construction activities and operation of camp and office sites

5.11.2 Impact Assessment

Waste generation will be largely confined to the construction stage.

Construction waste will predominantly be limited to the construction corridor and ancillary facilities. Waste will be managed by stockpiling and regular disposal to appropriately equipped disposal areas, and will be within the capacity of existing waste management systems.

Detailed arrangements for waste management will be specified in the CEMP. The general principle of avoid, reduce, reuse, recycle, dispose will be complied with as far as is practicable.

5.11.3 Mitigation, Management and Monitoring Framework

The CEMP will address waste management, including collection and disposal, in accordance with relevant guidelines and legislation. In addition, the CEMP will outline specific procedures and the emergency response for spills of any liquid or hazardous wastes. General principles for the management of each waste class are summarised below in Table 6.

Table 6. Principles for Management of Each Waste Class

Waste Class	General Management
Special Waste	Waste must be tracked if taken interstate. Disposed of at an approved waste facility.
Liquid Waste	Review requirements of specific Material Safety Data Sheets (MSDSs). Separate and store appropriately away from waterways in sealed and labelled containers within a bunded area. Disposed of at an approved waste facility.
Hazardous Waste	Review requirements of specific MSDSs. Separate and store appropriately away from waterways in sealed and labelled containers within a bunded area. Must be tracked and transported by a licensed contractor. Disposed of at an approved waste facility.
Restricted Solid Waste	None currently specified in the Guidelines.
General Solid Waste (Putrescible)	Separate and store appropriately in sealed and labelled containers. Disposed of at an approved waste facility.
General Solid Waste (Non-Putrescible)	Separate and store appropriately. Disposed of at an approved waste facility. Recyclables can taken to a recycling facility. Vegetation can be mulched and respread over the RoW.

5.12 Consultation

5.12.1 Methodology

A range of typical techniques for community consultation were employed to gauge stakeholder and general public feedback regarding the proposal. These are discussed in following sections. The consultation methodology was devised with reference to the *Guidelines for Major Project Community Consultation* from the Department of Planning (October 2007).

Planning Focus Meeting

To assist with consideration of the Preliminary Environmental Assessment and preparation of the DGRs, the Department of Planning convened a Planning Focus Meeting in Wellington (Council Chambers) on 29 June 2009. This meeting was attended by representatives of three of the four Councils and several State government departments. Minutes of the meeting, including attendees, are included in Appendix A.

Consultation with authorities

Various agencies who were not invited or did not attend the Planning Focus Meeting were contacted by mail. Authorities contacted:

- Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA)
- NSW Department of Lands (now LPMA)
- DPI (Minerals & Petroleum)
- Rural Lands Protection Boards (now Livestock Health and Pest Authorities, LHPA)
- Lachlan and Central West Catchment Management Authorities (CMA)
- Country Energy and Transgrid
- Australian Rail Track Corporation (ARTC)
- Landcare (via the Orange and Cowra Regional NRM Facilitators)

Aboriginal stakeholders

Various Aboriginal stakeholders have been consulted to inform this report. This process is ongoing. Details of those contacted and the results of consultation are described in Section 5.4.1 and in the report (Volume 2: Technical Report 3).

Public information sessions

Information sessions were conducted as follows:

- Wellington Soldier's Memorial Club, Tuesday 29 September from 2pm to 6pm; advertised in the Wellington Times.
- Molong RSL Club on Wednesday, 30 September from 2pm to 6pm; advertised in the Central Western Daily.
- Cowra Civic Centre, Thursday 1 October from 2pm to 6pm; advertised in the Cowra Guardian and the Young Witness.

Landowner liaison

A detailed program of contact with affected landowners has been implemented. Details of the methodology and outcomes of this program are included in the report in Volume 2: Technical Reports (Technical Report 4).

The proposed alignment affects 178 properties. All of the affected landowners have been contacted and most were met face to face between July 2009 and October 2009. Landowners not available for consultation were posted an information package and, on request, landowners were provided with information by email and/or post.

The majority of landowners (96% to date) have agreed to allow further access for additional survey.

Media

Several media interviews were conducted by ERM Power (and LandPartners Limited) over the course of the preparation of this document with a range of media organisations including:

- ABC Local Radio - Orange
- Radio 2TM - Tamworth
- Prime TV - Orange
- The Leader - Tamworth
- Wellington Times – Wellington
- Cowra Guardian - Cowra
- Southern Weekly – Wagga Wagga
- Daily Liberal - Dubbo

Other

All mineral exploration license holders affected by the proposed pipeline route have been contacted by mail. Various consultations have been held with Councils, state agencies and others regarding specific issues addressed in this report.

5.12.2 Outcomes of Consultation

The **Planning Focus Meeting** enabled discussion of the project and Council and State agency requirements/ concerns. Written responses were provided by State agencies and Councils after the meeting, raising a number of issues that were included in the DGRs and have been taken into consideration in this Environmental Assessment. Some issues have been factored into the draft Statement of Commitments to be addressed at the design and/or construction stages.

The **public information sessions** attracted low levels of interest:

- Wellington, 29 September 2009 – attendance: 4 people (2 couples), none of whom were affected by the pipeline.
- Molong, 30 September 2009 – attendance: nil.

- Cowra, 1 October 2009 – attendance: 4 people. One couple were affected landowners but had no issues with the pipeline and had already spoken to project land agents. The other two attendees were unaffected by the pipeline.

Advertising for the public information days attracted some local media and other interest:

- At Molong, the NSW Director of ERM Power was interviewed by Prime television (based in Orange) and this was an item on the 6pm news on 30 September.
- At Cowra, the local newspaper (Cowra Guardian) sought information for an article and future reference, although it is unknown whether the article was published.
- Weddin Shire Council contacted ERM Power to request that they consider how the pipeline could service Grenfell. ERM Power intends to meet with Weddin Council to discuss this. Grenfell is approximately 50 kilometres west of Cowra.
- Gallangabang Aboriginal Corporation contacted ERM Power to request prior notification of future meetings.

Landowner consultation resulted in some site specific refinements to the pipeline alignment. Common concerns raised by landowners are documented in the consultation report and include:

- The ability to subdivide their property once the pipeline has been constructed.
- The distance from the pipeline that any future housing must be built.
- A better alignment maybe possible on the property that does not impact on the farm operations to the same extent as what is being proposed.
- Impacts on and disruption to farming infrastructure – water supply, drainage lines and fences during the construction period.
- Timing of the construction in relation to the cropping and other farming activities.
- The degree of restoration and rehabilitation that will be carried out after construction.
- Environmental impacts, soil erosion, top soil loss, loss of trees.
- How compensation would be calculated for the easement and loss of productivity from the land.

Appropriate steps will be taken to ensure occupational health and safety and biosecurity on all properties during pipeline construction and operation to alleviate landowner concerns.

For reasons of privacy and commercial confidentiality the full details of consultations with individuals have not been submitted, but have been maintained in proponent and consultant records for future reference.

Some **state and local authorities** have responded with useful information and advice on the type of issues that may arise during construction and operation of the pipeline. These responses have been factored into the report and the Statement of Commitments. Acknowledgement of the receipt of correspondence and contact details

for further correspondence has been received from (refer to the above list); DPI (Minerals and Investment) now Industry and Investment NSW (IIN), ARTC, Transgrid, Telstra (not previously contacted), LPMA, LHPA, and Lachlan CMA.

The DEWHA responded by phone to the mail contact described above (Jonathon Teasdale) and was informed that this assessment had determined that there would be no significant impact on NES matters and a referral to the Commonwealth under the EPBC Act would not be made (refer to Sections 4.2 and 5.3.4 for further detail).

No responses have yet been received from **mineral exploration licensees** but acknowledgement of the receipt of the correspondence and contact details for further correspondence has been received from one of the seven organisations contacted.

The APA group have also been contacted for their requirements regarding the off take at the Young gas hub. No response has yet been received.

All contact and responses have been taken into consideration in the preparation of this Environmental Assessment. Consultation with all relevant stakeholders will continue during pipeline design, construction, operation and maintenance.

5.13 Environmental Risk Analysis

5.13.1 Environmental Risk Assessment

The DGRs require *“an assessment of the hazards and risk impacts of the project, prepared generally consistent with the approach outlined in Hazardous Industry Planning Advisory Paper No. 6 (DoP, 1992) and Multi-level Risk Assessment (DUAP, 1997) and with specific reference to applicable Australian Standards (including AS2885 Pipelines – Gas and Liquid Petroleum – Operation and Maintenance). The Environmental Assessment shall specifically consider on-going maintenance and safety management of the project, including potential impacts on and from bushfires and floods.”*

A PHA (refer Volume 2: Technical Report 1) has been prepared to specifically address the requirements of SEPP 33, the Hazardous Industry Planning Advisory Paper No. 6 (DoP, 1992) and Multi-level Risk Assessment (DUAP, 1997) with respect to the risks to human health and safety and pipeline integrity. The risk assessment on the following pages addresses the environmental aspects, impacts and risks associated with the construction, operation and decommissioning of the proposed pipeline.

Risk assessment must meet the requirements prescribed in AS/NZS 4360 *Risk Management* and AS 2885 *Pipeline – gas and liquid petroleum*. The following risk assessment (Table 10) takes a qualitative approach to assess the initial risk associated with each aspect and the overall risk derived after implementation of recommended mitigation, management or monitoring measures. Risks are a function of the consequence (refer Table 7) and likelihood (refer Table 8) of each impact and are classified as low, medium, high or very high (refer Table 9).

Table 7. Consequence Scale

Severity Level	Consequence Type					
	Loss of Profit	Health and Safety	Natural Environment	Social/Cultural Heritage	Community/Gov./Reputation/Media	Legal
V	\$10M-\$100M	Multiple fatalities or significant irreversible effects to >50 persons	Very serious long term impact	Ongoing serious social issues and/or significant damage to cultural items or sites	Serious public outcry (overseas coverage)	Significant litigation and fines
IV	\$1M-\$10M	Single fatality or significant irreversible effects to one or more persons				Major breach of legislation
III	\$100,000-\$1M	Moderate irreversible effects to one or more persons	Serious medium term impact	Ongoing social issues and/or permanent damage to cultural items or sites	Significant adverse national attention	Serious breach of legislation requiring report to authority
II	\$10,000-\$100,000	Hospital stay required	Moderate, short term impact		Local media and community adverse attention	Minor breaches
I	<\$10,000	No medical treatment required	Minor or no impact	Minor social impact	Minor local adverse attention or complaints	

Source: derived from AS/NZS 4360

Table 8. Likelihood Scale

Level	Descriptor	Description	Indicative Frequency
A	Almost certain	Event occurs on an annual basis	Once a year or more
B	Likely	Event known to occur several times in a lifetime	Once every three years
C	Possible	Event might occur once or twice in a lifetime	Once every ten years
D	Unlikely	Event occurs somewhere from time to time	Once every thirty years
E	Rare	Heard of event happening somewhere else	Once every 100 years
F	Very rare	Have never heard of this happening	One in 1,000 years
G	Almost incredible	Theoretically possible but not expected to happen	One in 10,000 years

Source: derived from AS/NZS 4360

Table 9. Risk Matrix

Likelihood	Consequence				
	I	II	III	IV	V
A	Medium	High	High	Very High	Very High
B	Medium	Medium	High	High	Very High
C	Low	Medium	High	High	High
D	Low	Low	Medium	Medium	High
E	Low	Low	Medium	Medium	High
F	Low	Low	Low	Medium	Medium
G	Low	Low	Low	Medium	Medium

Source: derived from AS/NZS 4360

Table 10. Risk Assessment

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk		
			Severity	Frequency	Rank		Frequency	Severity	Rank
Land acquisition	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium
Survey	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium
Fencing	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium
Establishment of ancillary facilities	Use of vehicles Construction/ establishment of buildings	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off	I	B	Medium

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk			
			Severity	Frequency	Rank		Frequency	Severity	Rank	
						when not in use Regular maintenance of vehicles and machinery				
Traffic management	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	li	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium	
Clear grade and	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium	
	Vegetation clearing	Loss of habitat Loss of CO2 sequestration Disturbance of wildlife	II	A	High	Minimise RoW in vegetated areas Retain significant trees within the RoW wherever possible Reinstate vegetation as soon as practicable after construction complete Fauna spotters to be used when clearing	I	B	Medium	
	Exposure of topsoil	Waterway quality effects Air pollution	II	A	High	Install and maintain appropriate ESC Utilise appropriate dust suppression techniques Monitor water quality	I	B	Medium	
Stringing	Use of vehicles	Air pollution	II	A	High	Car pool wherever possible	I	B	Medium	

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk		
			Severity	Frequency	Rank		Frequency	Severity	Rank
	and/ or materials	Greenhouse gas emission Use of scarce resource				Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery			
Trenching	Disturbance of soil layers	Loss of soil structure Damage to soil organisms Damage to buried heritage items Exposure of contaminated soil	II	A	High	Geotechnical testing prior to construction Pre-clearing/ trenching heritage survey Soil testing where contamination suspected through landowner consultation or other advice Use of recognised trenching techniques	I	B	Medium
ESC	Damage to watercourse during installation	Sedimentation Disturbance of aquatic flora and fauna	II	A	High	Use of sensitive and appropriate crossing techniques Pre and post crossing monitoring	I	B	Medium
Pipe welding and coating	Use of welding material	Accidental fire	II	A	High	Use of appropriate welding techniques by qualified and experienced personnel	I	B	Medium
	Use of coating material	Pollution	II	A	High	Use of appropriate coating techniques by qualified and experienced personnel Implementation of adequate emergency procedures for spills	I	B	Medium
Pipe laying	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and	I	B	Medium

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk		
			Severity	Frequency	Rank		Frequency	Severity	Rank
		Use of scarce resource				machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery			
Backfilling, compacting and reinstatement	Use of vehicles and/or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium
	Lack of compaction	Loss of soil structure	II	A	High	Use of appropriate compaction techniques by qualified and experienced personnel	I	B	Medium
	Altered topography	Erosion	II	A	High	Use of appropriate reinstatement techniques by qualified and experienced personnel Revegetation as soon as practical after construction complete Installation and maintenance of appropriate ESC	I	B	Medium
Hydrostatic testing	Use of water	Overuse of local water supply	II	A	High	Sourcing of appropriate water supplies Reuse of test water along the pipeline length Reuse of water post testing wherever practicable	I	B	Medium
	Contaminated post test water	Pollution	II	A	High	Use of chemicals only where necessary Test water pre release to determine appropriate use	I	B	Medium

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk		
			Severity	Frequency	Rank		Frequency	Severity	Rank
Restoration	Failure of vegetative cover	Loss of habitat Landholder concerns Erosion and/ or sedimentation	II	A	High	Monitor restoration of RoW post reinstatement Maintain ESC until cover achieved Liaise with landholders re requirements Supplementary seeding/ planting etc. if required	I	B	Medium
Final cleanup	Residual waste/ construction material	Pollution	II	A	High	Collection and disposal of all waste to appropriate facility	I	B	Medium
	Failure of ESC or vegetative cover	Loss of habitat Landholder concerns Erosion and/ or sedimentation	II	A	High	Monitor restoration of RoW post reinstatement Maintain ESC until cover achieved Liaise with landholders re requirements Supplementary seeding/ planting etc. if required	I	B	Medium
Instrument calibration	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium
Performance testing	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and	I	B	Medium

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk			
			Severity	Frequency	Rank		Frequency	Severity	Rank	
						machinery				
Baseline run	Use of vehicles and/or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium	
Pipeline drying	Use of vehicles and/or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium	
Purging and loading	Use of water	Overuse of local water supply	II	A	High	Sourcing of appropriate water supplies Reuse of test water along the pipeline length Reuse of water post testing wherever practicable	I	B	Medium	
	Contaminated post test water	Pollution	II	A	High	Use of chemicals only where necessary Test water pre release to determine appropriate use	I	B	Medium	
	Release of gas	Pollution	II	A	High	Use of appropriate purging and loading techniques by qualified and experienced personnel Implementation of adequate emergency procedures for spills	I	B	Medium	

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk			
			Severity	Frequency	Rank		Frequency	Severity	Rank	
		Explosion and fire	III	A	High	Use of appropriate reinstatement techniques by qualified and experienced personnel Implementation of adequate emergency procedures	I	B	Medium	
Monitoring	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium	
Painting or lubricating	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource Pollution	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery Implementation of adequate emergency procedures	I	B	Medium	
PIG runs	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and	I	B	Medium	

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk			
			Severity	Frequency	Rank		Frequency	Severity	Rank	
						machinery				
Corrosion repair	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium	
Replacement of Pipeline Markers	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium	
Easement clearing and slashing	Use of vehicles and/ or materials	Air pollution Greenhouse gas emission Use of scarce resource	II	A	High	Car pool wherever possible Walk instead of drive when able Choose low emission vehicles and machinery Turn plant, machinery and vehicles off when not in use Regular maintenance of vehicles and machinery	I	B	Medium	
	Vegetation clearing	Loss of habitat Loss of CO2 sequestration Disturbance of wildlife	II	A	High	No planting over the easement Minimise clearing to what enables access Liaison with landowners	I	B	Medium	

Activity	Aspect	Impacts	Initial Risk*			Mitigation Measures	Overall Risk			
			Severity	Frequency	Rank		Frequency	Severity	Rank	
Suspension	Corrosion of pipe	Soil contamination Subsidence	II - III	C	Medium-High	Maintenance of corrosion prevention systems	I	B	Medium	
Abandonment	Corrosion of pipe	Soil contamination Subsidence	II	C	Medium	Monitoring of pipeline after abandonment	II	C	Medium	
Removal	Disturbance of soil and aboveground systems	Loss of habitat Disturbance to soil structure Erosion	II	A	High	Use of best practice techniques	II	A	High	

5.13.2 Residual Significant Environmental Impacts

The risk assessment in the preceding section (refer Table 10) has shown that potential environmental impacts from the construction, operation and decommissioning of the proposed pipeline can be reduced to medium after implementation of various management, mitigation and monitoring techniques. Risks due to the physical removal of the pipeline after decommissioning remain high; however it is not envisaged that this will be undertaken.

Risks deemed medium are considered “as low as reasonably practicable” (ALARP). Detailed and specific risk assessments (incorporating occupational health and safety, construction and environmental aspects) will be repeated as part of the design, construction, operation and decommissioning stages of the project.

The risk assessment has determined that there are no additional key issues relevant to the proposal.

6. Statement of Commitments

6.1 Overview

Section 75F(6) of the EP&A Act states that the *"Director-General may require the proponent to include in an environmental assessment a statement of the commitments the proponent is prepared to make for environmental management and mitigation measures on the site."*

Section 5 of this report has identified a number of potential impacts from the proposal and recommended various mitigation, management and/ or monitoring measures to address each impact. It is these recommendations that form the basis of this draft Statement of Commitments by the proponent.

It is anticipated that this draft Statement of Commitments will be reviewed following assessment and determination of this application for Part 3A approval and any additional requirements will be included as conditions of approval. The proponent, or any future contractors, partners, operators or owners of the proposed pipeline, are required to comply with conditions of approval.

The draft Statement of Commitments includes:

- The objective of each Commitment;
- The proposed timing of each Commitment; and
- Reference documents or the section of this report and other relevant documents that informs each Commitment.

6.2 Draft Statement of Commitments

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
<i>Strategic Planning and Project Justification</i>				
To ensure a strategic and justified use of the gas resource	SP1	Investigate possible connections along the pipeline route for individual or community users	Operation	Section 5.1
	SP2	Investigate potential connections to other gas pipeline networks in NSW and Australia	Operation	
<i>Land Use Planning</i>				
To minimise land use conflict between the pipeline and land owners/ users	LU1	Effective and inclusive negotiation of easement agreements to ensure all future uses and restrictions are known and agreed to	Pre-construction	Section 5.2
	LU2	Implement a thorough program of ongoing stakeholder consultation to identify any issues of concern	All	
	LU3	Work with landowners, management agencies and the community to resolve any identified conflict	All	
	LU4	Manage, via the CEMP, any environmental impacts that may negatively affect existing land uses	Construction	
	LU5	Ensure that the RoW is reinstated as soon as practicable after construction and in accordance with landowner requirements	Construction	

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
<i>Ecology</i>				
To minimise impacts on native flora and fauna	E1	Open cut construction across watercourses will be completed during dry periods where possible. Use of a reduced RoW construction width, specialist crews and techniques will also minimise time and disturbance	Construction	Section 5.3
	E2	All vegetation clearing will be supervised by a fauna spotter/catcher to prevent impacts on resident fauna	Construction	
	E3	Trenches to be closed as quickly as possible. Fauna ramps at a distance of no greater than 200 metres apart. The length of trench left open at any one time will be minimised wherever possible	Construction	
	E4	Fauna spotters/handlers will be present to inspect trenches at the start and finish of each day, with the task of removing any fauna from the trench and seeking treatment if any animals are injured	Construction	
	E5	Mature trees which may contain hollows, and isolated mature paddock trees will be retained within the RoW wherever possible. These will be located and flagged prior to construction	Construction	
	E6	Appropriate dust control measures to be employed during construction	Construction	
	E7	Appropriate noise and vibration control measures to be employed during construction	Construction	
To minimise impacts on waterways	E8	Preparation and implementation of a Sediment and Erosion Management Plan (SEMP) prior to, during and post construction of the pipeline. Detail will need to be provided on specific methodologies including, but not limited to managing erosion in watercourses requiring open cutting, heavily eroded watercourses requiring bank re-instatement and works on steep slopes	Pre-construction	
	E9	Stockpiling of soil to be completed in compliance with current best practice guidelines	Construction	
	E10	Works will not commence during periods of heavy rain	Construction	

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
	E11	Areas of bare soil following construction (other than cultivated croplands) will be sown with non-invasive grass seed to prevent erosion	Construction	
	To prevent the spread of weeds	E12	A Weed Management Plan (WMP) will be developed prior to, during, and after construction to minimise the potential for the spread of weed species. Implementation of the WMP will remain the responsibility of the Principal Contractor, and eventually the Pipeline Operator	
To encourage natural regeneration and undertake appropriate revegetation of the RoW	E13	Any dead timber or debris within the construction area will be stockpiled and re-scattered post construction	Construction	
	E14	Any vegetation requiring removal will be mulched and stockpiled to be re-spread over the works area post construction. Weedy vegetation will be removed from the site	Construction	
	E15	Liaison with property owners will be completed prior to works to discuss appropriate areas for revegetation where tree planting projects are disturbed	Pre-construction	
	E16	Regeneration of the RoW post construction to be monitored and seeding and/or enhancement planting undertaken if natural regeneration is not successful	Post-construction	
Heritage				
To minimise impacts on sites and objects of Aboriginal heritage values	H1	All identified Aboriginal sites to be avoided	Construction	Section 5.4
	H2	Further consultation to be undertaken with relevant stakeholders	Pre-construction/ construction	
	H3	Monitoring of the construction RoW to ensure site protection and identify any additional sites or objects where present	Construction	
	H4	Survey and impact assessment of land to which access was not granted prior to construction commencing	Pre-construction	

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
	H5	Contingency plans for unexpected events	Pre-construction/ construction	
To minimise impacts on sites and objects of non-Aboriginal heritage values	H6	Work to commence within 25 metres of heritage items if observed during construction and the relevant heritage specialist and government authority to be contacted	Construction	
Human Amenity				
To minimise impacts from noise and vibration	HA1	Regular contact with affected individuals during construction to provide progress updates and notify of any particularly noisy activities	Construction	Section 5.5
	HA2	Training of all staff on actions to minimise noise during work activities	Pre-construction	
	HA3	Noise and/ or vibration monitoring either in response to complaints or as part of a regular monitoring program	Construction	
	HA4	Scheduling of particularly noisy activities for less sensitive times of the day e.g. not early morning, late afternoon, or outside of standard work hours	Construction	
	HA5	Undertake condition surveys prior to commencement of construction where required	Pre-construction	
	HA6	Consider use of respite times, where no noisy activities are undertaken, if construction is located in one place for longer periods	Construction	
	HA7	Site noisy plant or machinery behind existing barriers such as earth mounds, vegetated screens etc.	Construction	
	HA8	Operate noisy machinery separately rather than concurrently	Construction	
	HA9	Maintain all plant and equipment regularly	Construction	

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
	HA10	Avoid excessive idling of machinery or vehicles and minimise reversing of vehicles (reduce use of or use substitutes for reversing beeper)	Construction	
	HA11	Locate access roads and ancillary facilities away from residences to minimise traffic noise	Construction	
	HA12	Restrict use of heavy vehicles on existing roads to standard work hours wherever possible	Construction	
	HA13	Use mufflers or quiet technology wherever possible	Construction	
	HA14	Construct noise enclosures or barriers for particularly noisy activities or plant where applicable	Construction	
	HA15	Consider temporary relocation or architectural treatments for particularly affected landowners	Construction	
	HA16	Discuss construction activities and impacts such as noise and vibration as early as practicable once the project commences with affected landowners	Pre-construction	
	HA17	Blasting, if required, will be undertaken in accordance with specific procedural guidelines and with reference to the Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC 1990)	Construction	

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
	HA18	If work is required within recommended buffers outside of standard work hours the following will be undertaken: • Tonal reversing alarms on vehicles and plant are removed; • Noisy plant is not used in the early morning period between 6-7am; • Rock breaking is not undertaken at night; • An audit of the noise emissions from the selected plant items once the detailed methodology is finalized is conducted and the assessment of buffer distances revised accordingly; • Agreements are negotiated with landowners within the buffers to conduct noisy works outside the standard construction hours with the trade off being that the duration of exposure will be decreased; and • A detailed, real-time complaints handling system is implemented with the commitment to investigated noise levels and stop work if required when complaints are received.	Construction	
To minimise impacts on air quality	HA18	Air quality monitoring near sensitive receptors either in response to complaints or as part of a regular monitoring program	Construction	
	HA19	Regular watering of the RoW and any relevant stockpiles	Construction	
	HA20	Road sweeping of dust accumulating on sealed roads	Construction	
	HA21	Disturbed areas to be revegetated and/ or stabilised as soon as possible after construction complete	Construction	
	HA22	Clearing, grading and excavating to be avoided wherever possible in windy conditions i.e. when wind speeds over 40 km/h are experienced or predicted	Construction	
	HA23	Speed limits to be imposed for all traffic on the RoW and access roads	Construction	

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
	HA24	Grids and/ or wheel wash facilities at RoW and ancillary facility exits	Construction	
	HA25	All loose material loads eg sand, mulch, spoil etc., to be covered	Construction	
	HA26	Vehicles and machinery to be regularly maintained and cleaned	Construction	
	HA27	Reduce vehicle and machinery idling and revving	Construction	
	HA28	Vehicles and machinery to be fitted or purchased with emission reduction technology wherever possible	Construction	
	HA29	Encourage car pooling by employees to work and to site	Construction	
To minimise impacts on visual amenity	HA30	The RoW to be reinstated and revegetated as soon as practicable after completion of construction	Construction	
	HA31	The RoW and ancillary facilities to be kept orderly and clean at all times	Construction	
	HA32	Final cleanup to ensure all rubbish, construction materials, flagging tape etc. is removed from the easement	Construction	
<i>Socio-economic Impacts</i>				
To minimise impacts on the socio-economic environment of the locality	SE1	Local and regional publicity regarding construction timeframes and works	Construction	Section 5.6
	SE2	Fair compensation to landowners for easements	Pre-construction	
	SE3	Negotiation with landowners regarding access to private property	Pre-construction	
	SE4	Provision of local employment opportunities and purchase of local materials wherever possible	Construction	
<i>Hazards and Risks</i>				

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
To identify and manage all risks associated with construction, operation and decommissioning of the pipeline	HR1	A FHA to be prepared prior to construction to further define the risks and management required once detailed pipeline design is finalised	Pre-construction	Section 5.7
To minimise risk to public safety	HR2	Restrict access to construction areas	Construction	
	HR3	Effective communication to landowners and the general public regarding potential safety issues	Construction	
	HR4	Adequate management of increased traffic	Construction	
	HR5	Easement agreements to address any safety issues and requirements	Pre-construction	

Surface and Ground Water

To minimise impacts on waterways	W1	Site specific assessments to be undertaken of each of the six significant waterway crossings prior to construction. The assessments to consider a range of relevant issues (refer Section 5.8.1). Following assessment, detailed designs and procedures to be prepared for each waterway crossing (or type) in accordance with all relevant policies, guidelines and legislation	Pre-construction	Section 5.8
	W2	Hydro-test water will not be discharged directly to natural water bodies	Construction	
	W3	The quality of hydro-test water will be determined prior to its disposal and if appropriate the discarded water will be supplied for beneficial use in consultation with landowners. Water quality will be tested against the ANZECC Guidelines. Where water is not suitable for beneficial use it will be disposed of to land typically through a settling basin with erosion control. This will be determined in consultation with landowners	Construction	
	W4	No vehicle access over waterways during pipeline operation	Operation	

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
To minimise impacts on groundwater	W5	Where significant groundwater hosted by a permeable lithology is encountered, i.e. a discharging spring, the trench immediately downslope from the discharge zone should be backfilled and sealed using bentonite or equivalent to prevent change in the groundwater flow	Construction	
	W6	Areas of unconsolidated sediment found during trenching should be directionally drilled from points outside the unconsolidated unit to avoid disturbance of groundwater systems potentially present	Construction	
	W7	The trench to be filled with material matching the porosity/permeability of the unit found in the section of trench. Ideally this material would be the spoil from the trenching operations in the affected section. If the trenched materials are layered (topsoil, subsoil, clays, gravels) efforts should be made to replace the different materials back in the trench in their original order	Construction	
To ensure access to an adequate and equitable supply of water for construction	W8	Ongoing liaison to be undertaken with relevant agencies regarding access to water supplies	Pre-construction/ construction	
Infrastructure				
To minimise impacts on existing infrastructure	I1	All infrastructure crossings buried and above ground will be surveyed and located during detailed route survey and design	Pre-construction/ construction	Section 5.9
	I2	Prior to construction all buried services will be physically located by pot holing or by controlled excavation	Pre-construction/ construction	
Traffic and Transport				

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
To minimise impacts on traffic and transport networks in the locality	T1	A Traffic Management Plan will be prepared prior to work commencing. This plan will provide all personnel involved in management and construction of the pipeline with systems and procedures for managing traffic including: • Traffic route selection • Hours of operation • Scheduling movements of oversized vehicles, including specialised heavy machinery and pipes, to avoid peak times • Reinstatement of excavated road surfaces and road shoulders • Management of noise impacts and complaints • Safe work practices	Pre-construction	Section 5.10
To reduce impacts from increased traffic and transport as a result of the project.	T2	Construction noise and vibration management measures, where relevant, to be employed to minimise impacts from traffic noise (see commitments HA1-HA17 above)	Construction	
	T3	Publicity in local communities will increase local driver awareness of construction and the temporary increase in vehicle movements	Construction	
Waste and Hazardous Materials				
To ensure all waste material is managed appropriately	WH1	All waste to be classified as per the Waste Classification Guidelines (DECCW 2009) and managed in accordance with the general principles for management of each class (refer Section 5.11.3)	Construction	Section 5.11
To minimise the risk of pollution	WH2	The CEMP will outline specific procedures and the emergency response for spills of any liquid or hazardous wastes	Pre-construction/ construction	
Community and Stakeholder Consultation				
To ensure effective and ongoing consultation over the life of the project	CC1	Community and Stakeholder Consultation Plan to be prepared prior to construction. The Plan to be implemented before and during construction	Pre-construction/ construction	Section 5.12
Ancillary Facilities				

Objective	Ref. No.	Commitment	Project Stage	Section Reference/s
To minimise environmental and social impacts from construction of temporary ancillary facilities	AF1	Temporary ancillary facilities will be established, maintained and decommissioned in accordance with approval requirements, landowner requests, cultural heritage issues and environmental conditions	Pre-construction	Section 2.4.1
<i>Route Realignment</i>				
To minimise environmental and social impacts from any required route realignments	RR1	If realignment of the route is required outside of the corridor assessed for this application, appropriate investigation, assessment and management of any cultural heritage, ecological, landowner or construction issues will be undertaken	Pre-construction	Section 2.3.2

7. Project Justification and Conclusion

7.1 Summary of Project Benefits and Impacts

The proposed pipeline is needed to supply a cost effective and more secure supply of adequate gas to the Wellington power station. The Alectown to Wellington gas supply pipeline proposed in the power station application is not sufficient to enable future expansion of the power station.

The proposed pipeline will enable the supply of gas to the Wellington power station to meet local increasing demand for energy and to facilitate industry and other development opportunities in the region.

Impacts will be almost entirely confined to the construction period. Impacts will result from operation of heavy machinery involved in excavation, pipe laying and backfilling.

The development is consistent with the requirements of all environmental planning instruments and with the principles of ecologically sustainable development.

Prior to determination the Director-General must prepare a report under Section 75I of the Act. To inform that report this EA has addressed:

- (a) the Director-General's requirements for environmental assessment;
- (b) the environmental impact of the project;
- (c) the public interest; and
- (d) the suitability of the site.

7.2 Suitability of the Site

The proposed pipeline is the result of thorough investigation of all relevant factors including:

- Biodiversity and biophysical factors
- Indigenous and non-indigenous heritage
- Consultation with affected landowners
- Construction requirements

Subject to appropriate management and mitigation measures, the proposal will have no adverse environmental, social or economic impacts. It is entirely consistent with the Objects of the EP& A Act.

7.3 The Public Interest

Provision of a reliable gas supply to the approved Wellington gas power station is in the public interest. No matters have arisen, with regard to the environmental, economic or social aspects of the proposal, that are contrary to the public interest.

7.4 Conclusion

The project as proposed is justified on economic, social and environmental grounds. It is in the public interest that it proceeds.

Detailed assessment indicates that the potential for adverse impacts can be minimised or mitigated through a range of construction methods.

Approval of the proposal is warranted, subject to conditions which reflect a reasonable need for additional assessment prior to construction and for appropriate mitigation and management measures during construction.

8. Certification

Submission of Environmental Assessment prepared under Part 3A of the NSW Environmental Planning and Assessment Act 1979

Environmental Assessment prepared by:	
Name:	Lisa King
Qualifications:	Bachelor of Applied Science (Environmental Science) Graduate Diploma in Urban and Regional Planning
Address:	LandPartners Limited 2A Carrington Street Lismore NSW 2480 PO Box 1134 Lismore NSW 2480
	Level 3, 99 Melbourne Street South Brisbane QLD 4101 PO Box 3916 South Brisbane BC QLD 4101
In respect of:	
Project:	Young to Wellington Gas Pipeline
Project Application No.:	09_0143
Applicant name:	ERM Power Pty. Ltd.
Contact:	Larry Kramer
Phone:	(07) 3020 5109
Address:	PO Box 7152 Riverside Centre Brisbane QLD 4000
Land to be developed:	The pipeline route, corridor and ancillary facilities from Young to Wellington as described in this report and indicated on the map series in Appendix C.
Proposed development:	Construction of a high pressure underground gas pipeline from the Young gas hub centre to the Wellington power station.
Environmental Assessment:	The attached Environmental Assessment addresses all matters contained in Director-General's specifications for the development, in accordance with Part 3A of the <i>NSW Environmental Planning and Assessment Act, 1979</i> .
Certification:	I certify that I have prepared the contents of this Environmental Assessment in accordance with the Director-General's Requirements dated 22 July 2009 and that, to the best of my knowledge, the information contained in the Environmental Assessment is not false or misleading.
Signature:	
Name:	Lisa King
Date:	19 May 2010

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10. Glossary

Term/ Abbreviation	Definition
AADT	Annual average daily traffic
ABS	Australian Bureau of Statistics
AHD	Australian height datum
AHIMS	Aboriginal heritage information management system
ANZECC	Australian and New Zealand Environment and Conservation Council
ARI	Average recurrence interval
ARTC	Australian Rail Track Corporation
AS	Australian Standard
Biodiversity	The biological diversity of life, which is commonly regarded as comprising the following three components: - genetic diversity – the variety of genes (or units of heredity) in any population - species diversity – the variety of species - ecosystem diversity – the variety of communities or ecosystems
Bioregion	A bioregion defined in a national system of bioregionalisation. For this study this is the NSW South-western Slopes Bioregion as defined in the <i>Interim Biogeographic Regionalisation for Australia</i> (Thackway and Cresswell 1995).
BoM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
CH ₄	Methane
CO	Carbon monoxide
CO ₂	Carbon dioxide
CSIRO	Commonwealth Scientific and Industrial Research Organisation
dB	Decibel
dB(A)	A-weighted decibel
DEC	NSW Department of Environment and Conservation. Superseded by DECC, but acknowledged as author of publications under the name of the Department at the time of publication
DECC	NSW Department of Environment and Climate Change. Superseded by DECCW, but acknowledged as author of publications under the name of the Department at the time of publication
DECCW	NSW Department of Environment, Climate Change and Water
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
DGRs	Director-General's Requirements (for Environmental Assessment)
DoP	NSW Department of Planning
DPI	NSW Department of Primary Industries, with branches that administer agriculture, fisheries, pollution control, minerals and petroleum

Term/ Abbreviation	Definition
DSRD	NSW Department of State and Regional Development
EEC	Endangered Ecological Community
EP&A Act	NSW <i>Environmental Planning and Assessment Act, 1979</i>
EP&A Regulation	NSW <i>Environmental Planning and Assessment Regulation, 2000</i>
EPA	The former NSW Environment Protection Authority, now a branch of the DPI
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act, 1999</i>
EPBC Regulations	Commonwealth <i>Environmental Protection and Biodiversity Conservation Regulations, 2000</i>
ERM Power	The proponent
ESD	Ecologically sustainable development
FHA	Final Hazard Analysis
GIS	Geographic information systems
GPS	Global positioning systems
kL	Kilolitre
km	Kilometre; a measure of length equivalent to 1,000 metres
km ²	Square kilometres
kV	Kilovolt; A measure of electric potential difference equivalent to one thousand volts
kVA	Kilovolt-amps
kW	kilowatt
L _{Aeq}	Equivalent noise level (average)
L _{A1}	Noise level 1% of the time
L _{A10}	Noise level 10% of the time
L _{A90}	A weighted sound pressure level exceeded for 90% of the time (background)
MW	Megawatt; A measure of power equivalent to one million watts
MWh	Megawatt-hour. A measure of power equivalent to 1,000 kilowatt-hours
NEPM	National Environment Protection Measure
NES matters	Matters of National Environmental Significance under the Commonwealth <i>Environmental Protection and Biodiversity Conservation Act, 1999</i>
N ₂ O	Nitrous oxide
NO	Nitrogen monoxide
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxide
NPWS	NSW National Parks and Wildlife Service, superseded by DECCW but acknowledged as author of publications under the name of the Department at the time of publication
NSW	New South Wales
O ₃	Ozone
PB	Parsons Brinckerhoff
PCV	Pressure control valve
PHA	Preliminary Hazard Analysis
Pipeline inlet facility	Also referred to as the 'compressor station'
PIG	Pipeline Inspection Gauge

Term/ Abbreviation	Definition
PJ	Petajoules
POEO Act	NSW <i>Protection of the Environment Operations Act, 1997</i>
ppm	Parts per million
PRCI	Pipeline Research Council International
RNE	Register of the National Estate
RTA	NSW Roads and Traffic Authority
SCADA	Supervisory, control and data acquisition (system)
SEPP	State Environmental Planning Policy
Subject site	The area to be directly impacted by the construction and/or operation of the pipeline; a 20-30 metre wide corridor.
Study area (Ecology)	The subject site and an additional area of investigation around the study site that could potentially be affected by the proposal indirectly. For assessment purposes this was taken to be a corridor 50 metres either side of the nominal pipeline location.
TMP	Traffic Management Plan
TSC Act	NSW <i>Threatened Species Conservation Act, 1995</i>
µg/m ³	Micrograms per cubic metre